CONTEXTUALISING MATERNAL MORBIDITY THROUGH MATERNAL HEALTH AUDITS

Aborigo, Raymond Akawire, BA, MPH

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Global Public Health

Jeffrey Cheah School of Medicine and Health Sciences

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Abstract

Introduction: Recent efforts towards data collection on maternal health have focused on women who survived a life-threatening maternal morbidity (near miss). This has been based on the assumption that the causes of near misses are similar to those that lead to mortality. The work on near misses has shed significant light on challenges within health facilities. However, this focus overlooks critical insights that could be gained from an analysis of health systems more broadly defined to include the critical role played by major actors in communities.

Methods: This research used a multi-method and grounded theory approach to obtain local explanations of the concept of life-threatening maternal complications and tested that understanding in a population survey in the Kassena-Nankana Districts of northern Ghana. A qualitative study with traditional healers and traditional birth attendants provided a comprehensive explanation of what communities might view as a life-threatening maternal complication. These explanations were used to screen pregnant women within the community to determine how well the explanations fit with women experiences of life-threatening maternal complications. Women who qualified as having survived a life-threatening maternal complication were administered a semi-structured audit tool to assess the underlying factors to maternal complications. Using focus groups and in-depth interviews, the study explored the relevance of sharing the audit results with community leaders in order to enlist their support in addressing challenges that women face during pregnancy.

Results: The study findings revealed that communities have an understanding of what constitutes a life-threatening maternal condition and traditional healers play a key role in the management of these complications. They defined a "life-threatening maternal complication" as any health condition related to pregnancy that increased a woman's risk of dying. Using this definition in a population survey produced a prevalence of life-threatening maternal complications of 19.8%. An audit with women who had complications showed that not all women with life-threatening maternal complications access care at health facilities. Delays in recognising danger signs during pregnancy, delays in making the decision to seek care, delays in arriving at an appropriate place of care and delays in receiving treatment were reported by respondents. Community leaders expressed interest in pooling resources for their collective benefits but feared such an initiative would be limited by poverty, lack of trust, corruption and the reciprocity of benefits.

Conclusions: The results show the feasibility of conducting a community audit on life-threatening maternal complications and the need to pursue an agenda to integrate traditional healers within the health system. A maternal morbidity audit model that integrates community engagement in the audit process is likely to get community leaders to think about interventions that need not directly address a specific cause but may nonetheless mitigate a pathway of causes.

Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

Publications during enrolment

Publications derived from thesis

1. **Aborigo RA**, Allotey P, Reidpath D. Contextualizing Maternal Morbidity through Community Case Reviews. Journal of Women's Health Care. 2013;02. doi:10.4172/2167-0420.1000e112

2. **Aborigo RA**, Allotey P, Reidpath DD. The traditional healer in obstetric care: A persistent wasted opportunity in maternal health. Social Science & Medicine. 2015;133: 59–66. doi:10.1016/j.socscimed.2015.03.046

Publications related to thesis (Appendix 1)

1. **Aborigo RA**, Allotey P, Tindana P, Azongo D, Debpuur C. Cultural imperatives and the ethics of verbal autopsies in rural Ghana. Glob Health Action. 2013;6: 18570.

2. **Aborigo R**, Moyer C, Gupta M, Adongo P, John W, Abraham H, et al. Obstetric danger signs and factors affecting health seeking behaviour among the Kassena-Nankani of Northern Ghana: A qualitative study. African Journal of Reproductive health. 2014a;18: 66.

3. **Aborigo RA**, Moyer CA, Rominski S, Adongo P, Williams J, Logonia G, et al. Infant nutrition in the first seven days of life in rural northern Ghana. BMC Pregnancy Childbirth. 2012;12. doi:10.1186/1471-2393-12-76

4. Moyer CA, **Aborigo RA**, Logonia G, Affah G, Rominski S, Adongo PB, et al. Clean delivery practices in rural northern Ghana: A qualitative study of community and provider knowledge, attitudes, and beliefs systems. BMC Pregnancy and Childbirth. 2012;12. doi:10.1186/1471-2393-12-50

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Conference presentations

1. **Aborigo Raymond**, Allotey Pascale, Reidpath Daniel; The traditional healer: a persistent wasted opportunity in maternal health, *African Social Research Initiative at the University of Michigan, USA*. Oral presentation

2. **Aborigo Raymond,** Allotey Pascale, Reidpath Daniel; Making pregnancies safer in the Kassena-Nankana District of Northern Ghana: The role of men. *INDEPTH Network scientific conference at the University of Witwatersrand, Johannesburg, South Africa* Poster presentation

Appendix two contains a list of publications during the candidature period which are not related to the thesis

Thesis including published works

Declaration for thesis partially based on conjointly published or unpublished work

In accordance with Monash University Doctorate Regulation 17.2 Doctor of Philosophy and Research Master's regulations the following declarations are made:

I hereby declare that this thesis contains no material which has been accepted for the award of any other degree or diploma at any university or equivalent institution and that, to the best of my knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

This thesis includes **TWO** original papers published in peer reviewed journals. The core theme of the thesis is to demonstrate how audit of life-threatening maternal complications within the community can contribute to our understanding of maternal morbidities. The ideas, development and writing up of all the papers in the thesis were my principal responsibility as a PhD scholar, working within the **Global Public Health Unit** under the supervision of **Professor Pascale Allotey** and **Professor Daniel Reidpath**.

The inclusion of co-authors reflects the fact that the work came from active collaboration between researchers and acknowledges input into team-based research.

In the case of Chapter One and Section Two A of Chapter Six, my contribution to the work involved the following:

Thesis chapter	Publication title	Publication status*	Nature and extent of candidate's contribution
One	Contextualizing Maternal Morbidity through Community Case Reviews	Published	I conceived the idea and wrote the initial draft. 50% contribution
Six	The traditional healer in obstetric care: a persistent wasted opportunity in maternal health	Published	I conceived the idea and wrote the initial draft 50% contribution

I have renumbered sections of submitted or published papers in order to generate a consistent presentation within the thesis.

Student signature: [redacted] **……** **Date: 17th May 2016**

Main Supervisor signature:… [redacted] **..** **Date: 17th May 2016**

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The inputs of my examiners have helped to hone the focus of my work as well as my overall learning as part of the PhD learning process. I am grateful to them.

My candidature was made possible by a scholarship from Monash University, Malaysia.

Dedication

This thesis is dedicated to all women in the Kassena-Nankana Districts especially the two women in my life – my mother Mary Abapa and my wife Ramona Patience Abugabe. I also dedicate it to my son Richard Winsonne Aborigo.

List of Abbreviations

Abbreviation	Meaning
KND	Kassena-Nankana District
WHO	World Health Organisation
FGD	Focus Group Discussion
IDI	In-depth Interview
NHRC	Navrongo Health Research Centre
NHDSS	Navrongo Health and Demographic Surveillance System
ICD	International Classification of Diseases
VA	Verbal Autopsies
CKI	Community Key Informants
TBA	Traditional Birth Attendant
CHO	Community Health Officer
CEMD	Confidential Enquiry into Maternal Deaths
CBCR	Community-based Case Review
MDG	Millennium Development Goal
MMR	Maternal Mortality Ratio
CHPS	Community-based Health Planning Services
DHS	Demographic and Health Survey
CHAG	Christian Health Association of Ghana
DHMT	District Health Management Team
NHRCIRB	Navrongo Health Research Centre Institutional Review Board

List of Local Terminologies

Local terminology	Meaning in English
Vuru (Kasem)	Soothsayer
Bunga dundurun (Nankani)	Jaundice
Nyeene (Kasem) *Naaba (Nankani)*	Placenta
Sooru (Kasem)	Ritual for expelling blood from the womb and protection against evil spirits
Bisitoo (Nankani) *Yili-kweo* (Kasem)	Bitter breast milk
*Puure-nyoone (*Kasem) *Wobi-biisa* (Nankani)	Traditional cleansing to purify breast milk
Namunu (Kasem	haemorrhoids
Chapia (Kasem)	breast disease
Waafo (Nankani)	A cultural syndrome caused by seeing a python during pregnancy
Kunkwa (Kasem)	overnight remains of a burnt traditional meal made from millet
Bengto (Nankani)	Ground bean leaf
Pu-gara (Kasem)	Breech presentation
D*a'geru* (Kasem)	A piece of wood located at a crossed road
Na-yuu (Kasem)	The roof of a traditional house built with mud
Pua (Nankani) *Paa (Kasem)*	Malaria
Gwalla (Kasem)	Umbilical cord
Pumasigo(Nankani)	Stomach wound
Waafo(Nankani)	Vagina fistula
Puponu (Kasem)	A rope made from straw
Chi-banu (Kasem)	Poultry droppings
Buga (Kasem)	River
chuchuru-bia (Kasem)	Spirits
Chuchuru (Kasem)	Spirit child
Wan'ne (Nankani)	Calabash
Buruma (Nankani)	The by-product of shea-butter
To'ro (Nankani)	The fruit of the baobab tree
Digeru (Kasem)	Dirt (infidelity)
Tiga-soro (Kasem)	Leafy-okra
Sana vooru (Kasem)	Tamarind leaves
Puga-chogem (Kasem)	Abortion
Kalamim (Kasem)	A grinding stone
Changao (Kasem)	Lemon grass
Pu-pwora (Kasem)	Miscarriage
Saponga (Nankani)	A tree located at a cross road
Tou-zaafi (Hausa)	A traditional meal made from millet
Fifiu-lora (Kasem)	Preterm delivery
Wo-gnom (Kasem) *Pu-norigo (Nankani)*	Ulceration of the womb

Wo-kalamin (Kasem)	Clotted blood in the womb
Di-liri (Kasem)	Traditional medicine used to treat cultural syndromes associated with the python
Adoge-ku (Nankani)	Put an end to child birth
Adoge-yalege (Nankani)	Spacing child birth
Adoge-make (Nankani)	Enough child birth
Bakana (Kasem)	A man who exhibits female behaviours
Kaana-kadong (Kasem)	A man who rivals with women

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Declaration for Thesis Chapter One

Declaration by candidate

Chapter **One** covers the background for mortality and morbidity audits and justifies the need for morbidity audits within the community. The editorial was peer reviewed and published in the Journal of Women's Health Care. My contribution was as follows:

Nature of contribution	**Extent of contribution (%)**
I conceived the idea and wrote the initial draft	50%

The following co-authors contributed to the work. If co-authors are students at Monash University, the extent of their contribution in percentage terms must be stated:

Name	**Nature of contribution**	**Extent of contribution (%) for student co-authors only**
Pascale Allotey	Critically reviewed the paper and approved the final draft	
Daniel Reidpath	Critically reviewed the paper and approved the final draft	

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the candidate's and co-authors' contributions to this work*.

Candidate's Signature	[redacted]	**Date: 17/05/2016**

Main Supervisor's Signature	[redacted]	**Date: 17/05/2016**

*Note: Where the responsible author is not the candidate's main supervisor, the main supervisor should consult with the responsible author to agree on the respective contributions of the authors.

1 Chapter One

Introduction

This chapter tracks efforts that have been made over the years to reduce pregnancy-related disabilities and mortality globally. The chapter also explains the initiatives that have been made in order to monitor progress made as well as identify gaps in the methods that require attention from both health authorities and communities. The chapter concludes by justifying why health systems need to audit maternal morbidities within the community.

An editorial by the student researcher that was peer reviewed and published in the Journal of Women's Health Care, partly informed the content of this chapter. The editorial has been attached below.

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Women's Health Care

Editorial Open Access

Contextualizing Maternal Morbidity through Community Case Reviews

Raymond A. Aborigo[1,2]*, Pascale Allotey[1], and Daniel Reidpath[1]

[1]*School of Medicine and Health Sciences, MONASH University, Sunway Campus, Malaysia*
[2]*Navrongo Health Research Centre, Ghana*

Introduction

For every maternal death, thirty women who survive childbirth suffer from poor reproductive health and serious pregnancy related illnesses or disabilities [1]. Due to these unacceptable mortality and morbidity levels, efforts have been made since the late 1980s to improve maternal health and reduce maternal mortality. This has been one of the key concerns of several international conferences and summits including the Alma Ata conference and the Millennium Summit in 2000. Millennium Development Goal 5 target A, seeks to improve maternal health by reducing by three quarters the 1990 Maternal Mortality Ratios and increasing the proportion of births attended to by skilled birth attendants [2].

Mortality Reviews

One of the critical initiatives towards achieving the targets in MDG 5 is the accurate monitoring of maternal mortality in order to track progress towards achieving the goal. In the developing world, monitoring of progress towards MDG 5 has been a major challenge due to porous vital registration systems [3]. To help bridge the data gap, a call was made for health systems to institute maternal health audits to improve notification of deaths and to assess health facility preparedness to handle maternal complications [4]. In response to the call, both maternal mortality and morbidity audit systems are currently being set up as part of routine management of health facilities. At the community level, auditing has been limited to mortalities using the verbal autopsy approach where relatives of the deceased are interviewed about the circumstances surrounding the death to help in the cause of death determination [5]. This determination is made using the ICD codes which only provide the medical or biological cause of death. Meanwhile, following the widespread adoption of the "Three Delays" model [6] and the recognition of the role that social and behavioral factors contribute to maternal mortality in the Sixth report of the United Kingdom Confidential Enquiry into maternal and child health [7], WHO recommended that the verbal autopsy approach be extended for the investigation of personal, family or community factors that may contribute to maternal deaths [4]. This procedure has been termed differently; Community-based Case Reviews (CBCR), extended verbal autopsy, social autopsy and the study of avoidable factors. Eventhough this proliferation of terms without an agreed nomenclature limits the value of science; it nevertheless underscores the relevance of the social context in monitoring maternal health.

Morbidity Reviews

In addition to auditing mortalities at the community level, it has been suggested that audits be extended to severe obstetric morbidities at the community level [8]. Pathways to survival through severe maternal complications have not been adequately explored at the community level. Yet data from survivors of severe maternal complications have the potential to offer critical insights into the pathways to complications and subsequent survival. Such data, obtained from individual accounts of the medical and socio-cultural experiences of the woman that contributed to the complication, makes the audit process more reliable than that obtained from relatives of the deceased in the case of verbal autopsies.

According to the WHO, there is no universally applicable definition for severe acute maternal morbidities or "near misses" but the world body stresses the importance of the appropriateness of any definition to the setting [4]. A "near miss" death has often been defined using medical conditions, usually an organ dysfunction suffered by the woman during the pregnancy, childbirth or the puerperium which is considered to be potentially "life-threatening" [9]. Thus, most studies on near miss audits have centered on health facilities with the aim of improving quality of care at that level.

As most maternal complications occur during labour, in settings where a significant proportion of deliveries occur outside health facilities, most complications will start at the community level and those that choose to seek care at the health facility are likely to arrive in critical conditions. In making the decision to seek care, community members consider the severity of the illness and the culturally appropriate place to seek treatment. Communities have perceptions of what constitutes a 'life-threatening" condition in pregnancy which may not necessarily conform to the medical definition but ultimately influence their health seeking behaviour. Indeed, there are traditional health practitioners who manage "life-threatening" conditions at the community level and are preferred for the treatment of some maternal complications to orthodox practitioners. The current reliance on health facilities solely for identifying "near misses" may therefore be misleading.

The Way Forward

To address the ongoing dire status of maternal mortality in low income countries, the WHO has recommended approaches for generating data that help understand why maternal mortalities and morbidities happen and how they can be averted [4].

These data serve a number of purposes:

1. To monitor the extent of maternal deaths and progress being made (vital registrations, verbal autopsies and hospital records).
2. To explore the health system based causes of maternal morbidity and mortality and identify points of intervention (confidential and facility audits).
24. To explore the social determinants that contributes to maternal deaths (community-based case reviews).

Conspicuously missing in these approaches is the exploration of biomedical and social factors that predispose women to severe

***Corresponding author:** Raymond A. Aborigo, Navrongo Health Research Centre, Ghana, [redacted]

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maternal morbidities at the community level. A thin line exists between severe maternal morbidity and maternal mortality and the causes of these phenomena can be described as similar. Building on the existing methods of data collection, it is crucial to extend our understanding of causes of maternal morbidity by exploring the concept of near misses as they occur within the community.

Consequently, we propose a method similar to the verbal autopsy approach in which both biomedical and socio-cultural causes of severe morbidities at the community level will be obtained. Since maternal morbidities are more frequent than maternal mortalities, this could contribute critical data towards maternal health interventions. Additionally, data will be collected from the victim herself and supplemented by carers during the morbidity incident. In settings where health systems are already overburdened, feedbacks of findings from the community morbidity review could stimulate a community response to initiate community level maternal health interventions.

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1.1 Background of maternal mortality and morbidity audits

Introduction

The aim of Millennium Development Goal 5 (MDG5) was to improve maternal health by reducing by two thirds the 1990 levels of maternal mortality by the year 2015 [1]. Most of the causes of maternal deaths are preventable. In reporting progress over the last 20 years (1990-2011), Lorenzo et al. (2011) suggest a reduction in the number of maternal deaths to 273,500 deaths annually [2]. More recently, Kassebaum et al., (2014) reported 292,982 maternal deaths for 2013 [3]. Global data however mask regional differences and country specific progress. For instance, about 99% of all maternal deaths occur in low-income countries [4] and progress in Africa has been slower than other regions. Countries such as Botswana, Cameroon, Congo, Lesotho, Chad and Zimbabwe have made no gains [5] since 1990 and others such as South Africa have doubled their MMR within the period [6,7]. According to WHO estimates, Ghana has an MMR of 350 /100,000 live births [5].

One of the critical initiatives towards achieving MDG5 is the accurate monitoring of maternal mortality and morbidity in order to advocate for resources for policy attention and to track progress towards achieving the goal [8–10]. Timely and reliable information on maternal deaths is necessary in order to achieve the goal. However, in low-income countries, reliable data on deaths has been a major challenge [11,12]. Data on maternal deaths pose additional challenges because the event is rare and attribution of the death to pregnancy can be challenging. This raises critical issues on how maternal deaths are defined. On the contrary, data on maternal morbidity is relatively more common. For every maternal death, about 20 to 30 women who survive child birth suffer from poor reproductive health and severe maternal morbidities [13,14].

1.1.1 Maternal mortality audits

In low income countries, monitoring progress towards MDG 5 has been a major challenge due to porous vital registration systems (Bullough et al., 2005; Mills, 2011). A call was therefore made for health systems to institute maternal mortality audits to improve notification of deaths as well as ascertain the causes of death [15,16]. Essentially, maternal death audit (MDA) describes three tools used to study the causes and characteristics of maternal deaths [17]. These are confidential

enquiry into maternal deaths (CEMD), facility-based death reviews and community-based death reviews (also called verbal autopsy)[16,18–21]. Confidential enquiries and facility-based death reviews audit deaths that occur within health facilities while the verbal autopsy tool audits deaths that occur both outside health facility settings. The tools have helped identify the direct medical causes of death which are listed as haemorrhage, sepsis, eclampsia, obstructed labour and unsafe abortions [22]. These conditions however do not explain the cultural and behavioural factors that contribute to death. Therefore, since the early 1990s, there has been a push for the establishment of maternal audit tools that specifically identify the health system and community factors that contribute to mortalities [15,16].

The sixth report of the United Kingdom confidential enquiry into maternal and child health acknowledged the contribution of health systems as well as social and behavioural factors to maternal mortality [23]. In 1994, Thaddeus and Maine introduced the "three delays" model to document both community and health facility factors that contribute to maternal mortalities [24]. Consequently, in 2004, the WHO recommended that the verbal autopsy approach be further extended for the investigation of personal, family or community factors that may contribute to maternal deaths [16]. D'Ambruoso et al., (2010) explored this method in a recent study in Burkina Faso and Indonesia and called it an 'extended verbal autopsy' [25]. Other studies that have used a similar tool have called it 'social autopsy' [26,27]. Yet others have chosen to call it a study of 'avoidable factors' [28]. This proliferation of terms without an agreed nomenclature however limits the use of these tools to provide consistent comparative data.

Social autopsy which is the term most widely used, refers to an interview process aimed at identifying social, behavioural, and health system contributors to maternal and child deaths regardless of where they occur [27]. It complements the traditional verbal autopsy procedure which aims at determining the medical cause of death. It is based on the assumption that each maternal death has a story to tell about the pathway that led to mortality and thus provides practical ways of reducing mortality [15,29]. Other purposes of social autopsies include providing population-level data for developing more effective strategies for delivering maternal and child health care interventions. It also contributes to increasing awareness of maternal and child death as preventable problems in order to empower communities to participate and engage

in health programmes to increase their responsiveness and accountability [27]. Despite this relevance of social autopsy in maternal health, researchers are yet to reach an agreement on the core data set to be gathered using social autopsies as well as the standardised formats and methods for accomplishing them [27][1].

Generally, mortality audits highlight life-threatening maternal morbidities in the pathway to death. However, some cases with similar life-threatening morbidities (near misses) survive and an examination and analysis of these cases further illuminate not only the causes but also ways in which deaths can be averted.

1.1.2 Maternal morbidity audits

The concept of a "near miss" is important for exploring both maternal morbidity and mortality. Several definitions have been proposed [30–32]. In 2007, the WHO established a technical working group to develop a standard definition and uniform identification criteria for maternal near misses. The group targeted the identification of morbidity cases which present with features of organ dysfunction in health care facilities [33]. However, while this is conceptually important, the current discourse restricts the usefulness of “near miss” to only clinical settings where only a proportion of births and life-threatening morbidities occur.

The survival pathways of near misses have not been adequately explored and there are proposals to audit near misses within communities [27,34–36]. Arguments against this proposal include the likelihood of identifying cases that do not fit the medical definition of near misses and therefore unlikely to identify avoidable factors for severe morbidity [16]. Also, because of disagreements between women's recall of childbirth experience and medically diagnosed complications, auditing cases within the community will not be feasible (44,48,49).

However, a community audit of near misses is aimed at identifying social, behavioural, and health system contributors to maternal near misses and not just the clinical cause of the morbidity. The arguments also suggest the need for a uniform identification criteria in order to

[1] A WHO working group on social autopsy of which I am a member, recently met in Geneva (9-12 July 2013) to decide on the core content of the social autopsy tool and no agreement could be reached by the group.

facilitate country comparisons. This is useful but will require health systems to set a lower bar on specificity to enable countries with weak health systems to utilise the criteria. This is because the level at which a maternal morbidity becomes life-threatening is specific to the context of the woman's general state of health, the sources of care available to her [16] and the resources at her disposal [39].

1.1.3 The critical gap in assessing maternal morbidity

It is evident for most researchers in global public health, particularly from the social sciences that clinical data are generally inaccessible for the purposes of research and not always accurate or reliable in low-income settings such as Ghana. The importance of finding non-clinical, community relevant ways of addressing maternal morbidity is because community perceptions of life-threatening maternal complications and their causes vary between settings and knowing the different perspectives is necessary in understanding health seeking behaviours for maternal complications [40]. Attempts have been made to involve traditional birth attendants (TBAs) in the recognition of maternal morbidities to enhance referrals. However, a more detailed exploration of local knowledge of life-threatening maternal complications could assist in the development of resources that would enable the involvement of the broader community in addressing maternal complications.

One of the strategies for attaining MDG 5 is to ensure that all pregnant women access skilled care during illness and at child birth [41]. However, not all women are able to access such care due to contextual factors. A community audit of life-threatening maternal complications could therefore facilitate the identification of individual, family, community and health system factors that influence the use of alternate providers to manage maternal complications and thereby offer insights into the use of alternate care by women who fail to use skilled care. A further advantage in reviewing maternal complications within the community is the potential to identify and engage players in the family and the community to improve maternal health. Traditionally, attention has been focused on cause-effect models of maternal mortality and morbidity which usually excludes community engagement in thinking about interventions that need not directly address a specific cause but may nonetheless mitigate a pathway of causes. An exploration of local explanations for life-threatening maternal complications would help in the identification of cases and investigating

both the biomedical and socio-cultural factors that led to the morbidities as well as assess the quality of care that they received from various providers along the health seeking pathway.

2 Chapter Two

2.1 Literature review

Introduction

High maternal mortality was a feature of most countries from the mid-19th century. From about 1937, maternal mortality rates began to decline everywhere, and within 20 years, the country differences had almost disappeared [42–44]. The decline in maternal mortality rates was so dramatic that current rates for high-income countries are between one-fortieth and one-fiftieth of the rates that prevailed 60 years ago [45].The decline was attributed to the availability of data to monitor and inform on maternal health interventions [46]. In the late 1940s, which were the early years of the National Health Service, the British Ministry of Health introduced the system of confidential enquiries into the recording of maternal deaths, and every maternal death was subject to an intense but confidential enquiry [46]. It is impossible to know what would have happened without this system of continuous audit, but the reports give the impression that they identified the factors that could avert maternal deaths and informed greatly on interventions [45].

The first step in reducing maternal mortality is to identify problems through the inexpensive use of audits [47]. Audits may be used to discover sub-optimal care at national, regional and community levels for which recommendations for policy and advocacy may be formed [48]. Hearing the story behind a woman's death or maternal complication, allows care providers, health-care administrators, policy makers and public health officials to delve deeper into circumstances and identify strengths and weaknesses of the health care system [35].

Data on maternal mortality is necessary for a wider range of purposes at the local, national and international levels. The data is needed to, among other things, monitor and evaluate the effectiveness of activities designed to reduce maternal mortality and to monitor progress towards international development targets [49]. As a result, most health services have adopted the process of auditing maternal mortality and morbidity in order to gather information on the extent of the medical, contributory and underlying causes of maternal morbidities and mortalities [48,50].

2.1.1 Historical perspectives in measuring maternal mortality

The history of measuring maternal mortality goes back over three centuries [44]. It evolved with civil registrations and moved from being primarily a means of ensuring legal transfer of inheritance rights at death to being used for statistical purposes [51]. As maternal mortality is a rare event, multiple mechanisms had to be developed to ensure accurate reflection of the events and to provide data for maternal health programs [49].

A WHO report published in the 1980s highlighted not only the high rate of maternal deaths but also the poor sources of data [52]. For instance, demographic and health surveys were not sensitive or frequent enough to provide an accurate measure of maternal mortality [49]. The situation is however gradually improving with some reflecting a wider development in information-gathering in low-income countries [53].

2.1.2 Challenges in identifying maternal mortalities

Maternal mortality has been defined by the ICD-10 as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes" [54].

Women die at home, on the way to seek care and in health facilities. They die before, during and after delivery, as well as in early pregnancy from complications of abortion and ectopic pregnancy [16]. To accurately categorise a death as maternal, information is needed on the cause of death as well as pregnancy status or the time of death in relation to the pregnancy. This information may be missing, misclassified or under-reported even in industrialised countries with fully functioning vital registration systems [55]. The wider group of deaths to which pregnancy-related events belong are those to women of reproductive age which do not have a universal definition. The reproductive age has been defined differently in different countries. The commonly used definitions include women who are 15-44 years or 15-49 years. In settings where early age at first birth is common, it is regarded as those aged 10-44years or 10 to 49 years [49,56]. Wider reproductive age ranges (10-50) have been reported in some studies [56] and this generally would make country comparisons tedious.

Audits are conducted on maternal deaths that have been identified from health facilities and the community. Maternal deaths are identified from routine health facility information systems while those from the community are identified through vital registration systems and population surveys.

2.1.3 Identifying maternal mortalities in health facilities

Maternal deaths are identified in health facilities through health facility information systems which are "a set of components and procedures organised with the objective of generating information which will improve healthcare management decisions at all levels of the health system" [57]. Maternal deaths are usually identified from health facility registers such as ward admissions, discharge registers, delivery room logs, and operating theatre and mortuary records. Other sources of information that may be available are informal records such as physician notes, that are usually kept by health professionals [16,58,59]. Some studies have supplemented hospital records with interviews with carers [60] which can be tedious depending on the size and record-keeping procedures of the facility.

Health facility estimates are continuously updated and in principle, can ascertain maternal deaths because the deaths are medically certified. Health information systems could therefore be a good starting point for audits and case reviews to evaluate quality of care. However, there are serious limitations to the data that is obtained in health facilities especially in low-income countries. Where a good proportion of deaths occur at home, the reliance on facility records underestimates deaths and therefore not representative of the general population [58,60]. For instance, a study on maternal audits in Tigray reported 34 maternal deaths for the year 2004/2005 and only 14 of these deaths occurred in the health facility [58]. Even within health facilities, maternal deaths that occur outside obstetric wards especially those occurring in early pregnancy and those from indirect causes are often missed. This has been compounded by misclassification of deaths and wrong recording which leads to biased estimates [58,61,62].

Furthermore, poorly trained staff and the lack of standards for maintaining health records have contributed to under reporting of maternal deaths [58,60,63]. A study reported that during emergency situations, record keeping is usually given the least attention because providers prioritise patient care over record keeping [58]. However, detailed medical records for every

patient are important in order to provide proper care and monitor progress. In settings where records for severe cases are not completed, it could pose serious challenges to audit teams.

Despite these disadvantages, maternal deaths from health information systems are of major value where most deaths occur in health facilities [60]. In low-income settings, concerns about missing deaths [61,62], delays in compiling and analysing the data and problems with linking maternal outcomes can be overcome with computerisation of the systems, training of data entry clerks and harmonisation of data sources.

Two audit tools identify cases from health facility records. These are facility-based maternal death reviews and confidential enquiries into maternal deaths.

2.1.4 Facility-based maternal death review

A facility-based maternal death review is a "qualitative, in-depth investigation of the causes of, and circumstances surrounding, maternal deaths which occur in health care facilities" [17]. It traces the path of the women who died through the health care system and within the facility, to identify any avoidable or remediable factors which could be changed to improve maternal care [16]. The process is simple and is already part of quality of care improvement efforts in many health facilities [64]. The reviews may be conducted at a single health facility or periodically across several facilities as part of a district or regional assessment [59]. A multidisciplinary team is often used to review each case of maternal death. Discussions usually include how different teams interact in the care-giving process and how procedures can be improved for the benefit of future patients [16].

One critical concern with facility-based audits is that of confidentiality and upholding the "no name, no blame" principle [46,50]. Practical implementation of the concept showed that it is difficult to uphold. For instance, a study reported that during audit discussions, the health staff involved sometimes react defensively and try to justify all actions and inactions despite the fact that the moderator reiterated the principle before each session [63]. This is a common phenomenon in facility-based reviews because the aim is usually to identify faults in the maternal care process in order to make improvements. Health staff may not want their inefficiencies to be

discussed publicly and the fear of victimisation and punishment often lead to such defensive attitudes.

Also, implementing audit recommendations has come with some challenges. The major challenges include the lack of resources or lack of commitment by the individuals responsible to implement the recommendations [63]. Meanwhile, there is evidence that audit is likely to be effective when baseline adherence to recommended practice is adhered to [65,66].

In places where maternal mortality is of greatest concern, only a small proportion of deaths occur in health facilities [58]. Facility-based case reviews can therefore only give a picture of the causes of maternal mortality for a limited population. The pattern of causes of maternal deaths at home and those for health facilities are different and therefore results of facility-based reviews need to be supplemented by data from the community [16].

2.1.5 Confidential enquiries

Confidential enquiries date back to the 1920s in the United Kingdom (UK), when other health indicators such as infant mortality were improving and health care professionals and women's advocacy groups became concerned about the apparent lack of similar improvements in levels of maternal mortality [16]. Consequently, in 1928, local health professionals started a system of maternal death case reviews [44]. These were done on a small scale and often included a detailed review of adverse events. As commitment to the process improved, these small-scale reviews evolved and by 1935, a wider area health authority-based system of confidential inquiry was established. Recommendations from this system have been credited for the significant reduction in the maternal mortality ratio in the ensuing years [67–69].

In commenting on the impact of the findings of confidential enquiries, Sir George Godber, a past Chief Medical Officer for England, stated, "All this procedure had been intended to do was to secure improvements by the local review of cases, but it was soon apparent that avoidable factors were too often present in antenatal care for the opportunity for central remediable action to be ignored."[70]. This led to the decision to undertake a national confidential enquiry for England and Wales in 1952, which was extended to cover the United Kingdom in 1985 and is a system which is still running, and improving maternal health care, 50 years later [71,72]. The tool has

subsequently been adopted by Egypt [73], Malaysia [74] and South Africa [75]. While Egypt and Malaysia have been able to reduce their maternal mortality ratios over the past few decades, the ratio in South Africa has actually doubled casting a doubt on the effectiveness of the use of confidential enquiries in that setting.

In confidential enquiries, an anonymous multidisciplinary in-depth assessment is conducted on the causes and circumstances surrounding maternal deaths which occur in health facility settings [46]. The focus is confined to specific clinical issues and barriers to care or be all-encompassing by further examining the circumstances in the community or family that may have contributed to the woman's death [76]. Depending on local priorities, each enquiry may have different objectives and so there is no set template for conducting it [16].

In common with other tools for auditing maternal deaths, the primary purpose of confidential enquiries into maternal deaths is to learn lessons in order to save lives and to reduce the burden of severe maternal morbidity [46]. Confidential enquiries are not designed to count the number of maternal deaths for statistical purposes or for calculating maternal mortality ratios (MMR), although this may be an additional useful consequence if national coverage is complete. Instead, they provide evidence of where the main problems in overcoming maternal mortality lie and an analysis of what can be done in practical terms [77]. The tool also highlights key areas requiring recommendations for health sector and community action as well as guidelines for improving clinical outcomes [16].

The tool is however only appropriate for settings where maternal deaths are low with an organised health care system and established professional associations which are largely deficient in low-income countries [78]. It requires a functioning statistical infrastructure and competent and dedicated health professionals both of which are lacking in low-income settings.

Unlike facility-based case reviews which are owned by the health facilities which conduct the review, confidential enquiries involve many facilities and are owned at a level that the results and recommendations can affect policy and have a far wider impact on maternal health. Their

ownership by the various health care groups involved leads to professional clinical guideline development, dissemination, implementation and audit [16].

Another difference is that although the data are initially collected in a confidential manner at the local level, it is then anonymised before collation and assessment by an independent multidisciplinary group of health professionals [46]. This means that the name of the woman who died, the health care workers who cared for her and the institution in which she died cannot be identified. This enables those who cared for the woman to have the confidence to provide an unbiased and frank account of the actual circumstances and any deficiencies surrounding her death without any fear of punitive action [63]. Thus, a more realistic picture of the precise events and any avoidable or remediable factors in the care she received can be obtained [16,46].

2.1.6 Identifying maternal mortalities in the community

The need to track all deaths occurring outside health facilities is absolutely critical to ensuring the completeness and quality of mortality data. Maternal deaths can be tracked in the community through passive or active surveillance systems.

Passive approaches are where deaths are already collected by an existing vital registration system and maternal deaths extracted from the records of the system. The population reports all deaths that occur to a centralised system that allows for the extraction of specific deaths from the database. This is a typical feature of vital registration systems.

2.1.7 Vital registration systems

Statistics on births and deaths in a country are generally available through vital registries. Vital registration is a system by which countries maintain a continuous and complete record of births, deaths and the marital status of their populations [79]. The ideal starting point for estimating maternal mortality is through these registrations. However, in most low-income countries, vital registrations are weak and provide incomplete information [80]. Identification of deaths is passive and laws and infrastructure to make it compulsory are non-existent. In most low-income countries, there is generally a reluctance to report deaths either due to cultural restrictions or ignorance of the benefits [81].

Information in vital registers, regardless of their completeness, provide little usable data on causes of death [82]. Also, data on preventable causes that can be used to make improvements within the health system and communities to reduce maternal deaths are not recorded [60]. It is therefore necessary to look to other sources of data for information that would inform maternal morbidity and mortality interventions.

Active identification is where the enumeration process involves literally moving into populations through population surveys, census or surveillance systems. This approach tracks deaths and with appropriate attention to the size and coverage of data, can yield more complete and representative estimates and patterns of maternal mortality. Active identification can be further divided on the basis of whether the death is in the respondent's own household such as verbal autopsies or among their sisters such as the direct and indirect sisterhood methods [49,55]. All active methods demand considerable financial resources and personnel to visit all households and record all maternal deaths [83].

2.1.8 The indirect sisterhood method

The indirect sisterhood method was developed to derive population-based estimates of maternal mortality and to overcome the problem of large sample sizes and thus reduce cost [84]. The method uses the proportion of adult sisters dying during pregnancy, childbirth or the puerperium reported by adults during a census or a survey to derive a variety of indicators for maternal mortality. Four simple questions are asked about the number of sisters who were ever married, the number of ever-married sisters who are alive, the number of ever-married sisters who are dead, and the number of dead sisters who died while pregnant or during childbirth or during the six weeks after the end of pregnancy [84].

Reports from the indirect sisterhood method cover deaths occurring over a long interval. The results generate an overall estimate of maternal mortality for a point centred around 10 – 12 years before the survey. In so far as maternal mortality changes very slowly, and given that the method was designed to be used in settings where there are no alternative means of generating estimates, a retrospective estimate was not felt to be an overwhelming drawback by those who developed it [84]. Several assumptions were considered in developing the method. The initial assumption was that sisters keep in touch with one another, and that fertility in survey settings is high and so the

sample size would be amplified. A further assumption was that women would on average, have more than one sister to report on [84].

Dependence on these assumptions makes the method inappropriate for settings where fertility is low and where major migration has occurred [85]. Also, while the method is relatively simple and inexpensive to use, a major disadvantage is that the estimates reflect averages of the MMR over a period of more than 10 years before the survey [86]. It also means that health systems have to wait for very long periods to know whether interventions are working or not.

Despite these disadvantages, the method may still be the best available for low-income countries which need maternal mortality estimates to monitor progress and plan interventions but do not have the resources to invest in more robust methods of data collection [85].

2.1.9 The direct sisterhood method

Rutenberg and Sullivan (1991) proposed a direct sisterhood method, based on a detailed sibling history obtained from each respondent [87]. The sibling history includes the name and sex of each child born to the respondent's mother, together with the current age for living siblings or for dead siblings, age at death and number of years since death. To identify maternal deaths, reports of the death of a sister or sisters of reproductive age trigger additional questions about the timing of death relative to pregnancy [87].

This approach has been widely used by the Demographic and Health Surveys (DHS). They are able to calculate estimates for a defined time period because individual information is obtained about each sister, although for surveys covering samples of 10 000 households or fewer, the time periods need to be long; typically 7 years or more, to avoid very large confidence intervals around the estimates [55].

The direct sisterhood method relies on fewer assumptions, require larger sample sizes, and the information is more complex to gather and analyse than the indirect method. Apart from that, the method has the same disadvantages as the indirect method [87].

Essentially, both methods measure pregnancy-related deaths rather than maternal deaths as strictly defined [55]. Neither of them is effective in detecting early pregnancy-related deaths because they are based on knowledge of the pregnancy status of the dead sister which is something that may not be known by the responding sibling [85]. Also, the methods do not elicit the cause of death which is critical for maternal interventions. The methods have wide margins of error and so cannot give precise maternal mortality ratios [60,88].

Both methods have a community focus but that focus is limited to counting deaths and does not elicit the medical and remedial factors that contribute to maternal deaths at that level. Also, the long interval between surveys makes the method inappropriate for maternal mortality audits.

Despite the concerns raised against the sisterhood methods, they remain an invaluable tool for policy-makers and health planners who require a baseline estimate of maternal mortality. In low-income countries where resources do not permit the use of more robust methods, the sisterhood method could be used to measure maternal mortality for advocacy purposes [85].

2.1.10 Verbal Autopsies (VAs)

Verbal autopsy (VA) is an indirect method of ascertaining biomedical causes of death from the deceased's care takers on symptoms, signs and circumstances preceding death [89]. The VA tool was traditionally designed for assessing the cause of child mortality and was only used in adults for maternal deaths [90]. Currently, the tool has been widely received and extended to cover all deaths. Cause of death determination ranges from expert physician decision with the ICD-10 as a guide to the use of mathematical algorithms [91–93].

Initially, VA was strictly seen as a method to ascertain the magnitude and the medical causes of maternal deaths based on an interview with caretakers [94]. Over time, however, the need to obtain information on non-medical factors that may contribute to maternal deaths was acknowledged [16]. Currently, VAs are used more widely to provide information on both medical and non-medical causes of death [25–27]. This additional focus is a WHO

recommendation for auditing maternal mortalities that occur at home. WHO calls it community-based case reviews [16][2].

Community-based case review

This is "a method of finding out the medical causes of death and ascertaining the personal, family or community factors that may have contributed to the death in women who died outside of a medical facility" [16].

This definition restricts the application of the tool to auditing only maternal deaths that occur outside the health facility. However, some experts have suggested a community-based maternal audit should include all maternal deaths in the community regardless of place of death [95]. The relevance of this lies in the fact that physician death certification relies solely on proximal causes of death to the neglect of community factors that may have contributed to death. Community level investigations elucidate underlying causes of death and provide insights into limitations in both the health system and the traditional ways of doing things in the community [96]. Extending community audits to all maternal deaths regardless of where they occur will provide critical information in shaping maternal health interventions. A community-based approach is required to make the process effective. Such an approach demands that the community in which the death occurred should be fully involved in identifying maternal deaths as well as participate in discussing the problems and finding solutions for them [95].

Community-based case reviews uses the "Three delays model" [24] to develop a case review tool to investigate social and behavioural causal chains linking the household, community and the health system in the care seeking process [27]. However, beginning the investigation of social and behavioural factors from the point of care seeking will miss antecedent factors to the illness. Issues that affected the management of the pregnancy such as family planning, antenatal care, cultural norms and taboos will be missed in such investigations. An expansion of the review tool to include events preceding the illness will be necessary in fully documenting the underlying causes of mortalities.

[2] I was involved in a verbal autopsy study during the period of my candidature and the full publication can be found in appendix 1

In adapting the VA tool in this thesis, issues related to identification of life-threatening maternal complications within the community, selection of appropriate interviewers and respondents and the lag between the incident of illness and the date of interview in order to reduce recall bias, required critical considerations. Consequently, the ensuing discussion focuses on these issues as they relate to auditing maternal mortalities within the community. Lessons drawn from these discussions would inform the design and implementation of the proposed audit of life-threatening maternal complications within the community.

Identification of deaths

In settings with poor vital registration systems, data on deaths are obtained from community key informants (CKIs) such as the community health volunteer, community leaders and traditional birth attendants [16]. These individuals keep basic records of all births and deaths that occur within their communities. VA interviewers receive notifications from CKIs and contact family members of the deceased to conduct the VA interview.

2.1.10.1Interviewers

Interviewers in verbal autopsies range from medical professionals (medical officers, nurses, medical assistants) to people with secondary education. Some experts believe that medically trained interviewers more accurately determine signs and symptoms experienced by the deceased from VA interviews than lay interviewers [97–99]. Others however believe that medical knowledge may bias the results towards certain causes of death familiar to the interviewer [90]. Several studies suggest that well-trained lay people can obtain accurate information when using culturally and linguistically appropriate questionnaires [90,100,101].

The use of many interviewers is reported to be operationally convenient but it is believed that some produce unhelpful diversity in the results, without each interviewer gaining adequate experience in the VA procedure [97]. Generally, it is accepted that interviewers can come from the same ethnic group as the respondents and ideally, from the same village because words that designate diseases or symptoms may vary from place to place[100,102]. However, it has been argued that in many settings in which VA is used, it may be impossible to find interviewers with high levels of education who can administer elaborate questionnaires [103]. There are also

concerns that local recruitment may raise ethical concerns regarding confidentiality and ensuring adequate informed consent [104–106].

2.1.10.2 Respondents

A relative who had taken care of the deceased during the illness leading to death is usually identified as the respondent and some research have reported 100% response rates [100,104,107]. This process is not standard practice as some studies report interviewing friends or neighbours if a caretaker was not available [89]. Male respondents provide more detailed information than female respondents but wives pay more attention to the health of males than vice versa (78,79). A study showed that the accuracy of the verbal autopsy tool improves if the respondents took care of the deceased during the final illness [108]. Generally, cultural and societal factors influence the quality of the data collected and this must be taken into account when choosing the most appropriate respondent [81,109].

2.1.10.3 Recall

The trauma of death may influence recollection of symptoms and feelings of guilt during mourning may distort accounts of events preceding death [110]. A wide range of recall periods from the time of death is used in verbal autopsies. Some perform verbal autopsies as soon as possible, while others do so after a minimum of four weeks to allow an adequate mourning period [107,111–113]. The maximum recall period varies between studies and ranges from six months to an indefinite period of time. A long recall period is likely to impair a respondent's ability to recollect and report relevant information [89]. However, inadequate time for mourning may cause distress and influence a respondent's willingness and ability to engage in a verbal autopsy interview [97]. A recall period ranging from 1 to 5 years is generally thought to be acceptable [16,109,112]. Some studies have however suggested that recall does not affect reporting of an event as tragic as the loss of life and that longer recall is as reliable as shorter intervals [103,114].

However, as much time as possible should be allowed between death and interview [110] and definition of minimum as well as maximum period from death to interview is important [90,97]. The differences in the recall period may influence the validity of the verbal autopsy tool, and thus

affect comparison of verbal autopsy data across sites [89]. Further research is recommended to help define the acceptable recall period.

Investigations into progress made in improving maternal health have long used maternal deaths as the starting point. Deaths are the most extreme adverse events in pregnancy and reviewing the circumstances leading to a maternal death highlights not only areas of clinical relevance, but also avoidable or remediable health sector, community and public health factors [34,115–117]. While maternal deaths are rare, life-threatening maternal complications are common [118–121]. Women who survive maternal complications can give us insights into the pathways to their complications and survival [27,36,40,72]. Investigating this category of women is increasingly becoming part of quality improvement strategies within the modern health care system, particularly in high-income countries. In low-income countries, the modern health care system is either less involved in deliveries, or involved only when complications have already arisen [122,123]. When complications occur, it triggers a health seeking process that includes traditional health care and improvements in maternal health would require an additional focus on the traditional health care system.

2.1.11 Challenges with morbidity audits

In order to measure and monitor complete maternal health, it is necessary to identify and audit maternal morbidities. There are however challenges in identifying maternal morbidities. There are inconsistencies regarding the time frame within which a condition must occur to be considered a maternal morbidity especially around pre-pregnancy and the postpartum period [124]. Some definitions consider morbidities that occurred within 42 days after giving birth, others include maternal problems up to 24 weeks postpartum and some studies even examine maternal morbidities occurring anytime within the whole year after pregnancy [125,126]. The arguments are divided on either to keep the 42 days' time frame to be consistent with the maternal mortality definition or modify the time to include conditions as long as they can be linked to the pregnancy [124].

Also, the severity of the maternal morbidity has been a source of confusion for researchers. The morbidity continuum includes normal pregnancies, non-life-threatening pregnancies, potentially life-threatening complications, life-threatening maternal complications and then near misses

[127]. All the levels of morbidity are worth investigating but there are suggestions that a clear distinction between the different levels of severity would be a useful guide for health workers to objectively identify and report [124].

It is worth noting that the concerns surrounding the time frame and the severity of maternal morbidities guided the WHO Maternal Morbidity Working Group in arriving at a definition for maternal morbidity and its associated disability as “any health condition attributed to and/or complicating pregnancy and childbirth that has a negative impact on the woman’s wellbeing and /or functioning” [128]. The lack of clarity in the definition with regards to the timing and severity of the morbidity confirms the challenges involved in investigating maternal morbidities. The situation is even more complex in trying to investigate morbidities within the community. Yet, community-based studies conducted in various countries have reported that women within communities suffer significant morbidity both during pregnancy and in the postnatal period [121,129–131]. Currently, only the level of severity that involves near misses has been integrated into health systems as an audit method for determining lapses in providing care to women in order to improve the quality of care for women with complications.

Research shows that women who survive life-threatening complications in pregnancy, childbirth, postpartum, and post abortion periods are difficult to define in the same way as maternal deaths [132]. Studies have defined near misses differently based on their context. A study in South Africa defined a near miss as "a very ill woman who would have died had it not been that luck and good care was on her side"[116]. The element of luck is based on the recognition that women survive severe complications in the absence of modern medical care [16], suggesting the existence of alternate health care providers for managing maternal complications that in the view of the health system, could only be managed in health facilities.

The management definition which is commonly used refers to all pregnancy-related complications that are admitted to intensive care regardless of the medical reason [133–135]. Admission to intensive care is a common criterion for near miss audits in western countries [116,117,132] but this varies between countries and health facilities [136]. Consequently, some country studies which have used the definition have reported underestimation of near misses. For

example, a study in Scotland reported that only 28% of near misses were admitted to the intensive care unit [137]. The situation is worse in low-income countries where intensive care facilities are either scarce or non-existent [132]. A near miss study in Indonesia reported that only 4.1% of near miss cases were admitted to the intensive care unit [122]. Using the management definition may therefore lead to underestimation of near misses both in high and low-income countries.

A proposed clinical criterion defines a "near miss" as "a patient with an acute organ system dysfunction, which if not treated appropriately, could result in death" [116]. This definition was based on the concept that there is a sequence of events leading from good health to death - from clinical symptoms to a systemic inflammatory response syndrome, organ dysfunction or failure and finally death [72].

This definition relies on clinical diagnoses which also introduces variability [34]. For instance, not all women with eclampsia nearly die and not all women with an ectopic pregnancy are critically ill. Applicability also depends on the availability of good clinical and laboratory records, which may not be available everywhere [122]. More recently, a WHO working group has adopted the organ dysfunction criteria based on arguments that it is more reproducible across countries and institutions and can establish summary estimates for near miss prevalence which could serve as a measure of maternal health and a quality of care indicator [122,138]. Following this definition, conventional maternal morbidity research has been conducted within a biomedical perspective [35]. The scope of near miss audit teams has therefore been limited to care they provide within hospital walls. However, accumulated evidence suggests that not all near misses arrive at a health facility and majority of those who arrive there do so in critical conditions in low-income countries [122,123,139].Therefore, understanding the reasons why women survive outside the modern health care system and examining the reasons why those who use health facilities arrive there in a critical state is crucial in the elimination of remedial factors to severe obstetric complications and deaths.

Research evidence indicates that social, political, cultural, economic, and gender inequality play a significant role in women's health around the world [35]. Thaddeus and Maine's (1994) "Three

Delays Model", recognised community as well as health facility factors that contribute to near miss and maternal deaths [24]. However, several years after the model was developed, a meta-analysis by Gil-Gonzalez et al. (2006) revealed that political and cultural factors affecting maternal mortality are still grossly ignored in research [140].

Currently, many more studies are beginning to use the "Three Delays Model" to investigate the barriers that affect access to emergency obstetric care. The most frequent barriers that have been reported for the first delay include women and family not recognising the severity of the symptoms or lacked information to act [116,132,141], lack of birth preparedness or plans for action in case of emergency [142,143], women's lack of decision making power and the influence of family members regarding decisions around prenatal care and place of delivery [116], women having to wait for the spouse to get permission to go to the hospital [132] and perceptions that hospital care would be inadequate or of poor quality [144].

Although the model is useful in contributing data towards reducing barriers to care, researchers may have to expand the scope of their tools to include antecedent factors that could have contributed to the morbidity state. These will include family planning, antenatal care, skilled attendant at delivery and so on. Evidence shows that a third of pregnant women in low-income countries do not receive health care during pregnancy, 60% of child births take place outside health facilities, and only about 60% of all child births have a skilled attendant [145]. This trend has been associated with high maternal mortality statistics in such settings. Exploring these factors in near misses could therefore provide more information on the socio-cultural factors that predispose women to maternal complications.

Implications

In the search for causes of maternal deaths at the community level, health systems have not looked at near misses in which obstetric emergencies did not result in death but could have done so under slightly different circumstances. Near miss studies have usually based the identification of cases from health facilities. However, "near miss" cases do not necessarily end up at the health facility if it is not recognised as such in the community [39]. This has implications for the woman as well as community and lay understanding of potential risks. A local understanding of the

concept of life-threatening maternal complications is important in appreciating health seeking and for planning interventions. As advocated at Alma Ata, involving communities in this endeavour is key in achieving the desired success [146].

2.1.12 Involving communities in morbidity audits

Involvement of communities in health interventions is one of the principles of primary health care that was adopted in 1978 at Alma Ata by member states of the WHO [146]. It was based on the idea that communities have a crucial role to play in health improvements and that their full involvement is critical to eventual community self-reliance. Since then, several studies have demonstrated the effectiveness of community participation in health interventions [147–151]. For maternal health interventions, evidence shows that communities have the ability to disseminate information regarding danger signs in pregnancy as well as pool funds to transport women to health facilities or pay for the expenses that women incur when they use these facilities [152]. In view of this evidence, a maternal audit system that builds on the existing methods with emphasis on community participation at different levels may present a good potential for community initiatives towards improving maternal health.

In 1987, the World Health Organisation launched the safe motherhood initiative (SMI). The purpose of the initiative was to ensure that all women receive a minimum basic standard of care needed to be safe and healthy throughout pregnancy and childbirth [153]. SMI programs were designed to increase the prevalence of contraceptive use, increase the number of births attended by a skilled birth attendant, improve access to emergency obstetric care and improve the monitoring of maternal morbidity and mortality. The initiative was welcomed by low-income countries because it had the potential to address their significant maternal mortality burdens [4]. The guidelines established through SMI are the basis of the standard of obstetric care within health systems around the world [154].

By 1992 it had become clear that the effectiveness of SMI, particularly in low income settings, was limited, largely as a result of poor access and utilisation [155]. Extant traditional medical systems in low income countries in Africa and Asia remained the first line service of choice, particularly for rural communities [156]. SMI programs however, had failed to adequately acknowledge the importance of the role played by traditional birth attendants (TBAs). The WHO

therefore advocated for the integration, where appropriate, of TBAs in the primary health care system [155]. This began a program that saw the training of TBAs to improve their skills for the management of normal births and the recognition of potentially high risk cases that required referrals for emergency management in health facilities.

The strategy formally recognised the importance of pluralism of health care systems for traditional societies and to some extent, the recognition has persisted through more recent 'task-shifting' strategies [157]. However, the approach has been restricted to a shallow pool of practitioners and to a narrow field of practice [158]. Recent evidence suggests that for some maternal complications, including those that might be regarded as life-threatening, a broader range of practitioners known as traditional healers are consulted within the traditional health system [159,160]. These practitioners are not in the formal category of 'TBA' but are often the preferred care provider in pregnancy complications, even when there is access to obstetric care [160]. Without a clear understanding of the range of practitioners involved in pregnancy and its complications, and the nature of their practices, maternal health services will continue to only scratch the surface in the management of maternal complications.

2.1.13 Reflections from the literature review

Tools for monitoring maternal mortality and morbidity have evolved overtime with those that focus on the identification of cases at both health facilities and within the community being the most preferred. Significant strives have been made in the identification of maternal deaths and in the quality of data collected. Data for maternal deaths are drawn from both health facilities as in the case of facility deaths and from the community as in the case of the direct and indirect sisterhood methods. Beyond the numbers, health systems have devised tools for auditing all maternal deaths that occur in order to help improve maternal health care practices and reduce maternal mortality. Again, these tools have evolved from focusing solely on deaths that occur within health facilities as in the case of facility death reviews to include those that occur at home as in the case of community-based case reviews. In low-income countries where most deaths occur outside health facilities, such a methodological development has been useful in improving coverage of maternal deaths and in informing the design and implementation of maternal health interventions both within health facilities and in the community.

The development of tools for monitoring maternal morbidity has not experienced a similar evolution partly because they are relatively new. The methods are still heavily focused on health facilities with none on the community. In learning about the pathways to survival for women who survive severe maternal complications commonly known as 'near misses', the tools have focused solely on health facilities with the narrow view that audits aim at improving quality of care and cases can only be identified within health facilities. However, due to some contextual factors, not all women with life-threatening maternal complications seek care from modern health care facilities. In low-income countries like Ghana where health infrastructure is scarce and where the pluralistic nature of the health care system allows for the use of alternate providers, not all women in need of emergency obstetric care will seek care from modern health care facilities. Therefore, in order to have a complete understanding of the context in which women suffer life-threatening maternal complications and the care they receive, it would be useful to extend such investigations to the community using a community criteria. Although cases identified in the community may not conform to the very severe cases that are investigated in near miss audits, they would nonetheless fall within the continuum of maternal morbidity.

Apart from using morbidity audit findings to improve maternal health care practices in health facilities, communities require information on the contribution of their cultural norms, care seeking behaviours and traditional treatment practices to maternal morbidities in order to design community oriented interventions to improve maternal health. In settings where resources are not available for governments to respond promptly to maternal health needs, communities could mobilise themselves to respond to audit results to save the lives of women. Efforts to work with the community leadership to develop such community-oriented interventions will largely increase community participation in maternal health.

From the literature, some methodological considerations would be necessary in conducting enquiries into life-threatening maternal complications in the community. A local understanding of life-threatening maternal complications would have to be established and this would include timing and severity of the morbidity condition. Also, based on the understanding that data from life-threatening maternal complications are useful adjuncts for understanding the causes of maternal mortalities [161], the methodological approach that guides the implementation of

community-based case reviews (verbal autopsy) would be adapted for auditing life-threatening maternal complications. The idea for adapting this tool is an attempt to apply methods that have been shown to work in contexts of limited resources and literacy in a new way to address a critical problem. This has three advantages:

1. More data would be available to guide policy decisions as maternal complications occur more frequently than maternal deaths.
2. The researcher will have the opportunity to document the actual experiences of the victim.
3. Talking about survival is less traumatising than talking about deaths and therefore more reliable information would be obtained.

In the adapted approach, the victim as well as family members who cared for the woman during the morbidity event would be the respondents. Data elicited from the use of the tool would most likely expose a pathway of causes that may require the attention of community leaders. Health systems could take advantage of that information to harness the creative energies of communities and enlist their help in addressing the many challenges that women face during pregnancy.

2.1.14 Theoretical models

Two theoretical models were used to guide data collection and the interpretation of the findings. These included the Explanatory Model and the Pathway to Survival Framework.

2.1.14.1 The explanatory model

Explanatory models involve asking questions through an exploratory process of qualitative enquiry leading to complex responses which carry with them information about treatment rituals, symbols in communication, forms of knowledge and illness narratives [162]. Individuals usually explain their illnesses in a multitude of ways which often include blaming social circumstances, issues related to relationships, witchcraft or sorcery or a broken taboo[163]. Patients and practitioners often have differing perspectives regarding the patients' illness and such discordance often leads to difficulties in communication and poor treatment outcomes. According to Kleinman (1981), an explanatory model includes "the notions about an episode of a sickness and its treatment that are employed by all those engaged in the clinical process" [164].

Kleinman identified two perspectives in explanatory models – the patient and the practitioner's perspectives. The patient's perspective examines the causes of the illness, why the individual thinks he/she became sick at that particular time, how the illness manifests itself in him/her, what the illness will do to him/her and how it has to be treated. On the other hand, the practitioner's perspective examines the aetiology of the illness, the time and mode of onset, the pathophysiology, the course of the illness including symptom severity and trajectory and recommended treatment. Based on these differing perspectives, Kleinman suggests that explanatory models should have both patient and practitioner share information with the hope that there will be concordance which can give rise to a complete understanding of the illness and the expected treatment and recovery process [164]. This mechanism is however unique to modern medicine that is distinct from traditional healing systems which thrive on esoteric knowledge held by the traditional provider [165]. Patients and for that matter ordinary community members, rarely have understanding of the treatment practices and the rituals that accompany traditional healing and therefore efforts to elicit explanations of the healing process from such people would yield only conjectures and not facts about the healing process. Exploring local explanations that focus on traditional treatment practices would therefore be useful if the focus is limited to the practitioners' perspective.

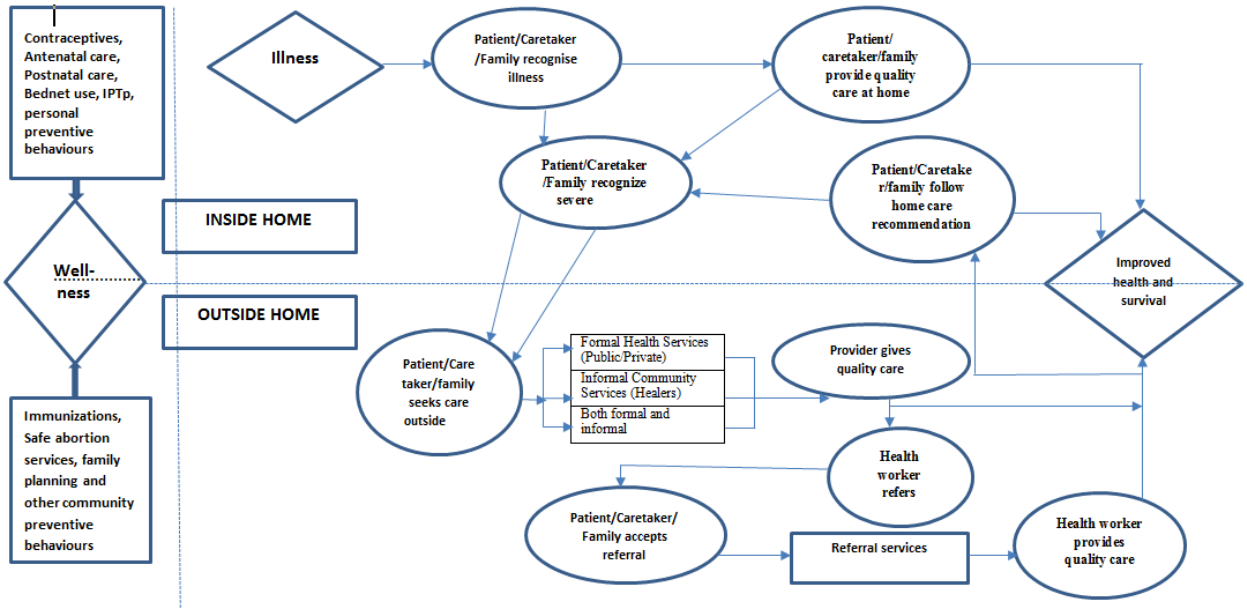
2.1.14.2 The Pathway to Survival Framework

The Pathway to Survival framework which was first conceptualised for analysing childhood mortality surveys informed the design of the community audit and interpretation of the findings [27]. The framework chronicles the health seeking pathways prior to death and focuses on drawing policy maker's attention to system failures that contribute to mortality. The framework is being adapted in this study for life-threatening maternal complications that were identified within the community using a screening tool developed from a local explanatory model for life-threatening maternal complications. This adaptation is based on two boundaries to health and the management of life-threatening maternal complications; wellness and care outside the home. It shows the interface between home care and outside services. The framework indicates that quality care should be held to an accepted standard with emphasis on quality care in the community and in the health facility. The framework shows that most life-threatening maternal complications occur outside health facilities and that both the woman and her family's recognition of danger signs of complication and provision of care are critical components. The

adaption of the framework for life-threatening maternal complications could facilitate the formulation of more effective maternal health promotion programs which can force some thinking by families and communities in terms interventions especially at the community level.

With the aid of the framework in Figure 1, the thesis chronicled the health seeking pathways and determined the point at which women who suffered life-threatening maternal complications survived. Failures in the health seeking pathway that may have contributed to predisposing or aggravating the woman's condition such as delays in seeking care from a formal health care facility were documented. This helped to provide valuable information that underserved communities can use to design programs that not only improve maternal health care but may serve to connect rural residents with health care services.

Figure 1: The pathway to survival framework



3 Chapter Three

3.1 Study research questions and objectives

Introduction

This chapter provides the research questions and the specific objectives that the study was designed to achieve.

3.1.1 Research questions

Main research question

To what extent can investigations of life-threatening maternal complications within the community contribute to our understanding of maternal morbidity in northern Ghana?

3.1.1.1 Subsidiary questions:

1. How do we monitor life-threatening maternal complications in the community?
2. How can we foster greater community involvement in addressing life-threatening maternal complications?

3.1.2 Study objectives

3.1.2.1 General objective

To determine the extent to which investigations of life-threatening maternal complications that occur within the community can contribute to our understanding of maternal mortality in northern Ghana.

3.1.2.2 Specific objectives

1. To derive a locally defined explanatory model for life-threatening maternal complications.
2. To determine how well the explanatory model fits with experiences of maternal complications?
3. To determine the perceived role of key community members in responding to maternal complications.

4 Chapter Four

4.1 Study site

Introduction

This chapter describes broadly the structure of the health care system in Ghana with particular focus on maternal health. A detailed description of the KND is also provided in order to detail the context of the findings. The first part traces the history of health care delivery in Ghana and describes efforts over the years to improve maternal health. The factors that influenced the selection of the KND as the study site are then outlined and the geographic and demographic characteristics of the district described. Socio-cultural arrangements as well as the belief system and traditional practices that relate to maternal health are also described. Finally, the maternal health situation in the district and the surveillance system that guided the sampling procedure for the quantitative survey are also described here.

4.1.1 Health care in Ghana

Back in the 16th century, traditional healers and clerics were the primary health care providers in Ghana [166]. The role of clerics in the medical field reflected the belief that unexplained illness, misfortune and premature death were caused by supernatural agents. Divinations were therefore used to determine the source of an illness and to suggest sacrifices to appease the causal agents before herbal medicine was prescribed for the patient. The people at the time understood illness and misfortune to originate from both natural and supernatural sources.

Traditional medicine is still an integral component of the health care delivery system in Ghana. It has evolved within Ghanaian societies overtime and its approaches vary between localities. Issues around taboos and forbidden behaviours are guided by two broad notions of disease causation - pathogens and spirits. The system uses herbal remedies, folk knowledge, traditions and values, health behaviour rules and patterns and identified personnel and structures for health delivery and restorative therapy [167]. Modern health care was introduced into the then Gold Coast[3] in the 19th century [166].

[3]This was the name of the country before it was changed to Ghana after independence in 1957

Modern health care in Ghana is administered by the Ministry of Health and the Ghana Health Service. The health system has five levels of providers - teaching hospitals, regional hospitals, district hospitals, health centres/clinics and community-based health planning services (CHPS) compounds. Primary health care is delivered through CHPS and as at 2011, about 1675 functional CHPS zones were in existence nationwide [168]. A functional CHPS zone is a geographically well-defined area within a sub-district, with an assigned community health officer [168].

CHPS was started in 1999 after an experiment by the Navrongo Health Research Centre showed that relocating local nurses to communities and re-orienting management of the health system will reduce barriers to geographical access to health care. Within the initiative, midwives and nurses are trained and sent to rural communities to provide basic preventive and curative services as well as doorstep services which include antenatal care, delivery and postnatal services [169,170]. Regarded as the primary strategy for reaching the unreached, the CHPS initiative is an integral part of the Ghana health service and represents the health sector's component of the national poverty reduction strategy [170].

Health care financing has been a major challenge for Ghana. Health services were provided free after independence in 1957 [171]. By the 1980s, financing health care from taxes became unsustainable and therefore user fees were introduced where individuals had to make out of pocket payments to receive health services. The system widened the equity gap and contributed significantly to low utilisation of health facilities [171,172]. As part of efforts to embrace universal coverage, the country opted to pilot community-based health insurance schemes in 1990 in some selected communities. The system was subsequently adopted as a national policy in 2003 by an Act of parliament - Act 650 [173]. As at 2009, about 67% of Ghanaians had subscribed to the scheme. The scheme covers about 95% of diseases in public and accredited private health facilities [174]. Since its introduction, the scheme has faced a lot of challenges but it has nonetheless improved financial access to health facilities with about 80% of all OPD cases being insured [168].

Despite improvements in both physical and financial access to health care, vast disparities continue to exist between urban and rural dwellers. Most health facilities are situated in urban centres, thus depriving populations in rural areas of access. Consequently, people in rural areas either rely on traditional remedies or travel long distances to access health care [175].

Table 1 shows Ghana's health indicators after several years of implementing these interventions.

Table 1: Population and health indicators [176]

Indicator	**Estimate**
Population	23,351,00
Population growth rate (%)	2.3
Civil registrations coverage (%)	51
Adult literacy (%)	66.4
Maternal mortality ratio (per 100,000 live births)	350
Total fertility rate (per woman)	4.3
Infant mortality rate (per 1,000 live births)	47
Life expectancy at birth (Males) years	60.0
Life expectancy at birth (females) years	64.0
Under five mortality (per, 100 live births)	69

4.1.2 Maternal health care in Ghana

The importance of maternal health was recognised relatively early in Ghana. In 1970, an eight year pilot project called the Danfa Comprehensive Rural Health and Family Planning Project, included the retraining of traditional birth attendants to improve their midwifery skills and to supply pills, foams and condoms [177]. Also, in response to the call for action at the maternal health and safe motherhood program conference in 1987, a safe motherhood action research project was initiated in 12 districts in Ghana to promote contraception and family planning methods. Evaluation of these programs was based on reduction in maternal morbidity and mortality and in the case of family planning, an increase in the use of family planning services

[178]. Other interventions include female adult education and communication programs which were mainly supported by non-governmental organisations [179]. Current interventions include increasing antenatal attendance, increasing access to skilled care during childbirth, improving access to emergency obstetric care and increasing postnatal attendance. Coverage of various maternal health interventions can be seen in Table 2.

Table 2: Ghana maternal health indicators[168]

Measure	**Estimate (%)**
Skilled delivery	52.2
Intermittent preventive treatment of malaria using fansidar	69.4
Coverage of Community-based Health Planning Services	21.8
Antenatal care coverage	91.3
Skilled attendant at delivery	52.2
Postnatal care coverage	64.7
Contraceptive prevalence	24.9
HIV prevalence among pregnant women 15 -24 years	2.0

As indicated in the introduction, the maternal mortality ratio in Ghana is 350/100,000 live births [5]. The direct obstetric causes of these mortalities include abortion, sepsis, haemorrhage, eclampsia, hypertension and infections [180–182]. Postpartum severe morbidities have been reported in about 9.6% of childbirths that occur within the community [183]. Apart from physical and financial barriers coupled with the unpredictability of labour that influence child birth at home, some families in Ghana generally do not use health care providers for the management of their health problems [184,185]. Factors that contribute to the use of alternate providers include the existence of a dual healthcare delivery system, the impact of family and religion on individual choices of health service and limitations imposed by the terrain and economics [186].

Despite these draw backs on utilisation of health care in Ghana, maternal audits have focused solely on auditing maternal deaths that occur in health facilities as part of quality improvement efforts. Community maternal death audits are carried out by the Navrongo Health Research Centre in the northern part of the country, the Kintampo Health Research Centre in the middle

belt and the Dodowa Health Research Centre in southern Ghana [168]. The centres apply the VA tool to ascertain biomedical causes of death. These audits aim at supplementing health facility information on the biomedical causes of death. The audits do not identify remedial factors contributing to death even though a social autopsy study by the Dodowa Health Research Centre demonstrated the feasibility of such an audit [187]. No audits are currently conducted on near misses regardless of where they occur.

As policy, all women with pregnancy-related complications are to seek care from referral facilities. The health system does not approve of the activities of traditional practitioners involved in the management of maternal complications even though the Medical and Dental Decree of 1972 and the Nurses and Midwives Decree of 1972 allow the practice of traditional medicine [188]. This is a challenging paradox to manage since a significant proportion of births in the country occur at home and are attended to by traditional providers [189].

The study was conducted in the Kassena-Nankana District (KND)[4] in the Upper East Region of Ghana. A couple of issues were considered in the selection of the study district. First of all, the KND is home to the Navrongo Health Research Centre (NHRC) which is the oldest health research centre in Ghana. The Centre has been conducting health research within the KND since 1989. The long association of the population with research made the researcher confident of a good cooperation in the implementation of the current project. Secondly, the Centre runs a demographic surveillance system which uses the VA approach for cause of death determination. This offered a good opportunity to assess the feasibility of adapting the existing VA tool for auditing life-threatening maternal complications. Thirdly, the KND has one of the highest maternal mortality rates in the country - 373/100,000 live births [190]. The district is also in the poorest region of the country where social determinants such as education, socio-economic status and gender inequalities affect the health of women [191–193]. Finally, the researcher is a native of the district and a staff of the NHRC. His knowledge of the district therefore inured to the benefit of the project. For instance, the population in the KND is largely illiterate and as a native

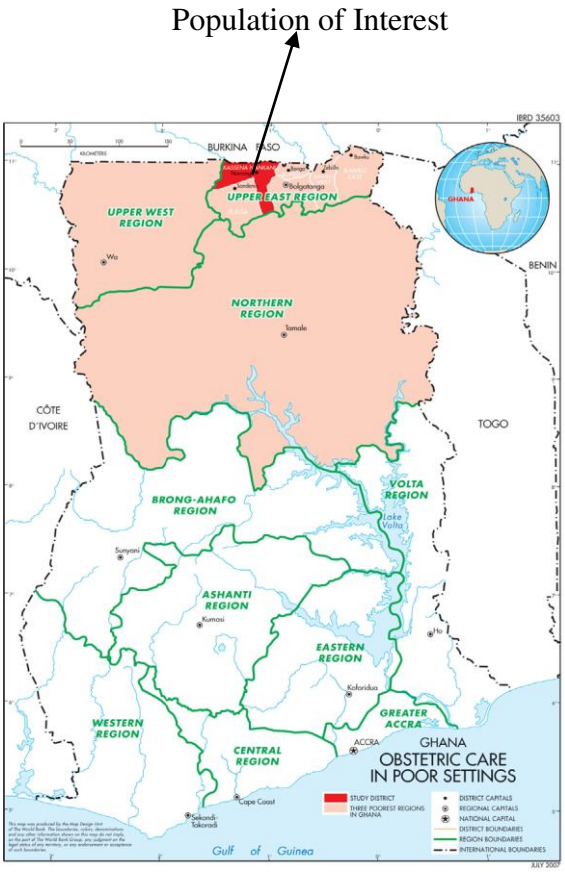
[4]The Kassena-Nankana District has recently been divided into the Kassena-Nankana East and West Districts. However, the former name shall be used for the purposes of this study.

speaker of the two major languages of the study district - Kasem and Nankani - he conducted the qualitative interviews and moderated the discussions using the local languages.

4.1.3 Geography and ecology

The KND is located within the Upper East Region in the north eastern part of Ghana. The district lies in the Guinea Savannah belt between $10^{o}30'$and $11^{o}00'$ N and $1^{o}00'$ and $10^{o}30'$ W and covers an area of 1,675 sq km. It is bordered by Burkina Faso to the north, Tumu district to the west, Bolgatanga district to the east and Walewale district to the south. The KND is characterised by a tropical monsoon with two main seasons - dry and wet seasons - with monthly temperatures averaging $23^{o}C$ to $34^{o}C$ [194].The rainy season starts from May and extends to October. Rainfall is erratic with an average annual rainfall of 850mm [195]. A large reservoir called the Tono Dam provides water throughout the year for irrigation. The dry season is divided into two - the Harmattan (November to January) which is characterised by dry, dusty and cool Saharan North-East Trade Winds and the Dry hot season (March and April) characterised by the scorching of most of the vegetation and frequent bush fires [179]. Figure 2 shows the location of the KND in Ghana.

Figure 2: Map of Ghana showing the KND



4.1.4 Demography and economics

The district has a population of 153,293 residing in about 32,000 households [196]. There are two major ethnic groups – the Kassena and the Nankani. The Kassenas inhabit the central, northern and western corridors while the Nankanis are located in the eastern and southern part of the district. A third minority group known as the Builsas also reside in the southern part of the district. Depending on the phenomenon of interest in any research, there could be ethnic variations but the three ethnic groups largely share a homogeneous social and cultural system. The demographic parameters of the district are summarised in Table 3.

Table 3: Demographic characteristics of the KND, 2012 [196]

Measure	Estimate
Literacy	27.6%
Male: female ratio	0.92
Population growth rate	0.81%
Crude birth rate	25/1000 population
Crude death rate	10/1000 population
Crude in-migration	63.5/1000 population
Crude out-migration rate	70.4/1000 population
Total fertility rate	3.8
Neonatal mortality rate	13.4/1,000 live births
Infant mortality rate	32.1/1,000 live births
Life expectancy at birth (Males)	56.4years
Life expectancy at birth (females)	67.0 years

Subsistence agriculture is the mainstay of the people. Families tend to farm on lands around their homes which is fertilised annually with manure from animal droppings. Nearly all farming takes place in the rainy season except in places with irrigation dams. Small gardens of mainly vegetables supplement farm produce and keep the people busy during the dry season. Common crops include millet, maize, groundnuts, beans, rice, and so on. A food glut characterise the end of the farming season while hunger and poverty worsens at the beginning of the season. Much of the produce is eaten by the family and some stored in granaries for the lean season or sold to buy other necessities for the family. Declining yields from agriculture and increase in population growth has increased poverty within the district. This has stimulated high migration out of the district to southern Ghana in search of non-existent jobs. Those who remain behind rear livestock such as cattle, goats, sheep and poultry. Craftsmanship and fishing is also common. Petty trading is widespread in the KND especially among women. This ranges from selling farm produce to retailing imported items. Women groups exist in almost every community mainly for economic reasons. Women pool resources or access micro credit for investment. Some areas of investment include grinding mills, shea-butter production, basket weaving and moulding of earthen pots.

How the profits are used is not very clear but it is believed that women in need of financial support benefit from the proceeds.

4.1.5 Physical features and social infrastructure

The capital of the Kassena-Nankana East district is Navrongo while that of the Kassena-Nankana West district is Paga. Both are growing rural towns with Navrongo being older and more urbanised. Paga is a border district capital with vibrant cross border business with neighbouring Burkina Faso. Until recently, developments in Paga were similar to other communities. Only 20% of the population live in urban towns - Navrongo and Paga [196].

Most communities in the KND are connected to the capital towns with untarred roads that compete for potholes. Movement within communities is a challenge especially during the rainy season when opportunistically created roads from the tyres of trucks that tried to cut their way into communities during the dry season, are covered by mud and grass render them impassable. Movement becomes more challenging when the millet crops grow tall and form canopies over footpaths.

Public transport linking communities is generally poor throughout the district. In most cases, transport is only available to rural destinations on market days which come on every three days. Increased ownership of motorbikes has facilitated the movement of people and goods between communities. A three-wheeled motorbike popularly known as "motor king" is common and has proved efficient in transporting both people and goods across the district. Private taxis are increasingly available but are too expensive for the average person.

The district is largely connected to electricity but few homes in the rural areas have electricity. The cost of connecting homes to the national grid is too expensive for most rural dwellers. In terms of sanitation, a few homes have private toilet facilities but majority depend on public toilets or open-range defecation. Currently, a garbage collection firm known as Zoomlion manages waste within the big towns but there is generally a noticeable absence of public sanitary facilities. Huge damps of garbage are seen in front of houses some of which are used to fertilise crops during the farming season. Majority of the people have access to clean water. The Ghana Water Company pumps water from dug boreholes and distribute to households within Navrongo and

Paga. The rest of the district depends on either mechanised or hand pumped wells and boreholes for water. Small dams are strategically located in various communities to provide water to livestock and for small scale irrigation purposes.

Navrongo is home to the only public university campus in the Upper East Region - the Faculty of Applied Science of the University for Development Studies. There are over 100 primary schools, about 50 junior secondary schools, six senior secondary schools, one teacher training college, one community health nursing training school and three vocational training institutions. Primary education which is limited to junior secondary school is free and compulsory but many children still remain out of school with the girl child being disproportionately affected. Government programs such as the provision of free school uniforms and the School Feeding Program coupled with activities of School Management Committees and Parent Teacher Associations have increased enrolment of pupils. Several initiatives and activities of pressure groups and movements are also driving the increase in girl child enrolment in schools.

The district has many tourist destinations and popular among them is the Paga crocodile pond where tourists can have the rare opportunity of touching and sitting on a live crocodile. Others include the Pikoro Slave Camp also located in Paga, the Sirigu Women's Porters Association in Sirigu and the Minor Basilica of the catholic church, built entirely of mud bricks.

4.1.6 The political structure

The KND is one of 216 districts in Ghana. A district is a second-level administrative subdivision created in 1988/89 as part of a decentralisation process of governance in order to combat corruption within officialdom in Ghana [197]. Each district is administered by a local assembly made up of elected representatives - assembly members - from the various communities and headed by an appointed District Chief Executive. In 2006, the Kassena-Nankana District was demarcated into two - The Kassena-Nankana East and West districts - and each governed by a separate assembly and district chief executive. The district chief executive is the representative of the president at the district level and is therefore answerable to only the president of the nation.

Traditional authority structures exist alongside the formal district assembly system. Chiefs are the traditional heads of the villages which are made up of several communities. In the KND, ten

paramount chiefs and several divisional and sub-chiefs constitute the traditional leadership that work closely with government authorities to execute developmental projects within their communities. Respectable elders, usually males who represent communities within the villages, counsel and support the chief in carrying out his duties. Chiefs are the gate-keepers of the community, peace-makers during conflict and the guardians of the cultural traditions of the people. Successful community health interventions often have the support of traditional chiefs who act as champions [198].

4.1.7 Belief system

Polytheism is common within the KND with animism co-occurring with various denominations of Christianity and Islam. Traditional religion predates the arrival of other religions and is commonly practiced within the communities. Women within the reproductive age (15-44) who report practicing traditional religion alone have decreased from 69% in 1993 to 31% in 2002 [160,199]. Traditional religion has a lot of influence on the people because of its intimate relationship with family loyalties and cultural norms. As in other religions, it recognises the existence of a supreme being who is served by a pantheon of lesser gods or spirits that dwell in rivers, trees, stones, animals and other objects [200,201]. Ancestors live with these spirits and act as the link between the individual and the deities. Ancestors are usually revered family members who are believed to have the power to alter the fortunes of the family. They are regularly worshipped through the pouring of libation (a ritual that involves the spilling of animal blood and ritual foods on the object embodying the spirit) to avert misfortune from the family and bring prosperity. There is a strong belief in reincarnation. The soothsayer, identified as *vuru*, is able to foretell during pregnancy which ancestor is to be reincarnated [179].

The importance of the belief system lies in its influence on the decision-making process during health seeking.

4.1.8 The traditional medical system

The traditional medical system in the KND is based on a belief in spirits – including ancestors, practice of soothsaying and the healing abilities of herbs and other natural products. Illnesses and other misfortunes are attributed to either spiritual forces or disgruntled ancestors. The ancestors are believed to cause misfortune especially where family members make decisions without

seeking their advice [192]. Soothsayers are believed to have the ability to communicate with the ancestors and an individual's personal god, foretell the future and give advice based on the communication. Soothsayers provide a preliminary diagnosis of an ailment and recommend the type of traditional practitioner that should be consulted. Key practitioners within the traditional medical system include herbalists, spiritualists and traditional birth attendants (TBAs). These practitioners function alongside modern healthcare providers throughout the district.

4.1.9 Traditional maternal health care practices

An estimated 100 traditional healers and soothsayers and several TBAs offer traditional maternal health care in the district.

During pregnancy, a wide range of behavioural restrictions exist and these are usually enforced by mother-in-laws. These range from sexual intercourse and food taboos during pregnancy to rituals to purify breast milk. Intercourse during pregnancy is considered important to ensure the proper development of the child and must cease by the eighth month otherwise the child will be born covered with sperm which is a bad omen especially for delivery attendants who may come into contact with it [179]. Women are encouraged to be active during pregnancy and not to sleep on their backs to avoid the baby being entangled by the cord. Pregnant women are not to sit with their legs crossed because that will cause the intestines to shift position and this may cause a permanent blockade of the vagina [179]. For food restrictions, pregnant women must stay away from cold foods and drinks because they cause nausea and diarrhoea. Warm food and drinks are supposed to improve blood circulation. Other restrictions include food rich in protein such as meat, fish, fresh milk, in order to prevent the foetus from becoming overweight and lead to prolonged labour.

Pregnant women are forbidden in some instances to visit the hospital. Special herbs boiled in water are used to determine the time of the day that a woman would deliver. Women who give birth at home do so with the help of TBAs and assisted by other older women in the compound [160,199]. Also, in exploring the use of health professionals for obstetric emergencies in the research setting, Mills and Bertrand revealed that community members believe that women who engage in extramarital affairs could have prolonged labour. The authors also reported that complications such as cord around the neck are treated with herbs, a woman with haemorrhage

has to have a calabash of hot water poured on her abdomen and a woman with retained placenta has to blow into a bottle [160]. The placenta is buried outside the house to indicate that the household's ancestors have accepted the baby.

During the postpartum period, women are expected to remain indoors and avoid lifting cooking utensils for three days if the baby is male and four days if female to prevent infection of the navel. Women drink hot herbal teas to prevent blood clots in the uterus. First time mother are required to express their first milk into a broken earthen pot and put black ants in it to test for bitterness. If the ants crawl out, the milk is declared wholesome and the mother can go ahead and breastfeed. If the ants die, the breast milk is considered bitter (*bisitoo* in Nankani and *yili-kweo* in Kasem), dirty and poisonous and can cause diarrhoea, leading to the death of the baby. The young mother has to go through a rite called *puure-nyoone in* Kasem and *wobi-biisa* in Nankani, to purify the milk before breastfeeding. *Puure-nyoone* or *wobi-biisa* involves the use of herbs or shea-butter to rub or wash the breasts. The duration of the ritual is three days for mothers of male babies and four days for female babies [160,202]. First-time mothers also go through a cultural cleansing known as *sooru* in Kasem and *kosoto* in Nankani, regardless of the bitterness of their breast milk. The process involves the pouring of warm herbal water over the mother for a period of three days if the child is a male and for four days if the child is female [202].

Although the use of traditional maternal and health care practices is declining, it is not clear if contemporary practices provide an alternative or an adjunct to traditional practices as preference for traditional remedies is still common [184][5]. Limited research has provided data on the use of traditional medicine to treat pregnancy complications even though communities see a legitimate and valuable role for traditional care [186].

4.1.10 Resources for modern health care

In terms of modern health care, public health facilities have been strategically located throughout the district to offer modern health care services to the people. About 33 community health compounds with resident community health nurses, six health centres, two public and four private clinics have increased access to modern health care [203,204]. The only hospital in the

[5] I was part of this research and the full paper can be found in the appendix

district is located in the urban centre and serves as a referral facility for all cases in need of emergency obstetric care. Three pharmacies and over 50 drug and chemical shops provide treatment to the sick. Financing health in the district is largely through a district mutual health insurance scheme but all maternal healthcare services are provided free within accredited health facilities.

The Community-based Health Planning Services (CHPS) compounds are part of a national initiative to provide consistent curative and preventive health care in areas that formerly had limited access to public health services. As part of this programme, Community Health Officers (CHOs) are trained and deployed to communities to provide basic and integrated services such as treatment of minor ailments, family planning services, antenatal care and immunisations [170]. Among these nurses are midwives who offer maternity services and refer complications to the next level of care.

4.1.11 Marriage and living arrangements

The KND is largely patriarchal and male dominance is ensured through marriage customs that relate to the lineage and polygamy. In this society, marriage is depicted characteristically as an institution for producing children and not for emotional reasons [192]. Payment of bridal price signifies a woman's requirement to bear children and religious customs, lineage and descent systems, kinship networks and family structure tend to reinforce those expectations [192,193].

Following courtship, couples notify their families of their intention to get married. Marriages are then arranged by families usually with several visits to the bride's family with gifts. Payment of bridal wealth or dowries usually seals the union which is rarely dissolved by divorce except where the union does not produce children. In such situations, the dowry is returned to the groom's family and the divorce is upheld [192]. Marriage customs restrain the autonomy and authority of women which in turn constrain effective health outreach because many women are not free to access health care without prior consent of their husbands [205]. Gender roles are profoundly stratified with males exerting control over the use of family resources and decisions about health seeking [192].

Descent in the KND is patrilineal and the family setting is patrilocal. Clans are exogamous and women are considered sisters. Women in broad terms, play a subordinating role as supporters and child bearers [191–193]. Socialisation into these roles start during childhood. Male children are generally preferred to female children partly because of the patrilocal arrangement where girls leave their father's compounds to their husband's to become the "property" of the husband's family. Investment in women is therefore considered a waste because it is the husband's family that benefits from it [179].

Individuals who have the same cooking arrangement are considered a household. Households are grouped into extended family units that are physically linked to form a compound [196]. Compounds are sparsely distributed within the communities and difficult to access especially during the rainy season. Compounds are headed by patriarchs who are usually the oldest male in the compound. Compound heads are gate-keepers and mediators in times of conflict either between family members or between compound members and the ancestors. They act as the spiritual link between the dead (the ancestors) and the living (compound members) through the pouring of libation. The compound head makes all major decisions that relate to the well-being of the extended family. Where necessary, the compound head may seek the wise counsel of the ancestors before reaching a decision [191]. Where the decision is made to use modern health care, women rely on family members to reach health facilities and most often, families are either not prepared or are not particularly helpful [206].

4.1.12 Maternal health care services

In the KND, direct maternal causes of death include haemorrhage, obstructed labour, sepsis, abortion and retained placenta. The indirect causes include malaria, anaemia and HIV/AIDS [190]. A number of interventions are currently being pursued to mitigate the effect of these causes. These include the promotion of contraception to prevent unplanned pregnancies, antenatal care to monitor pregnancies when they occur, improve access to a skilled attendant at child birth, improve referral system for obstetric emergencies and increase coverage in postnatal care. The coverage of the interventions are summarised in Table 4.

Table 4: Coverage of maternal health interventions in the KND [203,204]

Variable	Proportion (%)
Antenatal care	83
Post-natal care	73
Supervised deliveries	59
Family planning uptake	35

Family planning

A wide variety of family planning services are available in the district. These range from contraceptive pills to surgical procedures such as vasectomy or sterilisation which can only be provided in a hospital. Some of the available methods include the male condoms, Depo-Provera, oral pills, intrauterine devices and Postinor-2. Apart from the irreversible or surgical procedures, any woman can walk into a health facility and demand a method without the health service consulting the husband.

Antenatal care

Antenatal care services are provided to all pregnant women within the district. The services consist of monthly visits during the first two trimesters (week 1-28), biweekly visits from 28 weeks to 36 weeks of pregnancy and weekly visits after 36 weeks. Women are physically examined from head to toe and their weight, height, temperature, pulse, blood pressure and haemoglobin levels measured. The stomach is also palpated to determine the gestational age, checked for multiple foetuses, assessed for possible risk factors, foetal malformation and development of foetal body parts and also to determine the next visit date to the clinic.

Malaria is endemic in the district and so all expectant mothers are given intermittent preventive treatment for malaria using sulphadoxine-pyrimethamine (fansidar™). The drug is given under directly observed therapy, three times (every trimester) throughout pregnancy. In addition, pregnant women have access to subsidised insecticide treated bed nets for the prevention of malaria. Pregnant women attending antenatal are also tested for HIV based on a nationwide opt-out policy.

Postnatal care

After childbirth, the woman is detained for a day in hospitals and for about six hours in the community health officer's compound for postnatal services to be initiated. The mother is examined from head to toe and her vital signs are taken to ensure that everything is normal with her. She is also supplied with a large dose of vitamin A. Postnatal counselling often focuses on exclusive breastfeeding, danger signs in the post-delivery period and hygiene.

Skilled attendants at birth

All community health nurses have some midwifery skills and are therefore considered capable of assisting mothers to give birth. Some of the community health and family planning compounds have midwives but this cadre of professionals are mostly found in the hospital and the health centres. Home births are carried out within the community for women who want to have a skilled attendant at delivery but are not willing to use a health facility. A significant proportion of births in the district are conducted by TBAs [199] but only a few of them have been trained by the health service. They are trained to recognise complications and refer cases to the nearest health facility.

Emergency obstetric care

The district hospital is the only health facility equipped to handle comprehensive emergency obstetric care; none of the health centres or clinics meets the criteria for basic emergency obstetric care [185]. Each community health compound has radio equipment for communicating between facilities in case of emergencies. Radio calls are alerts for the facility to prepare to receive cases. Ambulance services are limited to the district hospital and serve communities which are within a 10km radius. Midwives and doctors do not attend to obstetric emergencies outside health facilities and so in peripheral communities, patients are required to make their own transportation arrangements. Official motor bikes used by community health officers for home-based services are sometimes converted into ambulances for transporting patients to health facilities.

Currently, monitoring of maternal mortality is limited to health facilities through institutional maternal death audits. Maternal deaths within the community are identified by the Navrongo

Demographic Surveillance System through the verbal autopsy approach. Near miss audits are currently not part of quality improvement efforts in health facilities.

4.1.13 The Navrongo Health and Demographic Surveillance System (NHDSS)

The KND is home to the Navrongo Health Research Centre (NHRC) which hosts the Navrongo Health and Demographic Surveillance System (NHDSS). The NHDSS conducts routine census updates on pregnancies and pregnancy outcomes including live births and maternal and perinatal deaths every 120 days. A detailed description of the NHDSS methods has been reported elsewhere [169,196,207]. A summary description of the surveillance system is however provided here to contextualise the sampling approach that was used for the current study.

For ease of monitoring the demographic dynamics of the KND, the NHDSS has demarcated the district into five zones - The East, West, North, South and Central Zones - which were further divided into clusters with a maximum of 99 compounds constituting a cluster. The two popular ethnic groups in the district – the Kassena and Nankani - are almost equally distributed among the zones. The East and South zones host the Nankanis while the North and West host the Kassenas. The Central zone which is the administrative capital of the district was excluded from the sampling frame of this study to focus the research on those rural populations where the influence of traditional practitioners is more profound [192]. The unique address system of the NHDSS for individuals within surveillance communities facilitated the sampling and identification of potential participants.

In establishing the NHDSS, a team of Community Key Informants (CKIs) was put together by the Centre to record all pregnancies, births and deaths that occur in their local communities to complement routine census update coverage [169,196,207]. CKIs were selected by community leaders on the basis of their status in the community; honest, literate, knowledgeable in the traditions of the community and available to work [169,207]. CKIs work closely with other community-based health providers such as the Community Health Officer (CHO), Traditional Birth Attendants (TBAs) and traditional healers. CKIs compile records of all the different providers and both the District Health Management Team (DHMT) and the NHRC depend on them to reach critical groups within the community to deliver health interventions.

Most maternal deaths recorded by the NHDSS are deaths that occurred outside health facilities. The NHDSS team is notified about all deaths either by CKIs or during routine update rounds and a verbal autopsy is carried out to obtain information on the circumstances leading to the death. The verbal autopsy consists of an interview, which includes a disease narrative and a checklist of signs and symptoms using a standard structured questionnaire (146). Trained field supervisors conduct the verbal autopsy interviews and three physicians independently code the questionnaires and assign the probable cause of death using the ICD-10 (2). Where at least two of the physicians agree on one diagnosis, it is accepted as the cause of death. Where there are disagreements, the case is further reviewed by two other physicians. In case of on-going disagreement, the case is coded as an undetermined cause of death.

Since 1992, verbal autopsy data have been used exclusively for assigning the medical cause of death in the KND. However, the use of the method within a routine surveillance system provides an opportunity to conduct community-based case reviews as recommended by the WHO. The surveillance platform also offers a great opportunity for identifying life-threatening maternal complications within the community through a careful adaptation of the VA approach [40].

5 Chapter Five

5.1 Methods

Introduction

This chapter describes the methods that were used to collect data on the project. The chapter describes the study design, the grounded theory approach, the data collection, the data processing and analysis, the training that was provided to field staff that assisted in data collection and the ethical considerations that were made before implementing the project.

5.1.1 Study design

A grounded theory qualitative research approach was used to develop an explanatory model for "life-threatening maternal complications" in the Kassena-Nankana District (KND). The explanatory model was used to design a quantitative screening tool that was pilot-tested on women had recent deliveries in order to identify those who survived life-threatening maternal complications in the community. Women who were identified to have survived life-threatening maternal complications were administered a semi-structured audit tool and the results shared with community leaders through focus groups to elicit their response to the findings. Data were obtained through interviews, discussions, observations and the NHDSS database. Methods triangulation which involved combining multiple methods of data collection to gather data gave credibility to the study findings.

5.1.2 The grounded theory methodology

The grounded theory approach was articulated by Glaser and Strauss in 1967 [208]. Grounded theory is an inductive approach for developing theory that is “grounded in data systematically gathered and analysed” [209]. Traditional research designs usually rely on a literature review leading to the formation of a hypothesis which is then put to the test by experimentation in the real world. The researcher chooses an existing theoretical framework and only then collects data to show how the theory does or does not apply to the phenomenon under study [210].Grounded theory however investigates real life situations and data are analysed with no preconceived hypothesis [208].

One of the methods used in grounded theory is interviewing where the researcher learns about a phenomenon by speaking to groups or individuals with shared knowledge or experience of the

particular phenomena. The process begins with the researcher asking a question or a series of questions designed to lead to the development or generation of theory. The researcher moves in and out of the data collection and analysis process. This back and forth movement is called iteration. The generative questions lead to the first iteration of theoretical sampling which is the process of identifying how to sample the next group or individuals to be interviewed, what data to collect next and where to find them [211]. This process of continually collecting and analysing data and engaging in a theoretical sampling process are critical features of the constant comparative analysis that Glaser and Strauss describe [208]. In the constant comparative analysis approach, data are constantly compared to previous data to identify new or emerging concepts until saturation is reached. As the researcher reviews the data collected, ideas and concepts that are repeated become apparent and are tagged with codes which are extracted from the data. As more data are collected and as data are re-reviewed, codes are grouped into concepts and then into categories. These categories then become the basis for a new theory.

Although there is currently no consensus on how saturation is reached in the grounded theory approach, Creswel suggests 20 to 30 interviews [212] while Morse suggests 30 to 50 [213] but they both failed to explain why these number of interviews and not any other numbers [214]. The experience of most qualitative researchers is that nothing 'new' comes out of transcripts after you have interviewed 20 people [215]. In studies with a high level of homogeneity as pertains in the Kassena-Nankana District, a sample of six interviews is deemed sufficient to enable the development of meaningful themes and useful interpretations [216]. The researcher seeks strong repetition in the themes he or she has already observed and articulated until he or she arrives at the point where there are no new ideas and insights emerging from the data.

The current study sought to explore the concept of life-threatening maternal complications within communities and grounded theory as an exploratory method was deemed appropriate. The search for a local explanatory model for life-threatening maternal complications was relatively new and the researcher needed a study design that would elicit rich qualitative descriptions of local explanations of maternal complications, their understanding of the causal chains leading to the complications and the treatment practices from all available data sources. This was necessary in providing variables for use in the quantitative screening for life-threatening maternal

complications. Theoretical sampling allowed for the identification of new data sources and the constant comparative analysis approach ensured that the evidence gathered was exhaustive and trustworthy.

5.1.3 Data collection methods

The study used a multi-method approach to gain a broad understanding of life-threatening maternal complications within the community. Both qualitative and quantitative research techniques were used in data collection. Qualitative techniques included focus group discussions, in-depth interviews and non-participant observation.

5.1.3.1 Focus Group Discussions (FGDs)

The focus groups method is an interview with a group of people on a specific topic or issue [217]. The focus groups approach was appropriate in this study because it allowed extensive discussion of all matters related to life-threatening maternal morbidities in the community rather than just an individual context. The participants had the opportunity to consider, expand and express their views within the context of the views of others [218]. Data obtained here were informative because they identified issues that were contentious as well as points of agreement. The group situation also allowed for the verification of information given by other members in the group and the group dynamics allowed the identification of extreme views [218].

5.1.3.2 In-depth Interviews (IDIs)

In-depth interviews were used with traditional healers to elicit rich descriptions of their trade and their treatment methods for various maternal complications [219]. The In-depth interviews technique allowed for the various themes to be explored in detail. Open-ended questions permitted the natural flow of the interaction and created the opportunity for the interviewer to follow-up with relevant questions and probes [220].

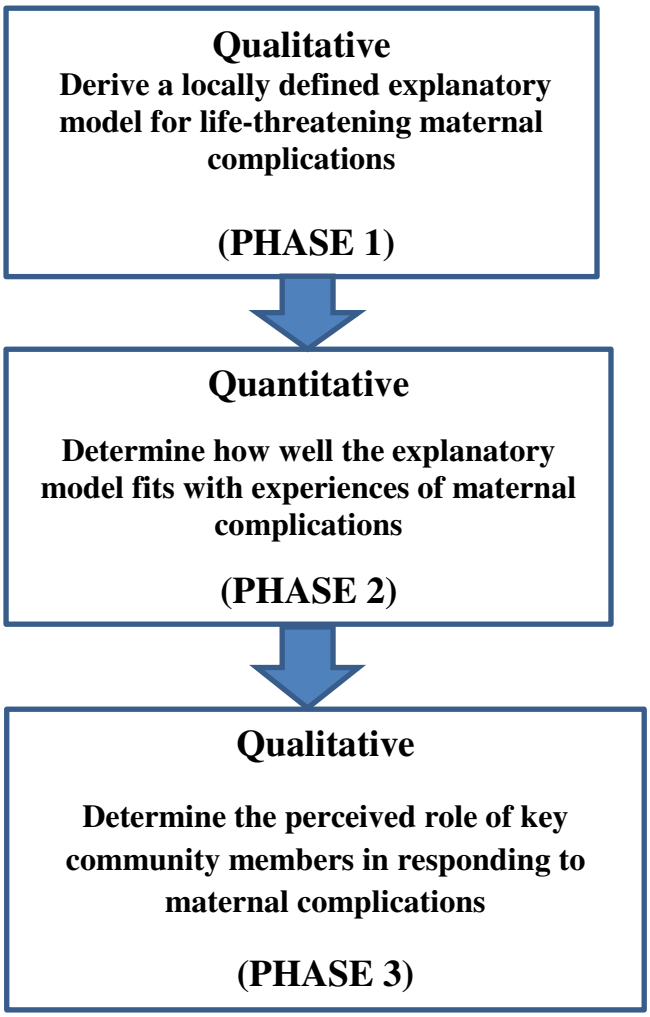
5.1.3.3 Non-participant observation

The study was designed to allow the researcher to observe the treatment of any complication that occurred during the period of data collection. The technique was valuable for verifying the differences in treatment procedures between healers and in understanding actual practices [219]. Although the researcher did not have the opportunity to observe a traditional treatment, he surveyed the consulting and treatment rooms of traditional healers and indeed, took samples of

the herbs and roots that were used for the treatments. Notes taken during the observation were used to provide more context information for the results.

The study was implemented in 3 phases. Figure 3 shows a flow chart of the various stages of data collection.

Figure 3: Study flow chart



Different sampling techniques were employed in selecting respondents and participants into the different phases of the study. These included both probability and non-probability sampling approaches. The probability sampling approach was used for the quantitative aspect of the study

in order to achieve representativeness. Also, before arriving at the targeted populations for the qualitative study, the research utilised demarcations of the study district carried out by the Navrongo Demographic and Health Surveillance System to arrive at specific communities where the interviews or discussions could be carried out. This process also took into account the two dominant ethnic groups within the district – Kassena and Nankani - in order to identify ethnic variations in treatment practices if any. Once the study communities were selected, non-probability sampling methods – convenient, purposive, snowball and theoretical sampling - were used to select research participants who matched the characteristics needed to provide relevant data to answer the research questions. These qualitative sampling approaches were not meant to achieve representativeness or to have external validity but to maximise the quality of the data and by so doing improve understanding of life-threatening maternal complications.

5.1.4 Phase 1

This phase sought to provide a local explanatory model for life-threatening maternal complications as understood by traditional providers in order to come out with a criteria for identifying such morbidities within the community.

Currently, the explanatory model for life-threatening maternal morbidities has predominantly a biomedical orientation which explains why investigations into such morbidities are limited to clinical settings. This phase of the study therefore sought to use an approach that improves our understanding of the indigenous systems of healing and local explanations of life-threatening maternal morbidities that go beyond the biomedical categories of morbidities and their diagnosis and treatment practices to include ritual healing. Implementation of this phase of the study was guided by Kleinman's practitioners' explanatory model [164].

5.1.4.1 Sample

Although, because of the esoteric nature of the indigenous healing process only traditional birth attendants (TBAs) and traditional healers constituted the sample for this phase of the study, the local explanatory model derived from the data represents that of the community. The researcher understands that the concept of "community" goes beyond the two traditional providers but those were the only groups that were either identified from the literature or through theoretical

sampling as having information that could help explain life-threatening maternal complications in the community.

TBAs were purposively selected [221] because studies in the research setting reported them as key categories of people who are knowledgeable in traditional child birth and treatment practices [160,184]. TBAs provide guidance to pregnant women during pregnancy and are preferred by some women for delivery services [184,160]. TBAs have little formal training and rely upon strategies they have learnt in the field to successfully support a woman to give birth. They use herbal remedies or other traditional practices to stimulate labour or facilitate child birth [184]. Complications that occur during labour or child birth are first identified by TBAs and a solution or course of action prescribed. Some TBAs play an additional role as traditional healers and so when confronted with maternal complications they either manage the complication or refer the case to other healers or the health facility.

5.1.4.2 Sampling

Twenty clusters - five from each zone - were randomly selected from the East, West, North and South zones for 20 FGDs with TBAs. FGDs were used with TBAs to explore their shared practices and more especially, maternal complications that they referred to traditional healers. The community key informant whose catchment area included a selected cluster provided the study team with a list of both trained and untrained TBAs who served each of the selected clusters. The field team, through convenient sampling [221], visited and invited the first 12 TBAs on the list who were available and granted consent to participate in an FGD. The number 12 was considered reasonable in order to allow for rich but manageable discussions.

In keeping with the data collection approach when using grounded theory, an analysis of the first transcripts from the focus group discussions with the TBAs suggested a theoretical sample that included traditional healers who receive women with maternal complications from the TBAs. It was reported in the initial discussion with the TBAs that traditional healers are central in the management of pregnancy complications within the community. Apart from treating complications recognised by modern medicine, they also specialise in complications attributed to spiritual forces.

The field team used the FGD sessions with TBAs to solicit information on traditional healers involved in the treatment of maternal complications. Through the snowball sampling technique [222], the team was often put in contact with traditional healers either operating within communities in which the focus group was held or in adjourning villages. In-depth interviews were conducted with healers who consented to participate in the study in order to elicit rich explanations of their trade coupled with their treatment practices for various maternal complications.

5.1.4.3 Research tools

While themes are normally derived from the data in the grounded theory approach, the design of the study tools were still guided by initial directions of enquiry related to the research objectives. Two guides - a discussion (see appendix 3) and an interview guide (see appendix 4) - which were developed based on the objectives of the study, were used to guide the moderation of the discussions and the interviews. As new themes emerged during the data collection process, the guides were revised accordingly in order to adequately explore those new themes. Each guide was divided into sections to address various themes. Probes which were incorporated into the guides ensured that the moderator or interviewer did not miss issues that were not explained in the responses. The probes also ensured that issues that were not predetermined were discussed further to elicit adequate information. The tools were pre-tested before being used in the field.

5.1.4.4 Data collection

A group of eight to 12 individuals was considered for the focus group discussions [223] after informed consent was obtained (see appendix 5). However, on some occasions, more TBAs showed up and they could not be turned back. The research team observed that once a TBA was invited, she made an effort to get other TBAs within her compound to also attend.

The research team consisted of a note taker and a moderator. The note taker wrote down a summary of each discussion as a backup in case the audio recording failed. He also noted down the atmosphere of the discussion and any non-verbal cues that were relevant to the study. In addition, the note taker played an observer role by prompting the moderator on individuals who were either dominating or not participating in the discussions.

The student researcher moderated all the focus group discussions and interviewed all the traditional healers. The moderator focused on the content of the discussions, knowing when to move from one domain to the other. He also ensured that the audio recorder was functioning well and that all discussants were active participants. The average time for an FGD was one hour 45 minutes while the IDIs lasted approximately one hour.

The demographic characteristics of the TBAs who participated in the focus group discussions are summarised in Table 5.

Table 5: Background characteristics of discussants

Variables	Frequency (n= 215)
Gender	
Male	3
Female	212
Age group	
<45	26
>=45	189
TBA status	
Trained	122
Untrained	93
Education	
Ever been to school	44
Never been to school	171
Occupation	
Farmer	142
Trader	65
Weaver	1
Housewife	7
Marital status	
Still Married	94
Widowed	121
Religion	
Christianity	167
Muslim	14
Traditional Religion	34
Ethnicity	
Kassena	120
Nankani	90
Builsa	5

Informed consent was also obtained from each healer before the interview session (see appendix 6). Only three of the healers were females. Most of them were above 45 years, had never been to school and were married at the time of the interview. All the healers practiced traditional religion.

FGDs in pictures - Phase one

IDIs in Pictures – Phase one

5.1.5 Phase 2

Phase 2 was divided into two parts. The first part screened pregnant women within the community to determine how well the explanatory model in phase 1 fits with women experiences of life-threatening maternal complications within the community. The second part conducted outcome-audits with all women who qualified as having survived a life-threatening maternal complication based on the local explanatory model.

Both parts of the study used quantitative research methods.

5.1.5.1 Sample estimate and sampling

The study was designed to recruit life-threatening maternal complications retrospectively. One concern was possible recall bias if the time interval between the occurrence of the life-threatening condition and the interview were too wide. Unfortunately, there was no guidance in the literature on the most appropriate time interval between the occurrence of the life-threatening condition and the interview. Consequently, the researcher arbitrarily restricted all interviews to within 3 months of the occurrence of the life-threatening condition with the assumption that a complete list of all births would be obtained from the pregnancies and births database of the NHDSS three months before the commencement of the study. Unfortunately, field staff on the NHDSS use four months to complete a cycle of data collection and it takes another two to three months for the data to be processed and made accessible to researchers. The researcher was therefore compelled to extend to a six month period. It is not clear if this extension affected recall of the morbidity event as no recommendation exists on the effect of timing of the interview on recall of events surrounding a maternal morbidity. It is believed that by adding carers during the morbidity event as respondents, any difficulties with recall would have been filled in by other respondents. Despite this effort, the possibility of recall bias would be acknowledged in the limitations section of the thesis.

The sample size was estimated based on the initial interval of three months. About 4000 births occur annually in the Kassena-Nankana District. For the 3 month period, about 1000 births were expected. It was estimated that about 15% of these pregnancies will develop complications [224]. Implying that about 150 pregnancies would qualify as life-threatening complications and therefore eligible for the administration of the audit tool. The change in the interval did not

warrant any change in the original sample size as the only reason for the restriction of the interval was to reduce recall bias.

5.1.5.2 Research tools

The content of the screening tool (see appendix 7) was informed by findings from phase one of the study. The definition of a life-threatening maternal complication as provided by the traditional practitioners and the pregnancy-related conditions that they identified as well as conditions that were reported in the literature were used to identify women who survived a life-threatening maternal complication. Currently, no tool exists for screening women in the community who have recently given birth to find out if they suffered a life-threatening maternal complication.

In the second part of data collection, a semi-structured questionnaire with a narrative section was used to collect data on the circumstances that led to the life-threatening maternal complication and the health seeking behaviour for the condition (see appendix 8). The content of the study tool was informed by already existing tools that have been validated and are in use. These included the WHO verbal autopsy tool, an adapted tool by D'Ambrouso et al. (2010) and two others used by the INDEPTH network [25,26,225,226]. The INDEPTH network is a network of demographic sites that monitor and evaluate populations and their health in Asia, South America and Africa. The Navrongo Health Research Centre is a member of the network.

The aforementioned research tools have traditionally been used for mortality investigations. The rationale for adapting them for the current study is based on the assumption that the causes of severe maternal complications could be useful adjuncts for the assessment of maternal deaths [72].

A set of diagnostic criteria for identifying life-threatening maternal complications within the community was obtained from the qualitative interviews in phase one and used to screen for life-threatening maternal complications (see appendix 7). We obtained a simple random sample of 1000 women from the pregnancies and births database of the NHDSS, whose pregnancies were either carried to term or terminated through abortion or miscarriage and were within the six month period stipulated by the study. Field staff on the NHDSS and CKIs who register pregnancies and births within the community, assisted the research team to screen about 903

women. Based on our definition of a life-threatening maternal complication, 179 of the women qualified to be administered the audit form. However, only 148 were met during the field visit. Both biomedical and socio-cultural factors surrounding the life-threatening maternal complication were documented after informed consent was obtained from potential participants (see appendix 9). Family members and carers for the woman were allowed to supplement the information from the patient to ensure that a complete account of the management of the morbidity event was obtained.

5.1.6 Phase 3

Results from the community audit were fed back to community leaders through FGDs and IDIs to determine their response to the issues raised. Specifically, this part of the study determined the perceived role of key community members in responding to maternal complications.

FGDs were conducted with community leaders (Chiefs, elders, assemblymen, leaders of women groups). All the chiefs and elders were males and a few females who were elected assembly members also participated in the discussions. Efforts were made to get women group leaders to participate but in most cases, only one woman turned up for the group discussion and others had none. This made them ineffective during the discussions.

IDIs were held with health workers (District Directors of Health, Medical Assistants in-charge of health centres, and midwives). Within the community-based health planning and services program, nurses are deployed to reside in communities and deliver basic health services including antenatal care, delivery services and postnatal care. The nurses and the health administration (district director of health services and the public health nurse) in the district work with opinion leaders in communities to implement community maternal health programs and this makes them key stakeholders within the community. Besides, the attitude of health workers was reported to influence the use of health facilities for delivery services and therefore it was important to seek their reaction to the reports.

Including nurses in the focus group discussions with the community leaders would have biased the discussions and therefore they were separated for in-depth interviews.

5.1.6.1 Sampling process

Sampling of communities for this phase of the study was purposive. Communities were selected based on their distance to the district hospital. In all, about 10 communities that were remote and bordered the district were selected. This was to enable the researcher document the community leaders' response to issues of delays in accessing emergency obstetric care.

For the IDIs, the two district directors and their public health nurses were interviewed. As noted earlier, the study took place in two districts and each of them has a director of health services and a public health nurse and all of them were interviewed. All four medical assistants in-charge of the public health centres in the four zones were also interviewed. Eight out of the 10 midwives in-charge of the community clinics or health compounds in the 10 selected remote villages were interviewed. One of the remaining two nurses was on leave while the other was indisposed and had vacated the health compound.

5.1.6.2 Research tool

FGD (see appendix 10) and an IDI (see appendix 11) guides were used for the discussions and interviews respectively. The content of the tools were informed by results from phase 2 of the study which clearly showed challenges within the community in caring for pregnancies and in accessing care when complications arise.

5.1.6.3 Data collection

Community leaders were brought together for a focus group discussion. A total of 10 focus group discussions were carried out in ten communities. About 16 IDIs were conducted with modern healthcare providers. The average duration of an FGD was about one hour 30 minutes while an IDI was about 50 minutes. Informed consent was obtained from both FGD (see appendix 12) and IDI (see appendix 13) participants before conducting the interviews and discussions.

FGDs in pictures – Phase three

5.1.7 Selection and training of field staff

The qualitative interviews and discussions were conducted by the student researcher. Three graduate level staff (1 male and 2 females), were recruited to assist with data collection. They were selected to meet the following criteria: fluency in at least one of the main languages in the study area - Kasem and Nankani; more than five years research experience, particularly with conducting FGDs and IDIs and experience in producing accurate translated transcriptions. For the quantitative data, five CKIs and 10 field staff of the NHDSS assisted with the screening of women to identify those who suffered life-threatening maternal complications during their last child birth. The field staff of the NHDSS were used for the screening because they are strategically located throughout the study district and they interact with the whole population in the district every four months. It was therefore easier for them to locate potential participants. Also, because of their extensive experience in collecting surveillance and verbal autopsy data in the field, it did not require much effort to hone their skills.

The audit interviews were conducted by the researcher, assisted by two research assistants (university graduates) with five years' experience in conducting interviews. The field staff were trained over a period of two weeks to understand the research protocol, the data collection tools, the consent procedures and to hone their skills in conducting interviews. The training for the quantitative study included the translation of the tools into the various local languages for the purposes of consistency. A pre-test was used to evaluate the performance of the field staff as well as finalise the study tools. Data collection was undertaken between March and November 2012. Table 6 summarises the number of interviews that were conducted using the different techniques.

Table 6: A summary of interviews conducted

Phase	Type of interview/discussion	Number of interviews/discussions
One	FGDs	20
	IDIs	19
Two	Screening	903
	Socio-cultural and biomedical audit	148
Three	FGDs	10
	IDIs	16

5.1.8 Data processing

In the qualitative arms, most of the interviews and discussions were conducted in the local languages. All interviews and discussions were recorded and transcribed directly into English while maintaining key cultural terminology in the local languages. Transcription was done using guidelines outlined by the student researcher. These included a legend which showed how the interviewer or moderator and the respondent or discussants should be identified in the transcripts, how to indicate inaudible sections of the audio tape, pauses, external noise, laughs and other expressions of respondents or discussants.

Each transcript was proof read by the student researcher and compared against the audio recording to ensure adequate translation and verbatim transcripts. The researcher also reviewed and edited all transcripts to minimise errors in grammar and meaning. Each transcript was given a unique identifier based on the type of interview and the category of respondent. Table 7 explains the labelling format for each transcript.

Table 7: Identifiers for transcripts

Identifier	Meaning
IDI-TH01-KURUGU	The first interview with a traditional healer and the place of the interview was in Kurugu. The number is added because more than one healer could be interviewed in a community.
IDI-MIDWIFE	An in-depth interview with a midwife. Only one midwife serves a community.
IDI-MEDICAL ASSISTANT	An in-depth interview with a medical assistant. Only one medical assistant serves in a health centre.
IDI-DIRECTOR OF HEALTH	An in-depth interview with a district director of health services.
FGD-TBAs-NAAGA	A focus group discussion with traditional birth attendants in Naaga
FGD-OL-KAYORO	A focus group discussion with opinion leaders in Kayoro

These labels were used to identify quotes in the presentation of the qualitative findings.

The quantitative data were paper-based. Data collectors were tasked to review the completed forms to correct any inconsistencies before ending their interviews. All completed forms were reviewed by the student researcher and where necessary, queries were generated for the field staff to revisit the respondent. The address system of the NHDSS facilitated the revisits.

All the screening and audit forms which were completed and certified by the student researcher were passed on to a data entry clerk to be entered into an Epidata 3.0.2 data platform. In order to verify the entries that were made, a second data entry clerk also entered the data in a similar database. Inconsistencies between the two entries were resolved. Those that demanded checks from the field were logged-out to the field staff to revisit the respondents.

5.1.9 Data analysis

5.1.9.1 Qualitative analysis

All the qualitative data from both phases one and three were analysed using similar approaches. All the transcripts were imported into QSR NVivo 10.0 software for coding [227]. Coding is the process of naming and labelling categories and properties. Content analysis enabled the researcher to identify, analyse and report patterns within the data [228].

Data analysis was guided by the grounded theory approach. Strauss and Corbin recommended three stages of coding when using the grounded theory approach [209]. These are open, axial and selective coding. The use of NVivo facilitated this process.

Open coding

Open coding is the part of the analysis where the researcher examines transcripts and identifies salient categories. The researcher describes phenomenon found by reading every sentence in all the transcripts. Answers to repeated questions in each interview are identified within the texts and named appropriately.

In the current study, open coding allowed for the segmentation of the data into similar groupings to form preliminary categories of information about life-threatening maternal complications as explained by the community. In coding the data, the researcher looked for and conceptualised issues related to life-threatening maternal complications in the data. Commonly mentioned words and phrases from the transcripts that highlight the community understanding of life-threatening maternal morbidities were noted and described in short phrases called codes. The short phrases were segments of texts in the respondent's own words and expressions relating to each code, and these were extracted and labelled. Subsequent texts that were coded under the same categories were constantly compared to previous segments of text coded under the same category and contrasted with other categories. Similarities and differences in each category and sub-category were examined. Extant text from observations and field notes were used to supplement the data and to ensure that data saturation was achieved.

In the current study, all traditional healers who were identified to treat maternal complications within the study communities were approached for their consent and interviewed. In developing the research proposal, it is common to indicate the number of interviews that are intended and why. This information is needed for the evaluation of the proposal by academic advisors, sponsors and ethics committees. For the current study, a limit was placed on only the number of focus group discussions for traditional birth attendants. The researcher was not tied to those numbers and could have continued to carry out the interviews if saturation was not reached. The plan to carry out 20 FGDs with traditional birth attendants was to ensure that saturation was achieved. This was confirmed during the open coding process when constant comparison of the codes generated no new codes after the first six focus group discussions. The data became repetitive and in most cases superfluous but discussions with the TBAs continued because the researcher was also interested in the repetitiveness of codes in the data. In all, 215 TBAs participated in the focus group discussions.

In phase three, remote communities that bordered the district were purposively selected to participate in the study. These communities were ten in number and therefore the researcher could only conduct a maximum of 10 focus group discussions. Again, this number of interviews ensured that saturation of the various themes was achieved. The number of midwives serving in

the communities that were selected for the study was also fixed and an attempt was made to interview all of them including the district directors and public health nurses.

Axial coding

Axial coding is done after intensive open coding and consists of identifying relationships among the open codes and grouping them into some sort of themes which generally portray a new way of viewing and understanding the phenomenon being studied. Connections among the open codes were established and named. Axial coding of the data focused on causal relationships and were fitted into a frame of generic relationships. The frame which was developed by Corbin and Strauss contains the phenomenon under study, the causal conditions, the context, the intervening conditions, the action strategies and the consequences of the actions [209]. The phenomenon is the outcome of interest and the causal conditions are the events or variables that lead to the occurrence or development of the phenomenon. The context is the background or moderating variables while the intervening conditions are the mediating variables. The action strategies are the goal oriented activities that agents perform in response to the phenomenon and intervening conditions. Finally, the consequences are the results of the action strategies either intended or unintended. Table 8 shows the generic relationships that were established in the data.

Table 8: Generic relationships for life-threatening maternal complications

Element	**Variables**
Phenomenon	Life-threatening maternal morbidity
Causal conditions	obstructed labour, retained placenta, haemorrhoids, prolonged labour, hypertension, obstetric haemorrhage, abortion, intrauterine death, breech presentation, nuchal cord, malaria, preterm deliveries, miscarriages, *wo-gnom* (ulceration in the womb), *waafo* (python disease), *wo-kalamin* (clotted blood in the womb), the *chuchuru* (spirit child) and witchcraft
Context	Maternal age, parity, place of childbirth, religion, place of care for illness, literacy, attendant at childbirth
Intervening	bleeding, blood pressure, dehydration, stress, anger , fatigue

conditions	
Actions strategies	Self-treatment at home, seek care at a health facility, seek care at a traditional healers'
Consequences	Survival without disability, survival with disability, death

Selective coding

The last stage in coding using grounded theory is selective coding. At this stage, the researcher organises and integrates the categories in a way that articulates a coherent understanding of the phenomenon being studied. The researcher chooses one category to be the core category and relating all other categories to that category. Essentially, the idea is to develop a storyline around which everything else is draped.

Tables 9 and 10 show an example of the three stages of coding that was done in the current study.

Table 9: Axial codes and selective codes based on the open codes for phase 1 of the study

Open codes	Axial codes	Selective codes
Traditional consultations, decision-making, spiritual, clinical, spirit child, charms, spells, witchcraft	Health seeking for maternal complications	Contexual factors that justify the need for a local explanatory model for life-threatening maternal complications
Transport, ambulance services, referral, time, cost, distance	Delay in arriving at an appropriate place of care	
health facilities, antenatal care, postnatal care, delivery rooms, treatment of complications, distance, cost of care, health insurance, consultations, examinations, tests, drugs, caesarean sections	Quality of maternal health care services	
Abusive staff, shortage of staff, limited skills of staff	Human resource for health	
Pregnancy-related, perceived risk of dying, health intervention required, period of the morbidity	Identification of life-threatening maternal complications	The local explanatory model for life-threatening maternal complications
obstructed labour, retained placenta, haemorrhoids, prolonged labour, hypertension, obstetric haemorrhage, abortion, intrauterine death, breech presentation, nuchal cord, malaria, preterm deliveries, miscarriages, causes, severity, presentation, treatments	The causes of life-threatening maternal complications	

wo-gnom (ulceration in the womb), *waafo* (python disease), *wo-kalamin* (clotted blood in the womb), the *chuchuru* (spirit child), witchcraft, causes, severity, presentation, treatments	Culture bound syndromes	
Traditional birth attendant, traditional healer, source of knowledge, knowledge transfer, consultation process, how treat, who treat, cost	Who is consulted in the management of life-threatening maternal complications in the community?	

Table 10: Axial codes and selective codes based on the open codes for phase 3 of the study

Open codes	Axial codes	Selective codes
abdomen rising, good luck, celebration of births, pregnancy and happiness, misfortune, baby dies, pregnancy as a disease, children bear your memory	Men' perception of pregnancy and childbirth,	Men and family planning services
more children, fewer children, no child, sex of child, number of children and happiness, number of children and popularity, bad children, good children, children as planting seed, difficulty in caring for many children	Men's fertility preferences	
put an end to child birth *(adoge-ku)"*, having enough births (*adoge-make),* birth spacing (*adoge-yalayala)",* many children and contraceptives, weaning from breast milk and birth spacing, bridal wealth and contraceptives, contraceptives and community populations, contraceptives as causes of complications, contraceptives and infidelity	Men's perception of family planning	
Allow wife for family planning, school fees, no herding of cattle, times are hard, no children at short intervals, more children are surviving, avoid pregnancy until child is weaned, make child and mother strong before next birth, traditional methods, collusion between wives and health workers, engage men	Changing fertility preferences and family planning programs	
Men consult soothsayers, go without informing husband, wait for husband, respect for husband, witchcraft, money for care, no right to personal thoughts,	First delay	Delays in the health seeking process
Timing of maternal emergencies, availability of vehicles, Motor-king, public transport, donkey carts, bicycles, motorbikes, ambulance services, market days, walking to the referral facility, cost of transportation, mobilisation of resources to support emergency transport, what communities can do to help, trust, community fines	Second delay	
Activities at ANC involving men, pregnant women adherence to drug regimen, compliance to ANC schedule, birth preparation, maternal danger signs,	The policy for men to attend antenatal care	Male support during ANC
Few men attend ANC, ANC is to weigh pregnancies, men at ANC irrelevant, Public show of love improper, not our tradition, name calling (*Kana-kadong/bakana),* men prioritising other roles	Men's perceptions and attitude towards antenatal care	
Long distance between home and clinic site, woman has difficulty in walking, suspicion of abortion, pregnant woman is sick, pregnancy has complications, pregnancy is advanced	Factors that facilitate men's attendance of antenatal care	

Reaching out to men, attend to women who come for ANC with spouses first, praise men present at ANC, men groups, pay attention to wife, involve men slowly, chiefs to play a key role	Increasing male attendance of ANC	
Pregnant women come from the communities, no progress without the community, the community health committee, involvement of volunteers, involvement of TBAs, involvement of chiefs and elders, pregnancy school, home visits by community health nurses, community roles during health campaigns, consultation of communities	Involving communities in maternal health	Community support for maternal health
Activities of women groups, activities of other groups and associations, mobilising communities to support pregnant women, community by-laws and fines, the effect of the extended family system, communal labour, community and family ties, migration to the southern part of Ghana, hard times, no money, no trust in monetary matters, support from those who are better of	Social support and mobilisation of resources for maternal health care	
Motivate TBAs, community fund transport and health expenses, motor-king for referral, chiefs to lead community initiatives, contribute cash, contribute in-kind (livestock), responsibilities of the health system, responsibilities of the government,	Improving community involvement in maternal health	

The narratives in the results section are built around the selective codes with detailed information originating from both the axial and open codes.

5.1.9.2 Quantitative analysis

Two sets of quantitative data were collected within the study. These included the screening of 903 women who had recently given birth and 148 women who were administered an audit tool after they qualified as per a community criteria, as life-threatening maternal complications. Data from both surveys were imported into R for analysis.

Standard descriptive analysis using proportions and means were carried out. In analysing the screening data, women who reported one known maternal complication in addition to recognising that she would not have survived if she did not seek some sort of medical intervention outside the home were classified as having suffered a life-threatening maternal complication. The pathway to survival framework was then used to trace preventive behaviours that were practiced by the woman during pregnancy and the immediate postpartum period, the challenges in the health seeking pathways when the complication occurred and the point at which the women survived.

Currently, there is no gold standard for determining life-threatening maternal complications within the community but there is a WHO standard criteria for identifying a maternal near miss. The WHO criteria was adapted by physicians who were engaged in the study, to code all the cases that were administered the audit tool. Two physicians evaluated the audits independently using the International Classification of Disease as a guide and the World Health Organisation criteria for near misses. The physicians independently coded a diagnosis and made a determination on the severity (whether life-threatening or not) of the morbidity condition after studying the symptoms and the open narrative section of the completed audit tool. Where there were discordance in the codes between the two physicians, consensus coding which involved bringing both physicians together to agree on the cause of the morbidity and its severity was organised. When the two physicians could not still agree on the cause of the morbidity and its severity, the case was considered undetermined. This process was important in determining the proportion of cases that were true life-threatening maternal complications based on physician assessments. An inter coder agreement kappa score of 0.72 (95% C1: 0.65- 0.77) (k = 0.71) was calculated which was considered significant [229].

All data on cost were collected in Ghana Cedis. The United States Dollar conversion was based on the average exchange rate for 2012 (1Ghana Cedis = 0.53USD).

5.1.10 Ethical issues in data collection

Permission for the study was sought from the chiefs and people of the selected communities through community meetings. Ethical clearance was also received from both the Monash University Human Research Ethics Committee (CF11/3546 – 2011001888) and the Navrongo Health Research Centre Institutional Review Board (NHRCIRB125). Written informed consent was obtained from participants in their preferred languages. The purpose of the study, the procedures involved as well as the risks and benefits of the study were explained to participants. Participation was voluntary.

Considering the sensitive nature of enquiries about death, in cases where the woman lost the baby, the mourning culture and expected courtesies were observed during the audit process. The field staff were trained to provide emotional support to participants who felt depressed during the

period of recounting the circumstances surrounding their complication and to refer respondents to places where they could seek further support.

Presentation of findings

The results of the study are presented in the ensuing chapters. Each chapter explores a major theme that answers broadly the research questions. Each broad theme is further divided into sections. A summary of each section as well as a brief write up on the implications of the findings are provided at the end of each section to show the relevance of the findings in relation to the research objectives.

Declaration for Thesis Chapter Six

Declaration by candidate

In the case of Chapter Six, the nature and extent of my contribution to the work was the following: Chapter **Six** provides the local explanatory model for life-threatening maternal complications. The research paper was peer reviewed and published in the Journal of Social Science and Medicine. My contribution was as follows:

Nature of contribution	Extent of contribution (%)
I conceived the idea and wrote the initial draft	50%

The following co-authors contributed to the work. If co-authors are students at Monash University, the extent of their contribution in percentage terms must be stated:

Name	Nature of contribution	Extent of contribution (%) for student co-authors only
Pascale Allotey	Critically reviewed the paper and approved the final draft	
Daniel Reidpath	Critically reviewed the paper and approved the final draft	

The undersigned hereby certify that the above declaration correctly reflects the nature and extent of the candidate's and co-authors' contributions to this work*.

Candidate's Signature		Date: **17/05/2016**
Main Supervisor's Signature	[redacted]	Date: **17/05/2016**

6 Chapter Six

6.1 Results

Introduction

The results are based on findings from both the quantitative and qualitative data in all the three phases of the research. Triangulation of the data sources provided a comprehensive view of the issues that were researched. The qualitative results are presented in a narrative format with indicative quotes that provide the best illustration of the themes used to represent the various categories of respondents. Where necessary, the results are also summarised in diagrams and tables for ease of comprehension and to add variety in the style of the presentation. The quantitative results are mainly descriptive statistics.

The results are divided into two broad chapters with each chapter further divided into sections. The first chapter (chapter six) of the results presents findings for objectives one of the research and the second (chapter seven) provides findings for objectives two and three.

Chapter six presents a detailed explanatory model for what is perceived by communities as life-threatening maternal complications. The model was used to construct a criterion for identifying life-threatening maternal complications in the community. It formed the basis for screening women and administering the audit tool which informed the findings in chapter seven. Data in chapter six were obtained on the causes of maternal complications, the key practitioners involved in the treatment of maternal complications within the community and how the treatment is done. These data were important in establishing the basis for the inclusion of traditional providers in current maternal morbidity investigations.

In Chapter seven, the quantitative data are presented from women who had recently given birth and fitted the local explanatory model for life-threatening maternal complications that was established in chapter six. The results of the quantitative arm were discussed with the community stakeholders who discussed their perceived roles in supporting maternal health within their communities. The data provide a rich description of the contribution of key stakeholders to either

averting or exacerbating the morbidity status of women and the challenges and possible solutions to improving maternal health.

6.2 Results One: The local explanatory model for life-threatening maternal complications

Introduction

In this chapter, the community context that justifies the need for a local explanatory model is described. This includes the bottlenecks associated with accessing care from modern health care facilities and why the use of alternate providers including traditional practitioners within the community for the management of maternal complications may be preferred by some pregnant women. The local understanding of a life-threatening maternal complication, the causes and treatment practices are also described. Specifically, the chapter addresses objective one of the research study.

The chapter is divided into two sections as follows:

- 6.1.1 Section one: Contextual factors that justify the need for a local explanatory model for life-threatening maternal complications
- 6.1.2 Section two: The local explanatory model for life-threatening maternal complications

6.2.1 Section one: Contexual factors that justify the need for a local explanatory model for life-threatening maternal complications

Introduction

This theme utilised findings from all phases of the research study. Throughout the interviews and discussions, participants consistently compared the traditional and modern healthcare systems and provided the context in which they are used for managing maternal complications. This section explains why some pregnant women with complications opt for alternate providers other than accessing modern health care and sets the stage for defining what communities perceive as life-threatening maternal complications.

6.2.1.1 The framework for seeking health care during maternal complications

Traditionally, when maternal complications occurred at home, a pattern of health seeking that involved the compound/household head and traditional providers were identified. The compound/household head would consult the *vuru* (soothsayer) who through the gods and ancestors is able to diagnose the cause of the complication and suggest an appropriate place for care. Complications deemed to be caused by spiritual forces, including "spirit children", witchcraft, charms or spells were referred to diviners/spiritualists.

> *"If someone is bewitched, a doctor cannot handle that. In that case if you send him to a spiritualist, he will say the patient has been bewitched and so these are the things that will save the woman. If you send her to the hospital, she will die because the doctor does not know that one. That is why some go to the hospital and some also go to spiritualists". FGD-OL-PUNGU*

The *vuru* recognises that some complications are better treated at home and others at a modern healthcare facility. So "*If the complication is not the type that can be treated at the hospital, she (the woman) can go there more than ten times, her condition will not change. She has to visit a herbalist" FGD-OL-YUA***.** For instance,

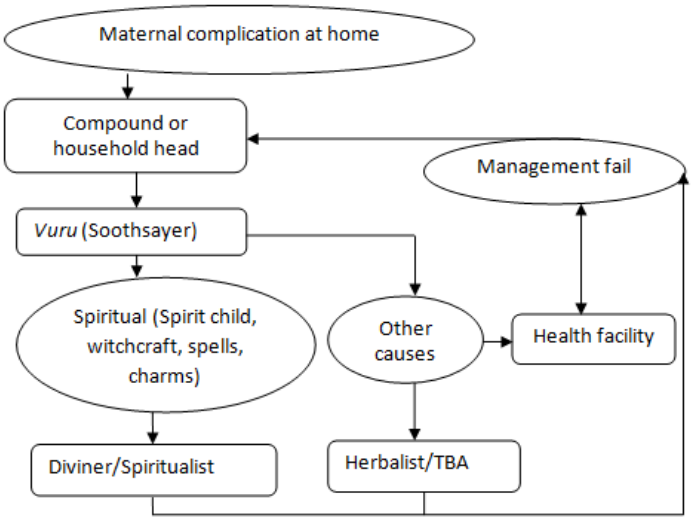
> *If it is "bunga dundurun" (Jaundice) the hospital cannot treat you. Your doctors have injected people suffering from "bunga dundurun"; they died and were brought here and we buried them. We have the herbs which cure easily. FGD-OL-KURUGU*

The decision to use modern health care is sometimes due to the failure of traditional healers to manage complications. In such cases, an approach is taken by the compound/household head, culminating in the use of modern health care.

> *If a pregnant woman falls sick and you consult a soothsayer, you may be told not to send her to hospital. If you do that, you will pick a corpse home. You have to do the home treatment first and if her condition does not improve, then you can take her to the hospital. FGD-TBA-PINDAA*

Figure 4 depicts the health seeking process for maternal complications in the KND.

Figure 4: Framework for seeking care for maternal complications



6.2.1.2 Perceived quality of maternal healthcare services

Quality of health services was evaluated based on their effectiveness in managing maternal complications. Some community members doubted if appropriate examinations are conducted in modern healthcare facilities before initiating treatment. Several respondents recounted incidents of treatment failures that compelled them to consider other sources of care. One discussant explained that "*the fact is, when you send her to the hospital, the nurses do not take care of her. They will not check her properly. They only give her paracetamol and when you return home, her condition does not improve and you have to send her back again. You then decide to send her to a herbalist. Imagine travelling every time in a vehicle to Navrongo [District hospital] only to be*

given paracetamol. The nurses do not take care of them; that is why we ask them not to go there anymore." FGD-OL-MANYORO

One respondent recounted how poor care by a nurse led to severe postpartum haemorrhage due to retained placenta.

> *I last took a pregnant woman to the hospital and they assisted her deliver and discharged us leaving the nyeene (placenta) in the woman and after four days of discharge when we performed the "sooru"[traditional cleansing rite for first time mothers], we couldn't sleep. She came and said mother, mother wake up and before we realised the woman was soaked in blood and I called another woman and we sent for a car and when we sent her to the health facility, the nurse said when she was discharged maybe we used our traditional medicine which is making her bleed meanwhile they didn't do the right thing. When the doctor came to examine her, he said it was the placenta that remained in her and they sent her to the theatre and removed it and came back and I asked whether the nurses did not do well or we gave local medicine. So that is why in most situations, we resort to traditional treatment even though they say we should not treat at home. FGD-TBA-KAJELO*

Another participant described how persistent failures by modern health care facilities compelled them to the turn to traditional remedies.

> *"My friend's wife had abdominal pains, she went to the hospital for a long time. She went to hospitals at Po (boarder town in Burkina Faso) and Navrongo. Whenever she took the medicine, her condition became better but later on it starts again. It went on this way for more than five months; she stopped going to the hospital and took herbs and the sickness stopped". FGD-OL-MANYORO*

Poor care and persistent failure to appropriately manage maternal complications has contributed to disaffection for modern health care. The result is mistrust and the search for alternative sources of care within the community.

6.2.1.3 Attitude of health workers

The attitudes of health workers discourage women from using health facilities for maternal emergencies. Participants complained about nurses disrespecting, neglecting and verbally abusing patients. Women are physically abused during delivery in the attempt to encourage them bear down effectively. Nurses were also reported for falsely accusing patients of actively delaying the visit to the hospital. The community members attributed the behaviours to the young age of the nurses and their limited experience in midwifery skills. They also suggested that alcoholism was a problem among health care workers.

> *"Some of the health workers especially these young nurses, they are always disrespecting us because they say we are old and that we always use our herbs to treat and when it doesn't cure we come late to worry them. They always say send your patient back to the healer to treat and that they cannot treat. Meanwhile it is not every time we use the herbs; at times we don't have money to transport the patient and pay for the bills because of poverty. Sometimes you have to sell a goat or cow or any animal to get money because these days the drugs are expensive. When they mention the price of one you get instant headache". FGD-TBAs-PAGA NAVIO*

> *"Sometimes they do not take care of the labouring woman in the labour room. They will just close the door and sit somewhere". FGD-TBAs-KWOGWANIA*

Some of participants however acknowledged that not all the nurses are engaged in negative behaviours. Older nurses were reported to be more friendly and accommodating.

> *"It is good but the young nurses who are there now do not work like the old nurses. The old nurses take good care of pregnant women and women who have just delivered but these days they do not have time to do that; sometimes they shout at them". IDI-TH09-GIA*
>
> *"At times when you meet good nurses and doctors they will take their time and treat your patient but if it is those nurses who do not regard their fellow human beings, they will be shouting at you as if you are an animal or as if you have stolen something from them. Meanwhile it's their duty to receive patients and give good treatment because they are paid for the work they do". FGD-TBAs-WURU*

6.2.1.4 Perceptions of health workers

Health workers were given the opportunity to respond to the concerns raised in the community. Some disagreed with the allegations of unprofessional conduct and others admitted that as humans, they are bound to make mistakes. They explained that the facilities are understaffed and so the pressure of work often makes them lose sight of their professional obligations. Several interventions were being put in place within the health service to improve the professionalism of health workers. These included reorientation through workshops on client care practices, coaching, regular monitoring and support visits and continuous education. A director of health service asserted thus;

> *"As for this one, I cannot deny it. The health workers are also human beings and have their weak points. So we are training them and some are even going through customer care workshops to be able to handle the clients with care. So the education of our health workers is on-going. We also expect our clients to behave well too. We need to do our part and they also need to do their part". IDI-DIRECTOR OF HEALTH*

As part of the interventions, the health workers suggested that staff who were unprofessional should be punished. This could be a verbal or a written notice. They also encouraged their clients to report any observed staff insubordination.

> *"I will say that behaviour change communication is important; the attitude of the health worker towards the pregnant women will have to change. Another way is refresher training for our midwives; things keep changing and there are new ways of dealing with issues. If these midwives are abreast with new issues of service delivery, they will be able to give competent care and that has always been done. We have sent our midwives to so many workshops. We expect them to give competent care to clients". IDI-MIDWIFE*

6.2.1.5 Availability of care for obstetric complications in health care facilities within the community

Community health compounds were established to be the first point of call for maternal emergencies especially in rural communities. However, they are currently poorly distributed across the district and many communities do not have access to a community health compound. Some existing health compounds lack nurses or midwives to offer health services to the people.

Community members complained about the absence of nurses during weekends and at night when complications often occur. Compounding the issue was the use of male nurses in community health compounds which was considered culturally inappropriate for maternity care. A male in a focus group discussion reported that "*It is only recently that a clinic has been built here and only men are there, no female nurses. So how can I send my pregnant wife there for him to look at her vagina?" FGD-OL-NAYGNIA*

The health system does not train males as midwives. However, most health facilities are understaffed and therefore male nurses sometimes assume midwifery roles; a situation which impacts negatively on utilisation of health facilities.

Nurses at the community health compounds and health centres were asked about the type of obstetric complications that are managed at their level. They identified mild anaemia, high blood pressure, waist pains, abdominal pains, mild malaria and vomiting. As expected, most of these conditions are managed in their mild or early stages at the health centre before the patient is referred to the hospital. Some of the health care facilities however do not intervene before referral due to fear that patients might misunderstand it as treatment and therefore will not proceed to the referral point. Health workers at the health centre described their role during maternal complications as follows:

> *"As a health centre we can handle the very simple ones. For example, if a woman has high blood pressure because of her pregnancy, that is if the woman was not known to have blood pressure before she got pregnant and her blood pressure increases slightly, we can manage that at our level; that is if we are seeing good results that the blood pressure is not rising". IDI-MEDICAL ASSISTANT*

> *"We are not a referral unit; we are supposed to handle cases that are minor. If it is severe we are supposed to refer. I have mentioned about the Pregnancy Induced Hypertension, now we have some drug that we can also use at our level if it is not severe". IDI-MIDWIFE*

Despite reporting that health centres lack the capacity to manage maternal complications, some nurses reported treating patients ahead of referral to the hospital. Some community health nurses

who are midwives also manage maternal complications within their community health compounds. Although this is useful in preventing complications, it does introduce variation in the standards and operations across health facilities which can cause disaffection among community members. For instance, some individuals feel marginalised when nurses in their communities are unable to offer certain services as contained in the excerpt below.

> *"We have different types of nurse's here; some are trained to assist women deliver, and others are just ordinary nurses. So if you go and meet those that are not trained to assist women deliver, they can tell you to go to Navrongo and deliver because they don't know how to assist women deliver and if there is a complication they will not know what to do. This makes the patient always think that they (nurses) don't respect her that is why they are referring her to Navrongo". FGD-TBA-KAJELO*

Throughout the KND, health centres are strategically located within the district to provide curative services to rural communities. However, for maternal complications, these facilities are limited in the services that they provide. The Navrongo hospital which is the only facility equipped to manage emergency obstetric complications is not easily accessible to all communities. This means that women with maternal complications may be compelled to explore alternative forms of care.

6.2.1.6 Referral of obstetric complications from health facilities

Referral is an essential part of the continuum of care. Referrals often started from the community health compound (CHC), to the clinic, to the health centre and to the district hospital. The number of facilities that a patient visited before arriving at an appropriate place of care generally depended on her first point of call. Most health facilities within the community are not equipped to handle life-threatening complications and therefore have to refer such cases to the next level of care. The decision to refer was influenced by the type and nature of the complication. Complications that were referred included obstructed or prolonged labour, haemorrhage, retained products, severe malaria and postpartum haemorrhage.

> *"And with the postpartum haemorrhage the women deliver and bleed which can be continuous and in that case we cannot manage; we simply refer and most often we do the*

resuscitation before we refer the woman to the nearest district hospital. IDI-MEDICAL ASSISTANT

"As for the complications, if a woman is bleeding I can't handle her here, anaemia, I can't handle, severe hypertension I can't handle. So I refer them even with severe malaria because they have to give her quinine IV and our facility we can't handle that". IDI-MEDICAL ASSISTANT

Also, the pregnancy history of the mother as well as her personal characteristics influenced referral. Primiparae, multiparae, multiple pregnancies and women with history of caesarean sections were referred to the hospital.

Currently, there are practical challenges in getting patients to the next level of care. Community health compounds which are within 5km of homes do not operate ambulance services and so nurses transported patients on their official motorbikes to referral facilities. Health centres have pickup trucks and some have ambulances that the community health nurse can phone during a referral. The non-availability of these vehicles when required was reported during the interviews and discussions. The primary purpose of the pickup truck was for the operations of the health centre. The demands on the few ambulances coupled with the poor state of roads within the communities has led to frequent breakdown of the vehicles; thus leaving community members to look for alternate means of transport. One of the nurses summarised the challenges with referral in the following quote:

"This clinic, we don't have our own means of transport. They bought some motorbikes which we use for home visits and other outreach programmes. So if a woman is in labour and I need to refer, I can't refer her because I have no means. So in critical situations I either call the DHMT (district health management team) office either in Navrongo or Paga for support. Sometimes the cars are out in the field or broken down. Our road is not good and you can imagine if a car does not come from either Navrongo or Paga and I have to transport a pregnant woman in labour on a motorbike on the bad road; it wouldn't be good for her". IDI-MIDWIFE

Community members were encouraged to find their own means of transport during referrals. However, public transport in rural communities is only available on market days which occur once every three days. Motorbikes are common in the communities but cannot be used to transport women with complications. Some pregnant women are also transported on bicycles and others have to walk to referral centres.

> *When you send a pregnant woman to the clinic, sometimes they ask you to go to Natugnia (CHC), when you get there, they also refer you to Sirigu. There is no vehicle here; picking a pregnant woman on a bicycle to Sirigu is very difficult. There is a sandy stream here and you cannot cross it. Carrying this pregnant woman on the bicycle, if the bicycle breaks down on the way, how can you push it to wherever you are going to? FGD-OL-MANYORO*

According to the nurses, community support for referrals is not encouraging and that puts the burden solely on the health workers. To one health worker, "*When you refer a pregnant woman, the relatives will say they are going to look for means of transport and they will never come back again or at times they will say we should get means and send the patient and whatever bills we incur they will pay but they will never come back and pay the money once the woman gets well" IDI-MIDWIFE.*

The nurses complained that some families do not comply with their referral recommendations. For community members, the decision to move from one level of care to the other transcends medical recommendations to include the consent of the family. Also, community members are not aware of the limitations of the various health facilities and sometimes do not understand why a facility will refer her to another. *"For instance, a bleeding woman comes and I tell her we cannot handle your condition here and you have to be admitted in the hospital, so we are going to give you first aid and refer you for admission and once she has seen that there are beds she doesn't understand that it is a health centre and we have our limits" IDI-MIDWIFE.*

6.2.1.7 Treatment and referral costs

Maternal health services such as treatment for complications and ambulance services are free in public health facilities. However, patients often buy some essential medicines outside these facilities due to chronic shortages and health staff were reported to request money from families

of patients to fuel ambulances. Community members quoted amounts ranging from 20 Ghana Cedis to 100 Ghana Cedis.

> *"Sometimes it is lack of money to get a vehicle. There is a hospital vehicle and if you call for it and they come, you will be asked to give them money to buy fuel for the vehicle. They will ask for 100 Ghana Cedis; as we are sitting here, where are we going to get 100ghana Cedis from? If you do not sell a cow, where are you going to get it from?" FGD-OL-NAYAGNIA*

> *"There was a time I went there (health centre) and witnessed something that happened to a man and his wife. There was a vehicle parked there but the man was asked to give them twenty Ghana Cedis (20GH¢) to buy diesel. But the man said he did not have that amount; the man had no option but to leave his pregnant wife there and then went to Manyoro market to borrow money from a relative before the vehicle sent the pregnant woman to Navrongo." FGD-OL-MANYORO*

Some nurses confirmed the reports from the community.

> *We have a pick-up which normally transport those we normally refer if they can afford the transportation fee which is 20GH¢ and those who cannot we give them first Aid and they will board public transport to Bolga hospital or Navrongo hospital depending on the market day in any of these two places. IDI-MIDWIFE*

Indirect costs included feeding of both patient and caretaker while on admission. These costs were perceived by participants to be high as the people are predominantly poor. Patients in search of cheaper alternatives, tend to prioritise the use of traditional practitioners who are less expensive. In such circumstances, the health facility is only used when traditional providers fail as articulated by one opinion leader.

> *"I think poverty also leads to that; if a man has no money, he feels the "Kassena treatment" (Traditional medicine) is cheaper. So he first of all goes to a herbalist because if he goes to the hospital he will spend more than what he will spend at the herbalist's." FGD-OL-MANYORO*

"If you have to take a vehicle to Navrongo, you need money and there may not be "sampua" (a pesewas) on me. I have to go to a colleague; he will also say he has nothing. What do I do? I will fetch some groundnuts and some millet and then go to a healer." FGD-OL-NAAGA

6.2.1.8 Caesarean section and utilisation of health facilities

The rate of caesarean sections in health facilities was a source of worry to community members. They observed that doctors often interrupt the waiting period for women to have normal deliveries to carry out caesarean sections for unwarranted reasons. To community members, most of the caesarean sections are unnecessary and are against their wishes.

"If they were to wait small for the right time, the woman will deliver but they rush and operate and at times we don't even know whether it is the fault of the doctors or the nurses. Most of the women do complain about this attitude; so many of us don't like the operation". IDI-TH-PUNGU SOUTH

"*Some women are due and yet you operate them and remove the baby without paying much attention to her situation. Otherwise why is it that a woman can give birth once and cannot deliver again? Every human has a time to be born into this world, so if you don't wait for that time and you rush to operate, that is not a good thing". IDI-TH-PUNGU NORTH*

The fear of caesarean sections was reported to influence utilisation of health facilities for delivery.

"they always want to use the TBAs to deliver their wives at home and not send them to the hospital because they fear that they will be operated especially first time mothers". FGD-OL-PUNGU NORTH

Community members provided several reasons for disliking caesarean sections. The reasons have been summarised in Table 11 below.

Table 11: Community members' concerns about caesarean sections

Fears	Quote
Once operated upon, subsequent deliveries will also be operated upon	*"If you are operated for the first delivery, your subsequent deliveries will end up like that too, thus making you so weak. If you happen not to have someone to take care of you at home, you will suffer because who will wash your clothes, bath the baby and cook food. Even if someone comes to help you, after some few days that person will go home and leave you alone and you will not be able to work for yourself." FGD-TBAs- GIA*
Limits the number of children one can have	*"We don't like it because they say if you are operated in your first delivery and you become pregnant again they still have to operate you and when you are operated for 2 or 3 times you cannot deliver again and if you want more children how will you get them again and they will even cut your "front" and destroy it and it won't look good again because every time, they cut; why?" FGD-TBAs- PAGA NAVIO*
Restricted diet which the ordinary person cannot afford	*"Yes actually the operation is not good because it makes the woman weak and they even tell her not to eat certain foods or do hard work otherwise her stitches will remove and the wound will not heal. They tell you to be eating light soup and soft foods; if you are from a poor family where are you going to get money to buy meat or fish and prepare the light soup." FGD-TBAs- PAGA NAVIO*
Community members depend on hard work to survive but CS prevents the woman from working to support herself	*"We do not like women being operated on; this is because it weakens the woman. Here, we survive by working hard. If you go through an operation, you don't have to lift anything heavy, you cannot work. So we are only forced to accept it" FGD-OL-GAANI*

CS gives the woman the added responsibility of taking care of the sore.	*"In this community, we don't like the operation; if the woman does not take good care of herself, she will smell. Water can also go into the sore if she does not take care and that will be another health problem. We don't like it but if it must be done we have to accept it," FGD-OL- NATUGNIA*
Uncertainty about the success of the procedure especially if power is interrupted during the procedure	*"We do not like the operation, you may be in the process of the operation and if lights go off, you can die through it. We prefer delivering at home without anyone hearing that they have done something to you. We do not like the operation". FGD-TBAs- YUA*

For most community members, they accept caesarean sections because there are no alternatives. They acknowledged that a large foetus, a narrow birth canal and cases of breech presentation require caesarean sections to save the woman. One TBA explained why caesarean sections are necessary in the quote below.

> *"If a baby is not in the right position but lies across in the womb, whatever you do, the baby cannot turn its head towards the passage and so they have to cut the woman and remove the baby. Secondly in a case where the passage is too small, the baby cannot come out and if you do not send the woman to the hospital, the baby will die. I have sent two women to Navrongo and they were operated upon. We were told that the passage through which the babies come out was too narrow". FGD-TBAs- KOLOGO*

6.2.1.9 Summary of findings

The decision to seek modern health care for maternal complications is influenced by socio-cultural as well as health facility factors. Traditionally, compound or household heads seek counsel from soothsayers who in consultation with the gods and ancestors prescribe the appropriate place for care. Health conditions are perceived traditionally to be caused by either medical or non-medical related factors. Medical causes either receive treatment from the health facility or traditional healers while non-medical causes are generally managed by diviners and spiritualists. When the recommendation to seek modern health care is made, the fear of caesarean sections and the perception of poor quality of services including the unprofessional conduct of

health providers, discourage utilisation. Non-utilisation was further attributed to the non-availability of emergency obstetric care in health care facilities located within communities. Women in need of emergency obstetric care within communities are usually referred to hospitals which may be geographically and financially inaccessible to rural populations.

6.2.1.10 Implications of the findings

Four major themes were identified from the results. These included the influence of cultural believes on utilisation of health facilities, inequalities in access to health care, the quality of health care and mistrust.

The findings revealed that culture is a significant barrier to utilisation of health facilities. Traditional beliefs in the KND determine the cause of maternal complications, how they are treated or managed and the appropriate place to receive treatment. The belief system guides health seeking for maternal complications regardless of what the health system advocates as the standard of care. For instance, a belief that a complication is due to a spiritual phenomenon necessarily suggests a traditional remedy.

The findings further highlight inequalities in the provision of maternal health care in rural Ghana. Patients in rural communities face both geographical and financial barriers in accessing emergency obstetric care in modern health care facilities especially during referrals. The issue is further compounded by institutional barriers that include hostile and the unprofessional conduct of nursing officers, maltreatment of patients and the absence of essential drugs.

Poor quality of care leading to mistrust was reported as a persistent challenge in maternal health care. This is a systemic problem and medium to long term solutions such as continuous re-orientation of health workers and realigning midwifery curriculums to make health workers more professional may be ideal. Current interventions to address attitudes and motivate staff through incentives and motivational workshops have had little success in improving quality of care.

From the quantitative findings, not all women with life-threatening maternal complications seek care at health facilities. Traditional healers are actively involved in the management of maternal complications and it is important to know the quality of care that is provided at that level. Some women use them as the preferred source of care and others only use them when they fail to get adequate care from the health facility. Regardless of the number of women who use traditional

providers, every pregnant woman has a right to life and it is important that the health system ensures that they receive appropriate care for their complications. Identification of traditional practitioners who are involved in maternal health care during complications is therefore critical to improving our understanding of life-threatening maternal complications and how they are managed within communities.

6.3 Section two: The local explanatory model for life-threatening maternal complications

Introduction

This section of the results sought to obtain local explanations of the concept of a life-threatening maternal complication from the perspective of traditional practitioners in order to come out with a diagnostic criteria for identifying cases within the community. The section is further divided into two; the first part (Section 2A) provides in-depth understanding of key practitioners (traditional healers) within the community who are involved in the identification and treatment of life-threatening maternal complications and the second part (Section 2B) provides the local explanations surrounding life-threatening maternal complications.

A research paper on the neglect of traditional healers in maternal health has been published in the journal of Social Science and medicine. The paper has been attached here because its contents partly reflect the contents of the section.

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The traditional healer in obstetric care: A persistent wasted opportunity in maternal health

Raymond Akawire Aborigo [a, b, *], Pascale Allotey [a], Daniel D. Reidpath [a]

[1.] Global Public Health and South East Asia Community Observatory (SEACO), School of Medicine and Health Sciences, Monash University, Malaysia

[2.] Navrongo Health Research Centre, Navrongo, Ghana

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abstract

Traditional medical systems in low income countries remain the first line service of choice, particularly for rural communities. Although the role of traditional birth attendants (TBAs) is recognised in many primary health care systems in low income countries, other types of traditional practitioners have had less traction. We explored the role played by traditional healers in northern Ghana in managing pregnancy-related complications and examined their relevance to current initiatives to reduce maternal morbidity and mortality. A grounded theory qualitative approach was employed. Twenty focus group discussions were conducted with TBAs and 19 in-depth interviews with traditional healers with expertise in managing obstetric complications. Traditional healers are extensively consulted to manage obstetric complications within their communities. Their clientele includes families who for either rea-sons of access or traditional beliefs, will not use modern health care providers, or those who shop across multiple health systems. The traditional practitioners claim expertise in a range of complications that are related to witchcraft and other culturally defined syndromes; conditions for which modern health care providers are believed to lack expertise. Most healers expressed a willingness to work with the formal health services because they had unique knowledge, skills and the trust of the community. However this would require a stronger acknowledgement and integration within safe motherhood programs.

1. Introduction

In 1987, the World Health Organisation launched the safe motherhood initiative (SMI). The purpose of the initiative was to ensure that all women receive a minimum basic standard of care needed to be safe and healthy throughout pregnancy and child birth (Berer and Ravindran, 1999). SMI programs were designed to increase the prevalence of contraceptive use, increase the number of births attended by a skilled birth attendant, improve access to emergency obstetric care and improve the monitoring of maternal morbidity and mortality. The initiative was welcomed by resource-poor countries because it had the potential to address the signifi-cant maternal mortality burden (United Nations, 2008). The guidelines established through SMI are the basis of the standard of obstetric care within health systems around the world (ICPD, 1994).

By 1992 it had become clear that the effectiveness of SMI, particularly in low income settings, was limited, largely as a result of poor access and utilisation (WHO et al., 1992). Extant traditional medical systems in low income countries in Africa and Asia remained the first line service of choice, particularly for rural communities (WHO, 2002). SMI programs however, had failed to adequately acknowledge the importance of the role played by traditional birth attendants (TBAs). The WHO therefore advocated for the integration, where appropriate, of TBAs in the primary health care system (WHO et al., 1992). TBAs were trained to improve their skills for the management of normal births and the recognition of potentially high risk cases that required referrals for emergency management in health facilities. The strategy formally recognised the importance of pluralism of health care systems for traditional societies and to some extent, the recognition has per-sisted through more recent 'task-shifting' strategies (WHO, 2012). However, the approach has been restricted to a shallow pool of practitioners and to a narrow field of practice (Allotey, 1999).

Reviews of progress towards meeting MDG targets show that in excess of 30% of women in rural communities do not have access to skilled attendants at birth (Ghana Statistical Service (GSS) et al.,

* Corresponding author. Navrongo Health Research Centre, Post office Box 114, Navrongo, Ghana.
E-mail address: [redacted]

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2009; World Health Organisation, 2014). Furthermore, community based studies suggest that for some obstetric complications, including those that might be regarded as life-threatening, a broader range of traditional practitioners are consulted within the traditional health system (Goodburn et al., 1995; Mills and Bertrand, 2005). These traditional practitioners e diviners, spiri-tualists, herbalists e are not in the formal category of 'TBA' but are often the preferred care provider for some women for obstetric complications, even where there is access to obstetric care (Aborigo et al., 2014; Mills and Bertrand, 2005).

Without a clear knowledge and understanding of the range of practitioners involved in the management of pregnancy-related complications and the nature of their practices, maternal health services will continue to ignore what might be a significant entry point to the provision of 'skilled' attendants. In this study, we explored the role played by traditional practitioners, other than just TBAs, in managing obstetric complications. We also examined their relevance in current initiatives to reduce maternal morbidity and mortality. Specifically, the study explored questions on who they were, how they acquired their knowledge, the range of complica-tions they managed and the nature of the management.

1.1. Background

Maternal deaths are rare but complications in pregnancy are common. Estimates suggest that for every maternal death, 15 to 30 women experience severe complications including obstetric fistula, ruptured uterus or pelvic inflammatory disease (Bang et al., 2004; Starrs, 2006). Furthermore, research in Ghana suggests that about 9.6% of women who have home births suffer severe maternal complications (Ghana Statistical Service (GSS) et al., 2009). Under the Ghana Health Service safe motherhood guidelines, these com-plications need to be referred to and managed within a health care facility equipped to manage emergency obstetric care (GHS, 2007).

However, preference for home deliveries and use of traditional medical systems continue to limit utilisation of health facilities for child birth and management of complications (Ngom et al., 2003; Ronsmans and Graham, 2006). Studies in Tanzania and Bangladesh show that women still trust TBAs to intervene when severe complications occur during child birth e and although TBAs were found to refer appropriately to other practitioners when the complications were beyond their capability to manage, mothers often did not follow upon the referral due to financial costs, transportation bottlenecks and fear of maltreatment from health care providers (Moyer et al., 2013b; Vyagusa et al., 2013).

In spite of several years of implementing referral systems for maternal health, reporting to health facilities with maternal com-plications in many low income countries occurs only as the final treatment option, when all others have been exhausted (Aborigo et al., 2014; Adisasmita et al., 2008). These other treatment op-tions include herbal remedies based on general folk knowledge, or prescribed by local healers. Treatment in this context could also require the imposition of strict dietary changes or rituals that serve to restore a malcontent ailing spirit that may ultimately be responsible for the poor health outcome (Hevi, 1989). It is impor-tant to note that although there is widespread recognition of the role of a traditional health care system other than through TBAs, sanctioned practice does not extend to maternal health and preg-nancy complications (GHS, 2007).

2. Study context

Safe motherhood was launched in Ghana in 1987 to make childbearing safer for all women and to improve infant health. The initiative coincided with other debates about the integration of other traditional practitioners into the health system within the broader context of comprehensive primary health care (Jarrett and Ofosu-Amaah, 1992). However, while the importance of a limited role of trained TBAs was recognised for maternal and child health programs (Odoi-Agyarko, 2003), there was significant resistance to the formal integration of other types of traditional medicine prac-titioners such as the traditional healers. A traditional healers (THs) association was established in the 1960s and more recently, a directorate for traditional and alternative medicines has also been established. All traditional healers who intend to practice are required to register with the Traditional Medical Council (Odoi-Agyarko, 2003). Although to some extent, these acknowledge the importance of the traditional medical system to the population, the veracity of their evidence base is still questioned by professional associations (Tsey, 1997).

Within this broader health system context, the study was car-ried out in the Kassena-Nankana East and West Districts (KND) in northern Ghana. The KND is a relatively poor rural and agrarian district with a population of about 153,263 people from the Kas-sena and Nankani tribal groups (Oduro et al., 2012).

Polytheism is common among the Kassena-Nankanis. Animism, the traditional religion, predates the arrival of Christianity and Islam and while there have been many converts, the different re-ligions and deities are believed to serve different functions (Allotey, 1999; Mills and Bertrand, 2005). The traditional religion holds to a supreme being e consistent with conversion to Christianity or Islam e but also served by lesser gods or spirits that dwell in rivers, trees, stones, animals and other objects (Manoukian, 1951; Yoder, 1982). Ancestors live with these spirits and act as the link be-tween the individual and the deities. Ancestors are revered deceased family members who are believed to intercede to alter the fortunes of individuals or the family. They are regularly called upon through the pouring of libation e a ritual that involves the spilling of animal blood and ritual foods and alcohol on an object that embodies the spirit. The pouring of libation averts misfortune from the family and brings prosperity. There is also a belief in reincar-nation and soothsayers (vuru) are able to foretell during pregnancy for instance, which ancestor is to be reincarnated (Allotey, 1995). Converts to other religions continue to maintain their belief in the power and wisdom of the ancestors and the spirits (Yoder, 1982).

Households in the KND are made up of extended patriarchal family units in relatively isolated compounds. A compound is a group of households that are physically linked. They are headed by males who have absolute authority over the compound members. In addition to the role as provider, the compound head is a mediator and the link between the dead and the living e the ancestors and compound members.

The traditional medical system in the KND is based on a belief in spirits e including ancestors, practice of soothsaying and the healing abilities of herbs and other natural products and objects. Illnesses and other misfortunes are attributed to either spiritual forces or disgruntled ancestors. The ancestors impose misfortune where family members make decisions without seeking advice (Adongo et al., 1997). Soothsayers are believed to have the ability to communicate with the ancestors and an individual's personal gods to foretell the future and give advice. Soothsayers provide a pre-liminary diagnosis of an ailment and recommend the type of traditional practitioner that should be consulted. Key practitioners within the traditional medical system include herbalists, spiritu-alists and TBAs. These practitioners function alongside formal health care providers throughout the district.

2.1. Maternal health facilities

Government health facilities are strategically located

throughout the district to offer formal health care. There are 33 community health compounds in the district run by resident community health officers. These facilities are supported by six health centres and a district hospital. The hospital is located in the urban centre and serves as a referral facility for all cases in need of emergency obstetric care. The hospital has two general physicians responsible for medical care, including obstetric emergencies that arrive at the hospital. Financing of health care in the district is largely through a district mutual health insurance scheme, but all maternal health care services are provided at no cost within public health facilities.

The Ministry of Health has retained a commitment to improve maternal and child health. The establishment of new centres and the provision of free maternal services are designed to improve geographical and financial access respectively. This notwith-standing, 40% of childbirths in the KND are not attended to by skilled professionals (DHMT-E, 2011; DHMT-W, 2011). It is known that there are still a significant number of TBAs, with little or no formal training who use herbal remedies or other traditional practices to stimulate labour or facilitate child birth (Moyer et al., 2013a).

3. Methods

3.1. Study design

A qualitative study was used to explore the nature of practice of the various traditional practitioners, the context in which they work, and their interaction with the community, maternal health services and pregnant women. This was part of a larger doctoral study that investigated community perceptions of near-misses and how they are managed within the community. Other aspects of the study are described elsewhere (Aborigo, 2015).

3.2. Sampling

The Navrongo Health and Demographic Surveillance System (NHDSS) is a research platform which runs through the Navrongo Health Research Centre (NHRC). The NHDSS conducts routine census updates and data collection every 120 days (Oduro et al., 2012). The system registers and monitors pregnancies and preg-nancy outcomes including live births and maternal and perinatal deaths. A detailed description of the NHDSS methods has been reported elsewhere (Oduro et al., 2012).

The NHDSS has demarcated the KND into five zones e central, north, south, east, west e made up of 247 clusters. Each cluster contains a maximum of 99 compounds. The central zone is the urban centre of the district and hosts the district hospital. This zone was excluded from the sampling frame to focus the research on those rural populations where the influence of traditional practi-tioners is more profound (Adongo et al., 1997). Five clusters were randomly selected from each of the remaining zones for focus group discussions (FGDs) with TBAs. One FGD was conducted in each cluster.

In establishing the NHDSS, community key informants (CKIs) were engaged by the NHRC to record all pregnancies, births and deaths that occur in their localities to complement routine census updates (Aborigo et al., 2013). CKIs work closely with other community-based health providers such as Community Health Officers (CHOs), TBAs and THs. CKIs compile records of all the different providers (Aborigo et al., 2013). The CKIs in the selected clusters provided the research team the list of TBAs (both trained and untrained) who serve the selected clusters.

In order to manage the discussions effectively, the field team used convenience sampling to select the first 12 TBAs on the list who were available and consented to participate in a focus group discussion. The focus groups provided an opportunity for TBAs to identify the best known THs in the community able to treat severe maternal complications. The list of THs was further expanded through snowball sampling. THs who consented to participate in the study were interviewed individually.

3.3. Training of data collectors

Interviews and discussions were conducted by one of the re-searchers. Three graduate level staff (1 male and 2 females), were recruited to assist with data collection. They were selected to meet the following criteria: fluency in at least one of the main languages in the study area e Kasem and Nankani; more than five years research experience, particularly with conducting FGDs and IDIs and experience in producing accurate translated transcriptions. They were trained over a period of two weeks to understand the research protocol, the data collection tools, the consent procedures and to hone their skills. A pre-test was used to evaluate their per-formance as well as finalise the study guides. Data collection was undertaken between March and November 2012.

3.4. Focus group discussions (FGDs)

We explored the knowledge and treatment of maternal com-plications with 20 groups of TBAs. A discussion guide was devel-oped based on the aims of the study. Each focus group was attended by 8e12 individuals with each lasting approximately 2 h.

3.5. In-depth interviews (IDIs)

In-depth interviews were conducted with 19 THs to elicit rich descriptions of their knowledge acquisition and management strategies. We also explored their experience of and preparedness to work with the Ministry of Health. Open-ended questions permitted the natural flow of the interaction and created the op-portunity for the interviewer to follow-up with relevant questions and probes. Each IDI lasted approximately one hour.

3.6. Data processing and analysis

All interviews and discussions were conducted in the local languages e Kasem or Nankani. Interviews and discussions were audio recorded and transcribed directly into English while main-taining key cultural terminology in the local languages.
Transcripts and field notes were imported into QSR NVivo 10.0 software for thematic analysis (QSR International Pty Ltd, 2014). Open coding was used to identify themes based directly on the research tools. Segments of texts in the respondent's own words and expressions relating to the themes were extracted and labelled. Subsequent texts that were coded under the same themes were constantly compared to previous texts coded under the same theme and contrasted with other themes. Similarities and differ-ences in each theme and sub-theme were examined. Observations and field notes were coded together with the main transcripts and used to provide more context information. A Grounded theory building approach was used to develop further areas of inquiry for the larger study (see (Aborigo, 2015).

The research was approved by the Monash University Human Research Ethics Committee (MUHREC CF11/3669: 2011001926).

4. Results

All the THs who participated in the study practiced traditional religion. Most of them were illiterate. The socio-demographic

profile of the TBAs who participated in the focus groups is pre-sented in Table 1.

Due to their interaction with THs, most TBAs have knowledge of the traditional management of maternal complications. A few played a dual role of TBA and healer and therefore in this section, THs is used to refer to both traditional healers and traditional birth attendants.

THs described several aspects of their roles within the com-munity, including how one becomes a healer, how the knowledge is managed, who the clients are, how various maternal complications are managed and the limits of their practice.

4.1. How does one become a TH?

"My grandfather started it and died and my father inherited from him and was treating people until he passed away and before he died he taught me where to get the herbs and the way to treat the illness and that is how I am a healer here today. For the past 20 years or more I have been treating pregnant women "IDI-TH08-MANYORO"

There were two major pathways to becoming a TH; for most, it was a family tradition but others were "spiritually chosen". Where the practice was handed down within the family, it was through an apprenticeship model starting from a young age.

It is the duty of the practicing healer to ensure that the successor gained knowledge about the profession in order to sustain the reputation of the family. Knowledge of the herbs is acquired either through apprenticeship or spiritual guidance. The instruments of practice are formally and ceremonially handed over when the main healer in the family is elderly, begins to feel weak and senses death. Some of the healers claimed their parents learnt the craft from a "higher being" or by observing and absorbing the skill from their natural surroundings but others could not tell how their families came to be associated with the practice.

Table 1
Socio-demographic characteristics of focus group participants.

Variables	Freq (n ¼ 215)
Gender	
Male	3
Female	212
Age group	
<45	26
45	189
TBA status	
Trained	122
Untrained	93
Education	
Ever been to school	44
Never been to school	171
Occupation	
Farmer	142
Trader	65
Weaver	1
Housewife	7
Marital status	
Still Married	94
Widowed	121
Religion	
Christianity	167
Muslim	14
Traditional Religion	34
Ethnicity	
Kassena	120
Nankani	90
Builsa	5

Healers who did not inherit their craft said they acquired it from "spirits". They were chosen by the spirit and gifted the knowledge of treating a range of conditions including maternal complications. Some received their gift from a buga (river) or from chuchuru-bia (spirits). The chosen individual is usually directed by the river or spirit through visions. Usually the spirit haunts the individual persistently, forcing him or her to consult a soothsayer for an interpretation of the events. Haunting ceases only when the indi-vidual accepts to work with the spirit. Alternatively, the individual may seek to have the spirit exorcised. Invariably however, in-dividuals accept the role as it ultimately becomes the main source of income for the family. The role of traditional healer carries proscriptions; for instance, the acceptance of food and drink from the home of a patient or looking back at the house of a patient after administering treatment. The healer becomes a channel through which the spirit works and because of the mode of acquisition of the knowledge, it cannot be shared or passed on to descendants.

4.2. What is the consultation process for maternal complications?

"We take a chicken to him (consultation fee), and then he comes to do the treatment. When a woman delivers and the placenta is not expelled, we have someone who we go to consult using a chicken. When he comes and rubs his hands all over the woman's abdomen, the placenta will be expelled." FGD-TBA-
KAYORO

The strong patriarchal system that operates in the district places health related decision making solely within the domain of the compound head. In the first instance, the compound head consults a soothsayer on behalf of the patient. The choice of soothsayer depends not only on relationships and networks, but also on reputation. The soothsayer in turn, determines the type of healer to be consulted if further referral is required. The type of healer is based on the soothsayer's understanding of the pregnant woman's complication. Some of the healers then continue to work with soothsayers to further refine the diagnosis. Healers also work with the 'spirit' that guides their practice to work through the diagnosis and appropriate treatment of the condition.

Participants noted different payment mechanisms for tradi-tional remedies. Some healers give free treatment, others are paid with livestock or cash. Some healers actively avoid monetary pay-ments due to a belief that it could weaken the potency of their treatments. Those who accept money said that due to widespread poverty in their communities there are no fixed charges and so they accept whatever the client considers appropriate.

"We are not a community that has money so when I go and finish with the work, they give me a chicken, if they have a new "wan'ne[Nankani](a calabash used as a serving bowl), they put some millet into the calabash and give to me; yes that is the payment." IDI-TH11-NAAGA

Sacrificing livestock or poultry to the gods or ancestors is a critical ritual used to evoke the gods or spirits to oversee the treatment. There are pre- and post-treatment rituals. Pre-treatment rituals include the offering of a fowl to the ancestors or gods to seek their blessings. Other items include kola-nuts, shea-nuts and/or millet. These serve two purposes; first to satisfy traditional expectations when visiting a healer and second as an invitation for the healer to attend to the woman.

Post treatment rituals include the slaughtering of a goat, dog, guinea fowl or a fowl of a particular colour (usually black or white) to evoke healing power. A rooster is given to the healer if the baby is

male and a hen if female. Other items include bambara beans (a local variety of round beans), cow milk, Shea-butter, Shea-nuts, kenaf seeds, mud-fish, cowpea, vegetables, tobacco, pito (a locally brewed alcoholic drink) and a wan'ne. These requirements vary across healers.

Herbal medicines are usually packaged in a broken clay pot while payments to the healer are conveyed in a calabash. Tradi-tionally, the herbs are ground in the broken clay pot and are left in the pot for ease of storage. The practitioners indicated that after the treatment, the pot with any leftover medicines is usually returned to the healer to signify the completion of the treatment and to assure the healer that indeed, the patient used the medicine. The leftover medicine is discarded by the healer. According to the healers, most complications in pregnancy occur among primi-gravidae and so traditionally, the new calabash is used to indicate that the woman is a first time mother. Multi-gravidae are expected to use an old calabash. Post treatment presentations are usually done within 3 days for male and 4 days for female babies.

4.3. Who are the clients?

"Can I count them? From Navrongo, Bolga, everywhere; a lorry takes me there, I get there and they say doctors have failed, I remove it, if it is alive, I remove it, if it is dead I remove it and wash my hands. It is they who call me; if they are hard pressed, they will come. I do not go round asking which woman has prolonged labour." IDI-TH14-KURUGU

People from different backgrounds, communities and tribal groups use traditional healers and their choice of a healer is usually informed by the reputation of treatment successes of the healer. The use of traditional healers, they explained, is partly due to the lack of confidence in formal maternal health services and a perception of overuse of surgical procedures.

The healers reported that some complications can only be rec-ognised and treated by traditional medicine and are not understood by doctors and midwives. These included namunu (similar description to haemorrhoids), chapia (breast disease), and bunaga-fia (jaundice). Others were culturally specific such as waafo, a condition characterised by severe abdominal pain caused by seeing a python. They reported that these conditions are likely to be exacerbated by hospital treatments and could lead to death.

"Most of these local illnesses are not treated in the hospital; for example the Namunu, even if you go there you wouldn't get medicine because they don't have medicine for it. The other time, they sent a woman who lives behind that farm land not far from here, to the hospital who was suffering from that Namunu illness, they couldn't treat her and they brought her back to me and I used my herbs to treat her". IDI-TH01-PUNGU

"When a pregnant woman comes to you and you realise that she is suffering from bunaga-fia (jaundice), don't allow her to go to the hospital. Get the jaundice herbs for her to boil and drink. If she drinks it in the morning, when she passes urine, it will be foamy, it will be "fuga, fuga,fuga," that is the jaundice. If you send her to the hospital and they inject her, you will bury her." FGD-TBAs-GAANI

Complications that are believed to be caused by witchcraft, spells or charms can only be managed by healers. Also, based on particular features of the infant or on the health of the pregnant woman, community members could declare the baby a chuchuru (spirit child) with the intent of killing its mother. Chuchuru exhibited abnormal behaviours or had birth defects and/or their birth was followed by a series of misfortunes for the family. Again this presented a situation which could not be managed through the maternal health services.

Traditional healers described an extensive range of conditions that they diagnosed and managed; many with less than orthodox methods. These included prolonged labour, pu-gara (breech pre-sentation), retained placenta (naaba), obstructed labour, gwalla (nuchal cord), still births, pumasigo (ulceration of the womb), pua (malaria), haemorrhage, terminations and abortions. A description of traditional management of these conditions are summarised in Table 2.

THs also identified instances where families were obliged to use their services because there were family taboos and restrictions that prevented them from using hospitals. In the event that a woman from such a family could not avoid hospital treatment, they could only return to the home through the back door and could not step across the front threshold.

All healers reported guaranteed success of their treatments with no fatalities. Their ongoing practice was testimony of the effec-tiveness of their treatments. Indeed, they boasted about the lives they had saved and for most, they are too many to remember. Some reported that their clients often return long after they are cured to thank them.

4.4. What are the limits of the healers?

"I am not a doctor; I cannot give a pregnant woman water or blood"IDI-TH14-KURUGU

Despite the reported successes in treating many maternal con-ditions, traditional practitioners acknowledged some limitations in their practice. Conditions such as excessive bleeding, dehydration and caesarean sections were clearly outside their area of expertise. Pregnant women in need of such care were usually referred for formal care.

Even though some of the healers said they have had negative encounters with some formal health care providers, they still expressed interest in working with the health system. The shared goal was to save lives even if the approaches were different and opportunities to work together could be mutually beneficial. Some shared their experiences working with formal providers.

"I work with the nurses here; a woman was in labour for two days, their senior had gone to Navrongo and they were called. When they got to the compound, they said their senior had gone to Navrongo and they have never handled such a case so if I could help them, I should help them. The woman had laboured for two days and on that third day the baby had already died in her womb. I went and removed it".IDI-TH11-NAAGA

None of the healers that participated in the study reported being registered with the Traditional Medical Council because they had never been approached to do so. Those who were still active were asked how recently they had treated an obstetric complication. The shortest period reported was two weeks.

5. Discussion

Healers are available, accessible, affordable, acceptable and trusted by communities to provide care as reported in this and other studies (Fakeye et al., 2009; Mills and Bertrand, 2005; Tamuno, 2011). The common religious faith and practice shared by healers and the community is also an important binding force.

Table 2
Maternal complications and traditional remedies.

Risk factor	Perceived causes	Traditional remedies
Retained naaba/nyeene (Placenta)	➢ Eating "kunkwa" (overnight remains of a burnt traditional meal made from millet flour) ➢ Eating raw flour from millet (usually soaked using water and shea-butter and eaten raw) ➢ Pregnant woman sleeping in cold weather without protection ➢ "Namunu" (description like haemorroids) ➢ Negligence of attendants at child birth	➢ Healers give herbal tea prepared with the bark of a tree sited at where two paths cross each other ➢ Healers rub their hands around the abdomen of the woman and then downwards ➢ Healers smear "buruma" (the by-product of shea-butter) on their hands and insert them inside the vagina of the woman to pull out the placenta ➢ Baby suckling mother's breast ➢ Insert a stirring stick into the mouth of the woman until she gags ➢ Let the woman blow into a bottle
Pubusi (Haemorrhage)	➢ Negligence of attendants at child birth	➢ Healers treat with herbs using luaor sanavooru (tamarind leaves) to stop the bleeding. ➢ A decoction is given to the woman to drink to arrest the bleeding
Puga-chogem (Abortion)	➢ Inserting or drinking a variety of abortifacients. e.g. sharp sticks, alcohol and traditional herbs	Healers do not encourage abortions but they have herbs for stopping the bleeding
Prolonged labour/ Obstructed labour	➢ Lack of physical activity ➢ Recall of the baby by the gods ➢ Unborn baby has some demands which the compound head must meet ➢ Negative intentions on the woman's part such as divorcing the husband after giving birth ➢ Anger against husband or some family member ➢ Cord around foetal neck ➢ Pu-gara (breech presentation) ➢ Negative intentions of a delivery attendant ➢ Infidelity of the woman referred to as digeru "dirt" ➢ Eating to'ro (the fruit of the baobab tree) ➢ Eating fatty foods, meat and milk ➢ Oversized baby ➢ Excision	➢ TBAs coax the woman to confess her infidelity or bad intentions and if that fails, the woman is coerced to confess ➢ Pregnant woman performs a stimulating activity e.g. running or kneeling until her body is "heated" to allow the delivery of the baby ➢ Healers touch the abdomen with a staff purported to have spiritual powers ➢ Healers smear concoctions on their hands and forcefully push their hands into the woman's vagina to pull out the baby ➢ Remove all delivery attendants who may be using spiritual powers to prevent the delivery ➢ Make an incision with a razor blade to extend the posterior end of the vagina to the anus to ease child birth

As noted in other studies, trust between healers and their clients comes from a shared culture and world view (Abdool et al., 1994; Mills and Bertrand, 2005). Beyond access to skilled care, beliefs about the etiology of complications, patient dissatisfaction with formal health care providers and failures of modern medicines in terms of efficacy and therapeutic outcomes contribute significantly to the enduring role of healers.

From our data, the activities of THs have an impact on maternal health. The extent of this impact, whether positive or negative, is unknown due to systemic failures to engage them. This will generally require data on the activities of THs in maternal health care to inform on either formalising their operations in managing some complications under the WHO task-shifting strategy or refocusing them to play roles that do not involve life-threatening conditions. It is evident from our study that for the most part that there is a system of training and acquisition of knowledge amongst the traditional healers (Tabi et al., 2006). Furthermore other studies have reported a range of skills of traditional healers, which like our study, range from single focus to generalist treat-ments (Tabi et al., 2006; Truter, 2007). The low level of literacy is important to note. Nonetheless, the ethos of training provides an important point of entry and a potential resource for the health services.

In Sudan, a study showed that after engaging THs in distributing oral contraceptives, the proportion of women aged 30e34 using contraceptives increased from 25% to 38% over a two year period (El Tom et al., 1989) and in Nepal, the overall use of contraceptives rose from 13% to 21% for a similar duration (Shrestha and Lediard, 1980). It is also clear that trained TBAs are skilled at recognising compli-cations and referring to health services. Less well explored and persistently resisted is training for the management of obstetric complications (Lee et al., 2011). This could involve extension of the TBA workforce by providing training to other traditional healers, and either equip them with skills to manage minor complications in places where they are the only primary care providers and help stabilise patients during emergencies before getting them to the next level of care. The impact of training other cadres requires concerted effort and evaluation (Lee et al., 2011).

One facilitating factor for engaging THs is their willingness to work with the formal health sector even though the nature of their interest was not clearly defined in our study. Findings from a review of projects in several countries showed that traditional practi-tioners are willing to work in primary care and establish a good relationship with formal health care providers (Hoff, 1992). A similar finding was reported in Ghana where about 96% of tradi-tional practitioners expressed interest in working with formal health care providers (Gyasi et al., 2011).

Ghana has opted for the integration of traditional medicine in its health care system, but the process has been slow and more aca-demic than practical. Registering and accrediting traditional prac-titioners, though challenging, has not been proactive. As of 2005, the ministry of health in Ghana identified problems with traditional practitioners to include the absence of data on their education, registration of their products, inappropriate premises for practice, inadequate record keeping and inadequate facilities for diagnosis (MoH, 2005). Evidence from our study suggests that most THs may not be able to meet most of these expectations due to high illiter-acy, the nomadic nature of some of their operations and strict se-crecy of their recipes. Besides, investigations to determine the potency and therapeutic efficacy of their products before registra-tion may be misleading as the power of their products are linked to the pre- and post-treatment rituals which cannot be verified through any scientific enquiry.

Clearly, accessing information from healers for registration and licensing would demand careful negotiation with the health sys-tem. The process would have to be guided by understanding of the traditional set up, respect for the work of healers and trust that their knowledge will be protected (Hoff, 1992). The health system stands to gain, if for instance, nurses and other health professionals working in remote areas, where the consumption of traditional

Table 3
Recommended guide for engaging traditional healers.

Intervention	Strategy
Registration/ Licensing	Use community health officers and volunteers to identify, register and license qualified traditional practitioners
Trust	Careful negotiation for information, protect intellectual property rights through legislation and transparency
Training	Train traditional providers to offer some level of intervention in case of emergency
Refocus	Gradual shifting of roles from managing complications to recognising maternal danger signs, making referrals, and distribution of contraceptives
Collaboration	Recognise them as partners in maternal health, encourage working closely with modern health care providers with mutual respect and understanding as cherished values

medicine is common, initiate strategies to identify and engage healers in order to streamline their activities. A recommended guide for engaging healers has been provided in Table 3. These recommendations are broad in nature and should be adopted based on the particular context of the health system.

5.1. Limitations of the study

We did not get an opportunity to observe actual treatment practices of the healers during the study period. Ethical and privacy restrictions also precluded the identification of women 'patients' through traditional healers so it was not possible to explore women's direct experiences of treatment by traditional healers. However, there was a consistency across the healers in the de-scriptions of their understandings of complications and the treat-ments they provided. This consistency provides some internal validity of the data.

6. Conclusions

Efforts to meet millennium development goals have seen several innovations and investments in the technology to address obstetric complications and emergencies. Recent approaches for monitoring emergency obstetric care (EmOC) have attempted to balance enhanced access with efficiency, given the scarcity of re-sources (Nesbitt et al., 2013). Furthermore, task shifting efforts have attempted to extend the responsibilities of allied health pro-fessionals to compensate for the limited numbers of highly trained medical staff (Schack et al., 2014).

However these strategies rely on a persistent assumption that women will report to formal health care facilities. It also assumes that failure to do so reflects 'delays' along the way (Thaddeus and Maine, 1994). Such an idealistic approach to health care provision however fails to recognise choice, and the perennial lack of both health infrastructure and professionals in many rural communities. The focus on health facilities, although important, fails to provide guidance for traditional societies which depend on the traditional healing system to save lives. This has limited the design of maternal health interventions over the years to improve the management of maternal complications within such communities.

Traditional health beliefs and systems have endured despite the widespread adoption of evidence based medicine and practice. Arguably, the slow growth in various complementary medicine practices is evidence not only in the recognition of the efficacy of some of these practices, but also of the critical challenges of ensuring access to some form of care to those who would otherwise have nothing. Three decades following the launch of the SMI, access to and utilisation of emergency obstetric care remains less than optimal for some communities and failure to explore locally acceptable, albeit suboptimal alternatives seem like a missed opportunity.

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6.3.1 Section two A: Key practitioners in providing local explanations for life-threatening maternal complications

A review of initial transcripts from the focus group discussions with traditional birth attendants identified traditional healers as the key practitioners who could provide vital data on the local explanations surrounding life-threatening maternal complications. Traditional healer is an umbrella term used to describe individuals who use traditional approaches to manage maternal complications. This term shall be used broadly in this chapter to include traditional birth attendants, diviners and spiritualists who also use traditional approaches to treat maternal complications.

In order to appreciate the information obtained from the practitioners, it was important to first understand their profession. This included how the traditional knowledge on maternal complications and the treatment practices was acquired, the consultation process, the population that benefits from their services and the limitations of their practice. Such information was also critical in determining the relevance of the practitioners in current maternal health interventions and possible strategies for engaging them within the health system.

6.3.1.1 How does one become a traditional healer?

There were two major pathways to becoming a traditional healer; for most, it was a family tradition but others were "spiritually chosen" or got it through luck. Where the practice was handed down within the family, it was through an apprenticeship model, starting from a young age.

> *"My grandfather started it and died and my father inherited from him and was treating people until he passed away and before he died he taught me where to get the herbs and the way to treat the illness and that is how I am a healer here today. For the past 20 years or more I have been treating pregnant women; my children are there they will take over and I have been sending them to gather the herbs so they know them very well and they can treat too. When women come and I am not there they treat them"IDI-TH08-MANYORO*

Knowledge of the herbs was acquired either by accompanying the parent to gather the herbs or by being directed by the spirit to fetch them. It was the duty of the practicing healer to ensure that

the child successfully learns the profession in order to maintain the reputation of the family. The instruments of practice were formerly and ceremonially handed over when the main healer in the family was elderly, begun to feel weak and sensed death. Some healers learnt the trade from a "higher being" or by observing and absorbing the skill from their natural surroundings. Others could not tell how their families came to be associated with the practice.

> *"My father started it and I also inherited it from him and it is not a spiritual pot that he pours libation on. Where he got it from, I don't know; I don't know whether he got it from a god or not, and he was treating the women and it was working. He passed away and I took over because he was able to show me the roots and I have not forgotten them." IDI-TH02-PUNGU*

> *"I got it from my father when he was alive. I used to follow him to the forest to gather the herbs and I watched him treat women and I am also training my children so that one day when I die, they can continue saving the women."IDI-TH05-GIA*

Healers who did not obtain their knowledge through the family said they acquired it from "spirits". They were chosen by the spirit and gifted the knowledge of treating a range of complications including pregnancy complications. Some received their gift from a *buga* (river) or from *chuchuru-bia* (spirits) unknowingly and usually through an accidental encounter. The chosen individual is usually directed by the river or spirit to heal through visions. Usually, the spirit haunts the individual for some time, forcing him or her to consult a soothsayer for an interpretation of the events. Haunting by the spirits only ceased when the individual accepted the spirit or solicited an exorcism from a soothsayer. However, invariably, individuals often accepted the powers as it ultimately became the main source of income for the family.

The "gift" carried obligations that must be followed in order to retain its value and effectiveness. Examples of the guidance for chosen healers included prohibition from eating and drinking in the home of a patient or looking back at the house of a patient as the healer left the patient's home. The individual became a channel through which the spirits worked and because of the mode of acquisition of the knowledge, it could not be shared or passed on to descendants.

6.3.1.2 What is the consultation process for maternal complications?

> *"We take a chicken to him (consultation fee), and then he comes to do the treatment. When a woman delivers and the placenta is not expelled, we have someone who we go to consult using a chicken. When he comes and rubs his hands all over the woman's abdomen, the placenta will be expelled." FGD-TBA-KAYORO*

Discussants reported that elderly males or females in the compound initiated the consultation process on behalf of the patient. They made the initial decision about which soothsayer to consult and the soothsayer determined which traditional healer was appropriate for a particular complication. While some of the healers used soothsayers to help in their diagnosis, others consulted the supernatural force that guided their practice. Traditionally, it was forbidden for some traditional healers to offer treatments outside their homes. For healers without such restrictions, where the distance is reasonably short, the healer prepared the medicine in the patient's home and supervised the administration as often as required.

> *"We do not go to women's houses to treat them; when someone comes here, I go in and ask the thing (the supernatural force that guides the practice) about the person's problem, it will then tell me. At times when something is going to happen to someone in this community, it will tell me to ask the person to come." IDI-TH18-SIRIGU*

Different payment mechanisms for traditional remedies existed in the communities. Some healers gave free treatment, others received livestock and birds, yet others received cash payments. Some healers actively avoided monetary payments due to a belief that it weakened the potency of the treatment. Those who accepted monetary payments had no fixed charges. Due to widespread poverty in the communities, they received just a token from their clients.

> *"We are not a community that has money so when I go and finish with the work, they give me a chicken, if they have a new wan'ne (a calabash used as a serving bowl), they put some millet into the calabash and give to me; yes that is the payment." IDI-TH11-NAAGA*

Sacrificing livestock or poultry to the gods or ancestors was a critical ritual used to evoke the powers of the gods or spirits to oversee treatments. The treatment process involved both pre- and post-treatment rituals. Pre-treatment rituals included the offering of a fowl to the ancestors or gods to seek their blessings in the treatment process. Other items for the healer included kola-

nuts, shea-nuts and/or millet. These served two purposes; first to satisfy traditional expectations when visiting a healer and second as an invitation for the healer to attend to the woman.

> *"It depends on the traditional healer; some use fowls, some use shea-nuts and others use tobacco. He will usually request a fowl before removing the placenta. You don't just go to him for the medicine in this hot sun without anything but you go there in the evening with a fowl and beg him. Who goes to a healer's house these days without anything?" FGD-TBA-KAJELO*

> *"Whether the person has a chicken or not I do the treatment; I only want to save the person. They do not pay anything. Someone may give you a chicken, another person may have nothing to give you; what do you do?" IDI-TH17-GAANI*

Post treatment rituals included the slaughtering of a goat, dog, guinea fowl or a fowl of a particular colour (usually black or white) to evoke the healing power of the gods. A rooster was given to the healer if the baby was male and a hen if female. Other items included bambara beans (a local variety of beans), cow's milk, shea-butter, shea-nuts, kenaf seeds, mud-fish, beans, vegetables, tobacco, *pito* (a locally brewed alcoholic drink) and a *wan'ne* (calabash). These requirements varied between healers.

> *"When they come to invite me with fowls I collect and go to the forest and gather my herbs. She has to buy these things; beans, cow milk, goat, pito, shea-butter and the black fish and all that I will instruct her to buy. In a situation where she cannot afford a goat out of poverty, she can buy just a piece of meat and we use all these things to perform the rituals after the treatment." IDI-TH03-KAJELO*

Herbal medicines were packaged in a broken clay pot while payments to the healer were conveyed in a calabash. Traditionally, the herbs were grounded in the broken clay pot and were left in the pot for ease of storage. After the treatment, the pot with any leftover medicines was returned to the healer to signify the completion of the treatment and to assure the healer that indeed, the patient used the medicine. The leftover medicine was disposed by the healer. According to the healers, most complications in pregnancy occurred among primigravidae and so traditionally, the new calabash was used to indicate that the woman was a first time mother.

Multigravidae were expected to convey their payments in an old calabash. Post treatment presentations were usually done within 3 days for male and 4 days for female babies.

6.3.1.3 How is the knowledge managed?

"At that time, anyone who wanted to help people could get those things (the herbs) so my father got the things for me to help women. For me, I will not give to anyone who wants the things to work with. I will not give them to him. These days, there is no trust; if I teach you, you will not mind my child. You will only think about yourself." IDI-TH11-NAAGA

Healers had one fundamental reason for ensuring that the knowledge was not shared with people outside the lineage; it was a source of livelihood for the lineage and people outside the family could not be trusted to share the benefits that accrued to the profession with their children or descendants.

"I learnt if from my father when he was alive. He died three years ago and I have just started the work. Whatever I can do, I will also teach a child in the family". IDI-TH15-YUA

"When I'm going to dig the roots, I take them (his children) along to teach them so that when I am no more, they can treat people with retained placenta." IDI-TH19-GAANI

For those traditional healers who were lucky to be "chosen" by a spirit, the spirit decided who to bestow the skills on as it was not transferrable. The spirit only chose a successor when the current bearer became too old to practice or dies. The current healer may be directed to choose the successor but he/she cannot influence the choice. After the death of the healer, the spirit returns to its origin.

"My mother taught me. Since the one who taught me is no more, I am the only one who do it. The medicine does not come from this compound; if something in your paternal compound chooses you and you inherit it, it does not belong to this compound. If I stop the work and the medicine does not want to go to its hometown, it will get someone to choose. I cannot choose anyone to do it when I am no more there." IDI-TH16-KOLOGO (Female respondent)

6.3.1.4 Who are the clients?

"Can I count them? From Navrongo, Bolga, everywhere; a lorry takes me there, I get there and they say doctors have failed, I remove it, if it is alive, I remove it, if it is dead I

remove it and wash my hands. It is they who call me; if they are hard pressed, they will come. I do not go round asking which woman has prolonged labour." IDI-TH14-KURUGU

People from different backgrounds, communities and ethnicity use traditional healers and their choice of a healer is informed by the reputation and treatment successes of the healer. Healers are contacted by clients who are community members or individuals from adjoining villages or districts.

"I go to other places; I do not treat only the women of this community. I have been going to Burkina Faso and I have seen what they do. When a woman is in labour and they cannot handle it, they look for people like us to come and see whether something can be done."IDI-TH18-SIRIGU

Also, some complications originate from traditional forces and are not understood by modern healthcare providers. Modern health care facilities cannot treat these morbidities in pregnancy and for jaundice, hospital treatments could worsen the patient's condition leading to death. The following contextualised quotes, illustrate these perceptions.

"Most of these local illnesses are not treated in the hospital; for example the "Namunu"(haemorrhoids) even if you go there you wouldn't get medicine because they don't have medicine for it. The other time, they sent a woman who lives behind that farm land not far from here, to the hospital who was suffering from that "Namunu" illness, they couldn't treat her and they brought her back to me and I used my herbs to treat her". IDI-TH01-PUNGU

"When a pregnant woman comes to you and you realise that she is suffering from jaundice, don't allow her to go to the hospital. Get the jaundice herbs for her to boil and drink. If she drinks it in the morning, when she passes urine, it will be foamy, it will be "fuga, fuga,fuga" that is the jaundice. If you send her to the hospital and they inject her, you will bury her." FGD-TBAs-GAANI

When community members believe that the cause of the complication is spiritual, they turn to traditional healers for remedies. Complications that are believed to be caused by witchcraft, spells and charms can only be managed by the traditional healer. Also, based on the characteristics of some babies or the health of the pregnant woman, community members could declare the baby a "chuchuru" (spirit child) who wants to kill the mother by causing the complication. A "spirit child" was described as any child who has abnormal behaviours or characteristics or whose conception and birth is followed by a series of misfortunes for the family. Such complications are beyond the hospital and must be dealt with by the traditional healer.

> *"A woman may be pregnant with a "chuchuru" (spirit child) and they have to get some herbs for the woman to drink so that the baby will come out and leave the woman alone. If you do not get those herbs for the mother, the baby will kill her". FGD-TBAs-KWOGWANIA*

Family taboos and restrictions prevented some individuals from accessing modern health care. In the event that such families are compelled to take a woman to the hospital for treatment, they cannot return to their homes through the front door. They must enter their homes through the back door as atonement for failing to observe the taboo.

> *"There are still families who do not go to hospitals. At times we go to plead with them to send their women to the hospital to deliver because we are all helping each other. In such cases even if they take the woman to the hospital to deliver, when they are coming home, they will not pass through the front gate into the compound, they will pass through the back of the compound. So such families exist." FGD-TBAs-YUA*

No healer reported a fatality over the duration of their practice and to them, their continuous use by community members is proof of the effectiveness of their methods of healing. Some boasted about the number of lives they had saved and for most healers, they were too many to remember. Some clients often returned long after recovery to show appreciation to the healers.

> *"M: Have you ever treated a woman who later died in your hands?*

R: Kwataaaa (never); since I started this work, no woman has died in my hands; not even a baby has died" IDI-TH11-NAAGA

"When a woman is in labour and she is not able to deliver when I get there, I use this (the tail of an animal) to touch her abdomen, move my hands downwards three times and see if the baby will come out. I use my hands but I also use herbs to touch her abdomen downwards three times." IDI-TH13-KURUGU

6.3.1.5 What are the limits of the healers?

"I am not a doctor; I cannot give a pregnant woman water or blood"IDI-TH14-KURUGU

Despite the reported successes in treating many maternal complications, conditions such as excessive bleeding leading to low blood levels, dehydration as well as caesarean sections are beyond traditional healers. Pregnant women in need of such care are therefore better off seeking care from a modern health care facility.

"If a pregnant woman is dehydrated, if they don't rush her to the hospital, she can lose her life. Also, if her blood is finished; we don't have blood treatments in our homes. IDI-TH01-PUNGU

Although the healers reported negative encounters with some modern health care practitioners, they were generally willing to work with modern health care practitioners mainly due to their own limitations. They were of the view that both practitioners aim at saving lives using different approaches and that working together could be mutually beneficial. Some shared their experiences working with modern health care practitioners.

"I work with the nurses here; a woman was in labour for two days, their senior had gone to Navrongo and they were called. When they got to the compound, they said their senior had gone to Navrongo and they have never handled such a case so if I could help them, I should help them. The woman had laboured for two days and on that third day the baby had already died in her womb. I went and removed it".IDI-TH11-NAAGA

Most healers are general practitioners but others also specialise in treating only maternal complications. All healers are required to register with the traditional medicine council but none

of the healers in the study had registered with them. A few of the healers were no longer practicing because they were either too old or had lost their client base. Those who were still active were asked how recently they had treated an obstetric complication. The shortest period reported was two weeks.

6.3.1.6 Summary of the findings

The study identified two channels of becoming a traditional healer; either through apprenticeship in a lineage of healers or a spirit through "luck". The former is inherited and the knowledge can be transferred from one person to the other - usually from father to son - while the latter is received through divine selection. Traditional healers are used by a diverse group of people within the community to manage maternal complications. These include families that do not use modern health care, those that modern health care has failed to treat and women whose complications are not traditionally recognised as hospital-related. Consultation is at the compound of the healer and depending on distance and other factors, treatment could be offered in the house of the healer or that of the client. Generally, the process involves both pre- and post-treatment rituals on the part of the patient and may include the giving of poultry, animals and some food items. Some traditional healers accept monetary payments while others forbid it.

Due to increasing campaigns for women to use health facilities, some of the healers are currently inactive. Most of them are however active and their operations extend beyond their communities. Some claim to have treated complications that could not be managed by hospitals and none reported any fatality during treatment. The traditional providers expressed willingness to engage with the health system and admitted that they are not doctors and so cannot manage complications that demand transfusions.

6.3.1.7 Implications of the findings

The findings confirm that traditional healers are strategically positioned within the traditional health care system to help in our understanding of life-threatening maternal complications. Healers are valued by the community and recognised as having the authority to identify and treat maternal complications. They are also available, accessible, affordable and their practice is acceptable to a section of the population. As indicated in the data, traditional healing has been a critical component of the health system and it is not about to disappear despite the aggressive and hegemonic enforcement of modern health care. The enduring value of traditional healers is based

on the trust between them and their clients as well as their perceived ability to manage maternal complications.

Traditional healers currently play no role in maternal morbidity investigations and this has created a gap between what is known about maternal morbidities and their management and what actually pertains especially in rural communities. Health systems have continuously failed to capitalise on the capabilities and willingness of traditional healers to collaborate with them to improve maternal health care. The result is a parallel system of health care that does not necessarily serve well, the needs of rural communities.

In the final section of this results chapter, the traditional healers explain in detail what constitutes a life-threatening maternal complication, the aetiology of the condition and how that informs their treatment practices.

Traditional healers in pictures

6.3.2 Section two B: The local explanatory model for life-threatening maternal complications

This section presents the healer's understanding of what constitutes a life-threatening maternal complication. Using Kleinman's practitioners' explanatory model, data were obtained on the aetiology of life-threatening maternal complications, the time and onset of each of the complications and the course of the complications. Traditional notions of causation, symptoms, severity and treatment practices and rituals associated with each complication were also discussed.

6.3.2.1 Defining the concept of "Life-threatening maternal complications"

Traditional healers within the KND had a broad perception of what a life-threatening maternal complication is. They defined a "life-threatening maternal complication" as any health condition related to pregnancy that increased a woman's risk of dying. The morbidity had to be serious enough for the woman to report that she would have died if she did not seek some sort of medical intervention outside the home. This typically included morbidities related to pregnancy that led to excessive bleeding, high blood pressure, dehydration, stress, anger or fatigue.

The aetiology of life-threatening maternal complications was explained to include both medical and cultural bound syndromes. Medical syndromes included obstructed labour, retained placenta, haemorrhoids, prolonged labour, hypertension, obstetric haemorrhage, abortion, intrauterine death, breech presentation, nuchal cord, malaria, preterm deliveries and miscarriages. Conditions that were specific to the cultural context included *wo-gnom* (ulceration of the womb), *waafo* (python disease), *wo-kalamin* (clotted blood in the womb), the *chuchuru* (spirit child) and witchcraft. The complication had to be severe enough to require the woman to seek care outside the home before it could be classified as life-threatening.

The healers did not have a specific time frame within the pregnancy continuum that these conditions had to occur to qualify as a maternal complication. It was particularly problematic in deciding at what point after the termination of pregnancy one could consider a condition as being related to pregnancy. However, in explaining the causes of life-threatening complications that are related to pregnancy, the healers explained the severity and frequency of the conditions and provided the context in which they could lead to death. In all cases, the conditions demanded

immediate attention by a health provider - either modern or traditional – which was largely influenced by the perceived causes of the complication. For each complication, the real risk to women based on the biomedical model was acknowledged.

6.3.2.2 Retained naaba/nyeene (Placenta)

Retained placenta occurs when all or part of the placenta or membranes remain in the uterus during the third stage of labour for more than one hour after childbirth. The condition can lead to haemorrhage, shock, anaemia or infection with potentially fatal outcomes.

Participants identified retained placenta, known locally as *naaba* in Nankani and *nyeene* in Kasem, as one of the life-threatening complications in pregnancy. Food taboos were the main cause of the complication. These included eating *kunkwa* (overnight remains of a burnt traditional meal made from millet-flour) and eating raw flour from millet (usually soaked using water and shea-butter and eaten raw). Exposing oneself to cold weather conditions, *namunu* (haemorrhoids) and negligence of attendants during child birth were also identified. According to the practitioners, both modern and traditional providers can treat the condition as captured in the following quote.

> *"I think that if the placenta remains in a woman who has just delivered and the doctor is not able to remove everything, it will lead to her death. We have someone here who can come and remove it and make the woman well. He uses herbs; he gives to the woman to drink and expel the placenta." IDI-TH09-MANYORO*

Herbs dug from the bush or the outer bark trees that are located at where two paths cross each other, are decocted for the mother to drink to stimulate the expulsion of the placenta. Some traditional healers rub their hands around the abdomen of the woman and then downwards until the placenta is expelled, yet others spit and hit the woman's head 3 times and after touching the woman's abdomen, the placenta is expelled. Also, "*if a woman delivers and the "naaba" does not come out, a herbalist will come with a new calabash, slaughter a chicken on his god (an object that represents the god) and immediately he touches the woman's abdomen, the placenta will drop" (FGD-TBAs-BIU).*Some indicated that *buruma* (the by-product of shea-butter) is smeared on the hands of the herbalist before he inserts them into the vagina of the woman to bring out the

placenta. Some of the healers carry out these procedures only after consulting a soothsayer, the gods or the spirits.

> *"a woman can deliver and her "nyeene" (placenta) can remain in her and when they come to invite me with a fowl I will gather my herbs and go to the woman's house and set fire in her yard and put the herbs in a local pot and cover it with a piece of broken clay pot and cook for some time. When it has cooked for some time, I put off the fire and sieve the herbal water for her to drink after which I will fetch the herbal water with my hand and drop on her "front" (vagina); immediately, the placenta will drop and they don't need to send her to hospital again." IDI-TH03-KAJELO*

Participants also reported that breastfeeding could help expel the placenta. Other methods included inserting a stirring stick into the mouth of the woman until she gags, letting the woman blow into a bottle and hitting the woman's waist or lower abdomen lightly but persistently; the reason being that the placenta is stuck to the uterine wall and so hitting will help it detach. Some of these treatments are contained in the excerpt below.

> *"When a baby is delivered and the placenta is not expelled, the woman has not yet delivered. You have to make the baby suck her mother's breast milk, if it sucks for some time the placenta will come out. If it remains inside her she will die. Another way of bringing out the placenta is to put a bottle into the woman's mouth and make her blow air into it." FGD-TBAs-KOLOGO*

6.3.2.3 Obstructed labour

Obstructed labour or dystocia is a second stage phenomenon during labour. It is caused by uncoordinated uterine contractions, abnormal foetal presentation and a narrow birth passage or pelvis. Complications include foetal death, respiratory depression, infection, uterine rapture, brachial nerve damage, fistula and possibly death.

Participants observed that a narrow birth canal could prevent the delivery of a foetus, thus endangering the life of both the foetus and the mother. Non-compliance to traditional nutritional guidelines and dietary taboos during pregnancy, were reported to cause the complication. These

included *kunkwa* (overnight remains of a burnt meal made from millet-flour), *gari* (a staple food made from cassava), sweet foods, *maasa* (millet cake), bambara beans, groundnuts soup, *to'ro* (the fruit of the baobab tree), alcohol, fatty foods and cold foods. Foods that were prohibited were supposed to prevent the baby from growing too big and to prevent the uterus from rupturing. Women who ate *to'ro*, fatty foods, meat and milk were reported to be at a higher risk of obstructed labour. These were carbohydrate and protein rich diets which were reported to fatten the foetus, thus making it too large for the birth canal. First time mothers were reported to be more likely to suffer obstructed labour because they generally do not conform to dietary guidelines which lead to fat babies and because it is their first delivery, they have narrow pelvises which obstruct labour. Delayed interventions were reported to endanger the lives of both mother and baby.

> *"If a woman is pregnant you don't have to be eating fatty meat or foods containing too much oil because it makes the baby grow big and that can make her delivery difficult and at times many women especially those delivering for the first time face this problem and usually they are operated upon because their birth canal is small and the baby is like a big stone so how can it come out?" FGD-TBAs-WURU*

The traditional nutritional guidelines also recommend that pregnant women eat at short intervals and avoid protracted hunger because it could jeopardise the health of the foetus. Eating energy rich foods prior to the onset of labour was also recommended. This gives the woman strength to bear down easily.

> *"Years ago, pregnant women listened to advice but these days they do not at all; if you advise her not to eat this, she will eat it. If you tell her not to cook with Maggie (Monosodium Glutamate) she will tell you, you do not own her cooking pot, she will put it into her soup. They eat everything in the market and when the baby is fat she is not able to deliver and they have to operate on her". FGD-TBAs-KOLOGO*

Traditional treatments focus on managing the birth passage to make it wider. When TBAs determined that birth was obstructed because of the size of the baby, they performed episiotomy by using a razor blade to make an incision to extend the vagina through the perineum to the anus

to ease delivery. Where treatment was inadequate, healers smeared the vagina with *bengto* (ground bean leaf) to lubricate the birth passage to ease child birth.

> *"If a baby's head comes out and the rest of its body cannot come out, it may be that the vagina is not wide enough so you use a razor blade to cut it to bring out the baby. I have done that to bring out a baby. I cut a girl; the baby got stuck, the baby's head was out but because the vagina was not wide I asked for a blade and cut and the baby came out." IDI-TH16-KOLOGO*

Female circumcision is common in the district and the healers identified the practice as a cause of obstructed labour. They upheld the relevance of the traditional belief that female genital cutting delays initiation of sexual intercourse and prevents promiscuity. There were two views on how it increased the risk of prolonged labour. Some argued that women who were not circumcised initiated sex early and got pregnant when their reproductive organs were not developed enough to handle the birthing process. Others were however of the view that female circumcision had more negative outcomes as it created a wound which after healing, left a scar that affected the dilation of the vagina during childbirth. This was captured by a traditional healer in the quote below.

> *Also, when a girl undergoes excision, after the wound has healed, the scar will make the vagina tight so that when the girl gets pregnant and is in labour, it becomes a problem for her. Because the scar has covered part of the vagina, they have to use a blade to make way for the baby to come out." IDI-TH19-YUA*

6.3.2.4 Prolonged labour

When labour extends beyond 18 to 24 hours, it is considered prolonged labour. Factors that cause obstructed labour also lead to prolonged labour. Maternal and foetal risk of prolonged labour include asphyxia, foetal distress, abnormal heart beat and haemorrhage. In most cases, it may require an emergency delivery by caesarean section to safe both baby and mother.

Participants differentiated prolonged labour from obstructed labour. While obstructed labour meant that something blocked the birth passage, prolonged labour was based on the length of time the woman took to deliver the foetus.

Traditionally, prolonged labour was understood as labour lasting more than 8 hours. According to the participants, the long hours of bearing down weakens both mother and baby and this can lead to death. They identified the complication as the major cause of maternal deaths in the district. Discussants attributed the complication to lack of physical activity by pregnant women. Some traditional causes included the desire of the gods to recall the baby, bad intentions of the woman - plans to divorce the husband after delivery, abandoning the husbands house with the baby after delivery due to anger against husband or mother-in-law or some family member - cord around the baby's neck, *pu-gara* (breech presentation), ill intentions of a delivery attendant and infidelity on the part of the woman commonly referred to as *digeru* "dirt". A TBA narrated what usually happen when labour is prolonged during a TBA assisted birth.

> *"When labour is prolonged, you have to tell the family members that you do not understand why the woman is taking too long to deliver. The land lord will then go and consult a soothsayer. If it is a family god that wants to possess the baby after delivery, it can prevent the baby from coming out immediately; the landlord will be told this by the soothsayer. But if it is that the woman has digeru, she has touched something and does not confess, the baby will not come out. As a married woman, if she goes out with other men, the baby will never come out until she confesses. If she has been thinking that immediately after delivery, she is going to divorce her husband, she has to say it, else the baby will not come out; but as soon as she says it the baby will come out" FGD-TBA-GAANI*

Due to the many possible causes of prolonged labour, when it occurred, the compound head consulted a soothsayer to provide a diagnosis of the complication. In some cases, the spirit of the unborn foetus was believed to have some demands which the compound head must meet before the woman could give birth. When a delivery attendant was suspected to witch-hunt the woman, she was removed from the birthing hut and this most often resolved the complication. The pregnant woman was also required to confess her infidelity, anger or evil intentions towards the family before she could give birth. TBAs often coaxed the woman to confess but in some cases, the woman was beaten and forced to confess as stated below.

"People have been saying that our taboos no more exist; but if you sleep with someone's wife and she gets pregnant, if she does not confess it, she will die during labour so the old lady handling her will try to press her hard to confess. We will continue coaxing her until she realises that she is suffering so much and then she will confess that she has gone out to soil herself (unfaithful); then she will deliver." FGD-TBAs-MANYORO

Others are reported to decoct the roots of a tree traditionally called *sapunga* located at a cross road to treat the condition. The tea from the decocted roots is given to the woman to drink and rub on her abdomen. The roots are decocted in the yard of the woman and the direction of the steam is used to match the position of the sun which indicates the time of delivery. Participants reported that if the steam blows towards the front of the house, the woman will give birth at sunrise, straight up; mid-day, and to the back; sunset. However, if the steam blows in every direction, the woman will only deliver the next day.

"You can also fetch the roots of a "sapunga", boil the roots for the woman to drink; this will make her deliver. The "sapunga" will also tell us when the woman will give birth. That is our watch. So if the water boils to the back, she will give birth when the sun rises, and upwards she will deliver by afternoon but if it blows everywhere, she will give birth the following day" FGD-TBAs-GAANI

Resolving prolonged labour also involved the services of a healer who came with a new calabash and circled the woman four times before giving her some herbal tea to drink to stimulate the expulsion of the baby. Some healers aided the woman by touching the abdomen with a staff believed to harbour spiritual powers. Others mixed vegetables such as *bengto* (ground bean leaf) and smeared it around the vagina to lubricate it in order to ease the birth. Also, *in situations like that, we (TBAs) fetch tiga-soro (leafy-okra) and mix it with water and massage the vagina of the woman. This is done to soften the edges of the vagina to enable her give birth safely (FGD-TBAs-PUNGU NORTH).* The healers also used the substance to lubricate their hands to facilitate insertion into the vagina to assist delivery.

The practitioners consistently reported that women often refuse their wise counsel and do whatever they want and that contributed to some of their vulnerabilities during pregnancy. They identified laziness and the lack of exercise as the cause of the "bad functioning of the blood" which led to complications during delivery. Women were encouraged to perform physical activities such as running or kneeling until the body is “heated” to enable the woman bear down. TBAs complained about the negative attitude of young women which predisposed them to prolonged labour in the following quotes.

> *"When a woman is pregnant and she goes to the bush for firewood, comes home to prepare Tuo zaafi* (A local meal made from millet) *to eat, takes her bath, the following day she goes to the bush again to pick shea-nuts, when she is going to deliver, it will not be difficult for her. But there is a pregnant woman who will not pick shea-nuts; she is always lying down, when it rains and people are sowing, she will not go out to sow, she is lying down, she will not even cook to eat. She wants you to hire someone to cook for her to eat and if you hire someone to cook for her to eat, on the day of the delivery, the baby will not come out; it will struggle and struggle but it will remain there because the woman’s body is not heated for it (the baby) to be delivered". FGD-TBAs-KANDIGA*

> *"If she wakes up she has to walk round the house, she doesn’t bend down for a long time, rest after working for some time. If she does all these things her blood will also spread all over her body and work to support her pregnancy but if she likes sleeping and doesn’t want to exercise herself, the blood will also “sleep”(clot) in her and wouldn’t function and she will have problems on the day of delivery". FGD-TBAs-CHIANA*

Although the practitioners recognised the importance of physical activity for safe delivery, they advocated moderation in order to prevent any untoward consequences. They reported that activities that involved vigorous shaking could cause the foetus to shift into breech position or cause the cord to go round the foetal neck, leading to prolonged labour.

> *"We advise pregnant women to work but not so hard; she should cook and eat, if it is rainy season she should go and pick shea-nuts and then fetch water. She should work that*

way because if she always lies down, her delivery will be difficult, she will have problems during delivery". FGD-TBAs-NATUGNIA

A traditional belief that sexual intercourse during the third trimester facilitated child birth was common. Women who do not have sexual intercourse during that period therefore risk having prolonged labour. The healers explained that semen contains substances that stimulate uterine contractions and therefore useful in pushing the baby down the birth canal.

6.3.2.5 Pu-gara (Breech presentation)

Breech presentation is a condition in pregnancy in which the foetus is not in head-down position in the uterus. Complications in breech presentation can lead to foetal distress, birth injuries and compression of the umbilical cord. It can be life-threatening to mother and baby where a caesarean section is required but inaccessible.

The practitioners identified *pu-gara* as a cause of obstructed and prolonged labour. They described the natural positioning of the baby at the time of birth as one that has the baby's head facing the birth canal (occiput anterior position). They however reported that sometimes, babies lie across the womb (transverse lie). Other babies were also reported to have either their buttocks or feet facing the inlet of the birth canal (frank or complete or incomplete breech presentation).

"We have "pu-gara" where the baby's head will be at this corner (pointing to the front of the womb) and the legs at the other corner(pointing to the back of the womb) and at birth the head doesn't come out first but rather a leg or a hand or the shoulder, making it difficult for those assisting the woman give birth; they usually suffer because usually the head is supposed to come out and they will hold the ears and pull out the baby". FGD-TBAs-PINDAA

Participants attributed the cause of this complication to improper sleeping positions such as lying on your back or stomach, sleeping on hard surfaces and doing excessive hard work. This happens in the 8th or 9th month of the pregnancy. The traditional practitioners observed that, if identified early in the 8th or 9th month, a traditional healer could correct it else the woman will have to go through a caesarean section. Also, by observing the pregnant woman's abdomen, the healer is

able to determine the positioning of the foetus. If the presentation of the foetus is breeched, the healer will correct it by slowly massaging the abdomen of the pregnant woman till the foetus positions appropriately.

> *"It may also be that the baby has not yet turned towards the passage but the woman is in pain and thinks the baby is about to come. When I get there, I look at her stomach and know the baby has not yet turned towards the passage. If it lies across I can remove it by God's grace. If a baby lies across in the womb and I give the woman my thing (herbal tea) to drink, she will give birth." IDI-TH12-KURUGU*

Also, to reposition the foetus, a rope is put around the neck of the woman and her head pulled towards her feet repeatedly until the foetus repositions. Special herbs known as *pu-gara* herbs and *da'geru* (a piece of wood at a cross road), are decocted and the tea given to the pregnant woman to drink and smear on her abdomen for four days. Shea-butter is also added to the herbal tea and used to prepare the woman's meals. The significance of the cross roads is rooted in the belief that the cross road has the power to reposition the "crossed baby" as *pu-gara* literally means "crossed-pregnancy".

Also, when it is observed during labour that the baby is in breech position, the pregnant woman is carried by strong men in the compound to the *na-yuu* (the roof of a traditional house built with mud), held upside down by the legs and shaken to encourage repositioning of the foetus. Participants who had experienced this treatment confirmed that the procedure is painful but effective. A TBA described it as follows:

> *"When a woman is in labour and cannot deliver because the baby is lying across in the womb, they look for strong men in the community to carry the woman to the "Na-yuu," turn her upside down and shake her very well. By doing that, the baby will turn to the normal position for the woman to deliver". FGD-TBAs-PUNGU-SOUTH*

To ensure normal positioning of the foetus, pregnant women in their third trimester are counselled not to ride bicycles, to always sit with their legs stretched-out in front of them and to avoid lying on their backs.

> *"When we advise them they do not take it but we do it all the same; we advise them not to ride bicycles to weighing when the pregnancy is advanced. Then when a pregnant woman is going to sit down, she should look for a place that is, "las" (Comfortable) and sit with her legs stretched. This will help the positioning of the baby inside her". FGD-TBAs-DOBA*

> *"A pregnant woman should not lie on her back; she should lie on her side, she should also sit with her feet stretched. In that way, when she is going to deliver, she will not suffer". IDI-TH13-KURUGU*

6.3.2.6 Gwalla (cord) around foetal neck (Nuchal cord)

Nuchal cord occurs when the umbilical cord wraps around the foetal neck either during pregnancy or delivery. The condition is not associated with adverse outcomes but a home birth with a tight cord around the neck could lead to complications such as obstructed labour or haemorrhage if the cord is cut without clamping.

The healers reported that "gwalla" (cord) around foetal neck is life-threatening for both mother and foetus - it can stress the woman to death and the foetus can suffer problems with mobility later in life. The complications were mainly attributed to late recognition and difficulty in untying the cord during pregnancy.

> *"The gwalla is life-threatening and it can be treated at home with herbs but in the hospital, they will operate the woman and remove the baby and leave pain in the woman. If they are not able to deliver the woman in good time, she can pass away because she will push and become too tired and will not breathe again." FGD-TBAs-CHIANA*

The healers believed that the condition was caused by wrong sleeping positions of the pregnant woman. Sleeping on the back, on the stomach, turning from side to side without first sitting up

before changing sleeping position and exposing oneself to cold weather were reported as the main causes of this complication. The complication happens around the third or fourth month of pregnancy. A TBA explained the complication in the following quote:

> *"if you are pregnant and you like sleeping on your back or stomach all the time, the gwalla can go around the baby's neck and during delivery as the woman pushes, this gwalla pulls back the baby and she cannot deliver until a doctor comes to operate on her. To prevent this from happening, when a woman is sleeping on one side and she wants to turn to the other side she has to first sit up before turning to the other position and if she wants to sit she has to sit well otherwise if the baby's leg enters her pelvis, the baby will become crippled. FGD-TBAs-KAJELO*

Pregnant women are encouraged to lie on their side and to sit up in-between sleeping positions to prevent the complication. If the complication occurred during the early stage of pregnancy, the most common traditional treatment was to tie a rope around the neck of the pregnant woman and untie it shortly after. This was done three times if they suspected the baby was male and four times if female. The process was to reverse any evil deed that the woman might have committed that is pulling the baby back. The rope used for the treatment was called *puponu* (a rope made from straw) and was traditionally used to tether goats.

> *"If a pregnant woman does not know how to lie down, she keeps on turning, "pri, pri, pri", the gwalla will wind around the baby's neck, if you do not put a rope around the woman's neck and then remove it, the woman cannot push to bring the baby out. You have to do that, again and again before she can push to bring the baby out." FGD-TBAs-DOBA*

Experienced TBAs were reported to deliver the baby successfully. When the TBA sees the baby's head, they dip their hands in *bengto* (ground bean leaf) to lubricate them and insert them into the vagina, feel for the cord and untie it from the baby's neck. This procedure is similar to what happens in orthodox practice but because of the possibility of spasms of the cord vessels

especially from cold hands which could cut blood supply to the baby, it is often avoided. One TBA narrated her experience in managing the complication in the excerpt below.

> *"My daughter had this problem when she was delivering. The cord wound around the baby's neck, we sat with her in the night till day break, it was midnight and we could not go to the hospital; she finally delivered at dawn. When the baby tried coming and I stretched my hands towards it, the "gwalla" pulled the baby back. Then I made her to sit down and I soaked my hands in "bengto" and inserted them into her vagina and tried until the cord removed from the baby's neck and the baby was delivered". FGD-TBAs-KANDIGA*

6.3.2.7 Namunu (Haemorrhoids)

Haemorrhoids are abnormally dilated veins in the rectal area. In pregnancy, the veins below the uterus are more likely to become swollen and stretched as the weight of the growing baby puts pressure on them. Haemorrhoids are common in pregnancy during the third trimester or may develop during pushing in the second stage of labour. Haemorrhoids are associated with rectal bleeding, itching, severe pain and may require a minor surgery to correct. The condition is generally not life-threatening but may lead to long-term discomfort.

Traditionally, *Namunu* is perceived as a major cause of prolonged labour and therefore life-threatening. *Namunu appears in front of a woman's vagina and prevents the baby from coming out (FGD-TBAs-PINDAA). Namunu* makes the woman bleed and is generally painful when passing stool. It blocks the birth canal, obstructs labour, could lead to retained placenta and these can cause the death of both baby and mother. Discussants indicated that the condition is either inherited or caused by an infection. They also believed that it is acquired through the eating of sweet foods including honey. Some women may not be aware of the condition until labour.

> *If after several times the woman pushes and that thing (namunu) keeps coming to block the baby from coming out, the woman can die because if that thing (namunu) does not go inside and leave space how will the baby come out? FGD-TBAs-CHIANA*

Only home remedies are acceptable for the treatment of *namunu*. When the herbalist arrives in the woman's compound, he sets fire in between three stones that are carefully arranged to support a cooking pot. A clay pot containing the necessary herbs is put on the fire to boil. The herbal tea is given to the woman to drink. In addition, a piece of cloth is dipped into the hot herbal tea and applied on the *namunu* which forces it back into the body; freeing the birth canal for delivery. Primigravida can be treated for as long as eight days whereas multigravida are treated for a day. A healer reported thus;

> *"I prepare myself and go to the patient's house and set 3 stones in her yard and set fire and put them in a local pot and place it on the fire to boil for some time and I remove them from the fire and sieve the herbal water for her to drink. Also I will burn some of the herbs into ash and grind them into powder form and use water and shea-butter to mix them after which I use it to press the "namunu" and immediately it will run back inside and it will never appear again in her life". IDI-TH01-PUNGU*

The practitioners maintained that during treatment, the pregnant woman is not allowed to eat beans, goat meat, *pito* (alcoholic beverage made from malt), shea-butter and mud-fish. She is however required to buy these items for the post treatment ritual to prevent her from ever suffering the illness again.

> *"If a woman start's to go through this treatment process, I warn her not to eat or drink the following things; beans, goat meat, pito, shea-butter and black fish but after she is cured she has to buy these things; beans, cow milk, goat brew pito, shea-butter and the black fish and all that I will instruct her to buy and bring to me". IDI-TH03-KAJELO*

Some TBAs reported that one could fetch *chi-banu* (poultry droppings) and mix it with *changao* (lemon grass) and burn it with charcoal fire and put it close to the *namunu.* The combination of the heat and scent makes the *namunu* retract. Others mix the *chi-banu* with water and smear it on the vagina for the *namunu* to retract. Most of the practitioners reported that a pregnant woman can suffer *namunu* only once in her life. *If I push the thing (haemorrhoid) inside, it doesn't come*

out again until you die so if you go to the hospital to treat yourself, maybe it is another illness not the namunu". IDI-TH08-MANYORO

6.3.2.8 Obstetric haemorrhage

Obstetric haemorrhage is the heavy loss of blood during pregnancy, childbirth or the puerperium. Maternal conditions such as placental abruption during pregnancy, uterine rapture during childbirth and retained placenta during the postpartum period can lead to severe bleeding and subsequent loss of life.

The traditional practitioners said bleeding could occur anytime in the pregnancy continuum; during pregnancy, labour or the puerperium. Antepartum haemorrhage was linked to miscarriage and haemorrhage during child birth and the postpartum haemorrhage was blamed on the unprofessional handling of deliveries by attendants. Continuous bleeding for a protracted period of time was considered life-threatening and therefore warranted emergency medical attention. The practitioners could not describe the quantity of blood that a woman had to lose before it would be life-threatening. They relied on the duration of bleeding as an indicator of the severity of the condition. A TBA reported this in the quote below:

> *"Also, if you bleed for long and they do not do anything to stop it; every day you bleed even if it is water in a dam it will finish and when your blood finishes you are not a human being again; you will die". FGD-TBAs-PAGA-NAVIO*

Traditionally, some herbalists are known to have herbs that can stop the bleeding. One can access herbs such as *lua* or *sana vooru* (tamarind leaves) from a herbalist and boil them for the woman to drink to arrest the bleeding. Generally, traditional practitioners were of the view that patients with haemorrhage should seek treatment from a modern health care facility because there is no home remedy for replacing blood.

Puga-chogem (Abortion) was reported to be linked to haemorrhage. The practitioners reported that young women usually inserted or drank a variety of abortifacients to abort an unwanted pregnancy and that these often led to haemorrhage. Women inserted sharp objects and traditional herbs and others drank alcohol in order to abort a pregnancy. According to the practitioners, most

healers are opposed to abortions but they treat haemorrhage due to abortion. The healers were of the view that if the herbs fail, the individual could go to the hospital.

> *"Some women also try to soak "lua" to drink in order to abort the baby when they realise that they have missed their periods for two months ". FGD-TBAs-MANYORO*

6.3.2.9 Intrauterine death

Foetal death after 18 weeks gestation is referred to as intrauterine death. Risks associated with the condition include clotting, haemorrhage and infection. Long-term retention of a dead foetus can lead to disseminated intravascular coagulation where all the coagulation factors in the blood are used up, making it difficult to stop any bleeding after delivering the dead foetus.

Traditional practitioners said when women do not feel foetal movement, they usually consult them. They said, after palpating the woman, they are able to tell if the foetus is still alive. They said that this was only possible when the gestational period was beyond five months.

Intrauterine death and *pu-pwora* (miscarriage) were reported to be the same. The practitioners were divided on whether intrauterine death was a life-threatening condition. Those who thought it was life-threatening said that if the woman is unable to expel all the body parts of the baby, it could lead to infection which can kill the woman. They added that the risk of death largely depends on the interval between the foetal death and the time it is detected and removed.

Two sets of causes were identified - spiritual and non-spiritual. Spiritual causes were derived from socio-cultural believes about witchcraft or the *chuchuru* (spirit child) syndrome. A "spirit child" is a child whose birth is surrounded by strange phenomena suffered by the mother, family or the child itself. Non-spiritual causes included bad sleeping positions of the woman, malaria, head loading and having intercourse during the first trimester of pregnancy.

> *"If you are pregnant, it is not good to be riding bicycle on long journeys, walking in the sun for long or carry heavy load. If you are fond of doing these you can get a miscarriage or you can deliver forcefully when the time is not yet due". FGD-TBAs-CHIANA*

If an intrauterine death is diagnosed by the soothsayer as a spiritual cause, home remedies are usually recommended. These included rituals to exorcise the woman followed by the woman drinking herbal teas to help expel the foetus. As part of the healing ritual, the healer would not drink or eat anything from the patient's house during the treatment process. Intrauterine death from non-spiritual causes can either be treated at home or in a modern health facility. At home, experienced healers usually lubricate their hands with *bengto* and insert them into the vagina to pull out the dead foetus.

> *"Even if a baby dies in the womb I can deliver it. I put my hand in and bring it out; the woman will not die; this one, only we (herbalist) can treat it. We can also use certain leaves and roots to make a herbal tea for her to drink and bring out the thing (foetus) inside her, if not, it will kill her". IDI-TH15-YUA*

The practitioners differentiated *pu-pwora* from *puga-chogem*. While *pu-pwora* is an involuntary loss of pregnancy before term, *puga-chogem* is the intentional termination of pregnancy.

6.3.2.10 Gestational hypertension

Gestational hypertension describes high blood pressure during pregnancy. It includes pre-existing hypertensive disorders, pre-eclampsia and eclampsia. High blood pressure during pregnancy results in protein in urine with substantial risks for both foetus and mother. High blood pressure can cause heart disease, stroke and kidney failure in the mother and for the foetus, it can obstruct supply of blood to the placenta leading to low birth weight.

The traditional providers reported hypertension as a sudden rise in blood pleasure triggered by heart failure and depression. Women whose husbands neglected or physically abused them during pregnancy were reported to be at a higher risk of hypertension. When men indulged in extramarital affairs or were unsupportive of their wives during pregnancy, the woman could develop heart conditions leading to hypertension. The practitioners reported that men were more unfaithful when their wives were pregnant and during the immediate postpartum period and that led to women suffering psychological disorders leading to high blood pressure. Women were usually counselled on how to manage their emotions during pregnancy in order to forestall the risks associated with it. A TBA described the problem in the following quote.

"When women of today are pregnant, their husbands will run out and come late in the night and sneak into the house so that nobody will see him and the woman will not also sleep so how will she be healthy since she is always thinking. Even if the woman delivers after two to three days, the man leaves her for another woman and that causes the high blood pressure in most women. This is how most young men treat their wives". FGD-TBAs-KAJELO

In response to partner violence during pregnancy, women went on hunger strike and this caused them emotional stress leading to hypertension. Poverty was also identified as a risk factor for hypertension. The practitioners explained that, women suffer the burdens of poverty more than men and that high fertility increased that burden. Pregnancy aggravated these burdens as the woman could not work to support herself. Consequently, pregnant women developed psychological disorders that led to an increase in blood pressure. One TBA reported that "*Our problem is poverty. You have many children that you cannot take care of. Why won't you be frustrated and get hypertension". FGD-TBAs-KOLOGO*

6.3.2.11 Pua/Paa (Malaria)

Malaria is transmitted by a mosquito and any infection during pregnancy has substantial risks for both the woman and her foetus. Malaria during pregnancy can lead to maternal anaemia and placenta parasitaemia can lead to low birth weight which is a significant cause of neonatal mortality.

Pua in Nankani or *paa* in Kasem, was identified as a common illness among pregnant women and was reported to contribute significantly to hospitalisations during pregnancy and to *fifiu-lura (Preterm deliveries). Fifiu-lura* (Kasem) was reported to be a health problem during pregnancy where a pregnant woman gives birth before nine months gestation; usually during the seventh month. They gave other causes of *fifiu-lura* as head loading and working in the sun.

"like I have said earlier, some of the women, if they like carrying heavy loads on their heads or working for long in the sun they can experience 'fifiu-lura' (preterm delivery)" FGD-TBAs-WURU

It was commonly understood that malaria is caused by mosquitoes and that pregnant women are particularly susceptible. However, some misconceptions still persisted as some practitioners said one could get malaria by working in the sun or eating cold foods. Malaria causes jaundice and "a lot" of malaria in the body can also lead to miscarriage, anaemia, hypertension and death.

> *"Pua (malaria) can be life-threatening because if there is so much pua in a pregnant woman, it will lead to a miscarriage; it can also worry the mother and may even lead to jaundice. If the doctor does not take good care of the woman, it will lead to her death." IDI-TH09-MANYORO*

The TBAs reported that pregnant women who went for antenatal care were routinely treated for malaria and therefore had a reduced risk of getting malaria. First time mothers however did not access the treatment early either because they were ignorant of their pregnancy status or concealed it until it was visible. Also, some women were not comfortable taking medicines and therefore failed to comply with the routine treatments. Malaria during pregnancy was attributed to non-compliance to the intermittent preventive treatment for malaria.

> *"At times too, the nurses will give them the drugs to swallow with water. They will collect the drugs and ask the nurse to bring them water to enable them swallow the medicine; while the nurses goes to fetch the water, they will throw the drugs away and pretend as if they chewed them. They say they won't swallow poison. Some also collect the drugs and keep without taking them and when you ask whether they have taken the drugs, they will say yes meanwhile they don't take them. So why won't the malaria stay in her until delivery and that would cause complications during delivery". FGD-TBAs-PUNGU-SOUTH*

> *"Sometimes too a woman can be pregnant you may not even see her yourself but others will see her and talk about her pregnancy to your hearing and when you also hear that she is pregnant and you go to tell her to go to the hospital she will turn and ask you "how do you know I am pregnant? Are you the one who impregnated her? If you did, then come and send her there and we will see". When she replies you like this, you wouldn't know*

what else to do so they will delay before going there for the medicines". FGD-TBAs-PUNGU-NORTH

Side effects of malaria drugs at the health facility also affected compliance. These included dizziness, vomiting, fever, yellowish urine, head ache and body weakness. Among the preventive measures was sleeping under mosquito nets, keeping the environment clean and destroying breeding places of mosquitoes.

"It is the mosquitoes that cause malaria; if you live in a dirty environment and you don't cover your drinking pots and bowls and you don't heat food before eating it, you can get malaria". FGD-TBAs-PAGA-NAVIO

Opinions differed among the practitioners on the appropriate place to treat malaria. Most of them agreed that malaria was better treated by modern health care providers because most women died in the past trying to treat it at home. Those who opted for traditional remedies recommended the bathing and drinking of tea prepared from neem leaves. Bathing the herbal tea treats the malaria on the body while drinking it treats the malaria inside the body.

A number of conditions were identified as related to maternal morbidity that were specific to the cultural context. These conditions were *wo-ngwom* (ulcerations of the womb), *wo-kalamin* (clotted blood in the womb) and *Waafo* (Python).

6.3.2.12 Wo-gnom/ pu-norigo (Ulceration of the womb)

The healers indicated that when a baby is delivered, several parts of the woman's body which were hitherto joined to the baby detach; creating ulcers in the woman's womb. The condition was identified as *wo-ngom* (Kasem) (*pu-norigo* in Nankani). The condition worsened when the mother refused to either eat hot foods or drink hot fluids to thin the blood in the womb to ease its flow. Hot water and hot foods prevented infection of the ulcers and eventually healed them. According to the traditional practitioners, eating cold foods during the immediate postpartum period was associated with significant risks. These included the hardening of the lower abdomen, postpartum-hair loss, diarrhoea, body weakness, weight loss and severe abdominal pains which may lead to death.

"If she is stubborn, she will fall sick. After the delivery, she is not supposed to drink cold water, she has to drink hot water but if she refuses and drink cold water, she will grow lean with scanty and soft hair; she will look like an AIDS patient. This is because she has refused to drink hot water and so there is a sore in her abdomen. That is why some women deliver and after some few days you hear that they have died". FDG-TBAs-KANDIGA

Reduction in risks was ensured by drinking hot fluids such as the juice from millet flour mixed with shea-butter. If a patient chose to drink cold water, she must stick to it throughout the immediate postpartum period. Drinking cold and hot water immediately after delivery worsened the ulcerations.

Treatment for the condition was only available at home using herbal tea prepared from *sana vooru* (tamarind leaves). The tea warms the abdomen and that helped in the healing of the ulcer. The woman was required to drink, bath and use the herbal tea to prepare all her meals until the ulcers were healed. Treatment lasted between one and three months. A healer described the process as follows;

"In our local homes, if a woman has just delivered and still has some remaining blood inside her womb, we fetch "sana vooru" (tamarind leaves), boil the leaves and use the water to prepare porridge or the woman to drink. This will melt the blood and it will come out through her vagina". IDI-TH09-MANYORO

6.3.2.13 Waafo (Python disease)

Waafo occurred when the woman experienced severe abdominal ache during pregnancy. The condition was common with families which had pythons as their totem. Lineage in the KND is patrilocal, thus, women marrying into a family which has the python as a totem are usually introduced to the python and they were forbidden to see it during pregnancy. Any sighting of the python during pregnancy induced severe abdominal pains and the family consulted a herbalist for *di-liri* (Traditional medicine used to treat cultural syndromes associated with the python).

"Waafo is treated only in the house. They have to dig the roots and boil for the woman to drink. If it is not time for labour, the pains will not stop. But if it is time for the woman to deliver and she drinks the water from the "waafo" herbs, she will be saying, "I am dying, ooh, I am dying," until she delivers." FGD-TBAs-DOBA

"They all serve the same purpose; but the medicine used at home is different from the one given in the hospital. A woman told me she went round hospitals seeking treatment for waafo, she went as far as to Nalerigu hospital but was not cured. I treated her and she was alright". IDI-TH19-GAANI

6.3.2.14 Wo-kalamin (clotted blood in the womb)

Wo-kalamin is a condition that occurs due to the woman's inability to expel all the blood from her womb after childbirth. *Wo-kalamin* literally means a "grinding stone in the womb" to indicate the hardness of the abdomen when a woman has the condition. The blood clots inside the womb and causes severe pain, with life-threatening consequences for the woman. First time mothers were particularly susceptible. A traditional cleansing ritual known as *sooru,* was carried out on all first time mothers to help expel all remaining blood in the womb. The ritual involved the pouring of hot and cold herbal preparations on the new mother. The new mother knelt in front of two women who took turns to splash hot and cold water on the mother at quick intervals to avoid the woman sustaining burns. A calabash of the warm water was then cupped on the woman's abdomen and shook vigorously to help expel any remaining blood in the womb. The process lasted three days for mothers of male babies and four days for mothers of female babies. The ritual also protected the woman from evil forces during the postpartum period. It was a taboo for a first time mother who had not gone through *sooru* to be seen outside the house. The belief was that the woman was susceptible to attacks by evil spirits with life-threatening consequences. A TBA confirmed the belief in the following quote;

"you see, a nursing mother who has not performed the "sooru" is not allowed outside the house because there are some people who are believed to have charms such that when they see the nursing mother she can die. So the disobedient type of nursing mothers can

ignore such taboos and go out and if they happen to meet such a person that will be the end of her life." FGD-TBAs-PUNGU-NORTH

6.3.2.15 Summary of findings

Traditional practitioners within the KND perceived a "life-threatening maternal complication" as any health condition related to pregnancy that increased a woman's risk of dying. These included conditions that led to excessive bleeding, high blood pressure, dehydration, stress, anger or fatigue. Both medical and maternal conditions that are understood in the cultural context were identified.

Traditional approaches to the management of pregnancy complications are based on culturally unique perceptions of the nature and cause of complications as well as the healing processes involved. Traditional remedies for maternal complications include spiritual (sacrifices and rituals), herbal and other social healing techniques performed by traditional practitioners. Items used for the healing process include plant and animal products, traditional oils and spirits. The choice of a healing method is influenced by what the healer perceives as the cause of the complication. Preparations of medicines are accompanied by rituals and context prescriptions in order to exert the necessary effects.

Traditional remedies exist for most maternal complications within the KND. Traditional providers articulated their perceptions of the dangers that each obstetric complication pose to the lives of pregnant women and prescribed both preventive behaviours and treatments. Prevention of complications was mainly through the observation of traditional prescriptions including food taboos and forbidden behaviours. For some complications, spiritual protection is necessary to avoid illness while nothing could be done to avoid others. The causes of maternal complications were classified broadly into medical, social, traditional, nutritional, spiritual and patient-related factors. These causes have been summarised in Table 12 below.

Table 12: Perceived causes of maternal complications

Broad cause	Explanations
Medical	Retained placenta, breech presentation, cord around the neck, excessive bleeding, abortion, preterm deliveries, miscarriages, infections, malaria, unprofessional handling of deliveries by delivery attendants
Socio-economic	Husband-related stress, poverty, lack of exercise or too much of it, timing of sexual activity during pregnancy, refusal to eat and drink hot foods during the postpartum period, envy within families
Traditional	Excision, failure to go through traditional cleansing rituals, ill intentions of pregnant women, infidelity, ill intentions of delivery attendant, sighting of family totems during pregnancy
Nutritional	Eating of foods that make the foetus fat, poor feeding of the mother, eating of sweet foods, eating foods that destroy the placenta
Spiritual	Evil spirits, spirit children, witchcraft, spells and charms
Patient-related factors	Narrow vagina or pelvis, young maternal age, high parity, laziness, non-compliance to pregnancy taboos, bad sleeping positions

6.3.2.16Implications of the findings

Three broad themes emerged from these findings. These include the role of culture in our understanding of life-threatening maternal complications, the local management of maternal complications, the perceived efficacy of traditional remedies and the correlation between traditional remedies and modern health care practices.

Cultural beliefs play a significant role in the healing of maternal complications.

Culture explains the aetiology of the complications, influences the place of treatment and the type of remedies that are prescribed. The role of culture is also evident in preventive practices and beliefs about the effect of non-compliance to taboos and behaviour prescriptions on the health of pregnant women. Considering that culture is an integral part of the life of the community, adherence to its dictates may be common within the district and this has implications for the management of life-threatening maternal complications.

The findings also raised concerns on the clinical safety and the therapeutic efficacy of traditional remedies. Traditional remedies for maternal complications predate modern health care. Some traditional practitioners gave positive accounts of their experiences with traditional remedies which provide some rationale for the continuous use of these services in spite of the great successes that science and technology have made in improving maternal health care. It further suggests some level of trust in the safety and efficacy of the procedures. However, risks associated with some traditional practices such as the use of ground vegetables to lubricate the hands of the traditional practitioner to aid delivery and the smearing of poultry droppings on the vagina raised critical concerns for safe motherhood.

Episiotomy as performed by the practitioners could lead to vaginal fistula where an abnormal passage is created between the vagina and rectum, allowing faeces to come out of the vagina. Throughout the discussions and interviews, there was no indication that the traditional practitioners observed hygienic or known safety practices in attending to their patients. None also reported the use of antiseptics to prevent infections. Knowledge of the active compounds of the plant products and other traditional medicines is also limited, thus making it difficult to assess their efficacy or otherwise in patients.

Traditional remedies for maternal complications are remarkably different from modern health care practices. However, a close observation reveals some correlation in the underlying understanding of the nature of the complications and how they are managed. For instance, the importance of physical activity during pregnancy which is widely known was acknowledged by traditional practitioners and the limits were clearly defined. Also, the act of putting a rope around the mother's neck and pulling her head towards her feet to correct breech presentation can be

compared to Enkins and Chalmers knee-chest position which helped 65 women who were confirmed by ultrasound to have breech presentations to deliver normally [230]. Other correlated practices have been summarised in Table 13 below.

Table 13: Correlation between traditional remedies and modern health care

Complication	Traditional remedy	Modern health care	Comment
Retained placenta	Herbalists smear their hands with *buruma* (the by-product of shea-butter) and insert them through the vagina of the woman to pull out the placenta.	Manual removal of placenta: Inserting a hand through the vagina into the uterine cavity to detach the placenta from the uterine wall and remove it [231].	Unlike the modern providers, the herbalists carry out this procedure without administering anaesthesia. Modern health care providers usually wear sterile gloves to reduce infections but traditional practitioners rub *buruma* on their bare hands before inserting them through the vagina. It is possible that some of the herbs may contain chemicals that stimulate the uterus to contract and expel the placenta but this is inconclusive.
Obstructed labour	If baby is too big for the birth canal, traditional birth attendants use a blade to make an incision to extend the vagina to ease delivery.	Similar to episiotomy where a surgical incision is made on the perineum and the posterior vaginal wall. [232].	Usually performed under anaesthesia and sutured after delivery. Even though the two procedures are similar, again, the traditional practitioners carry out their procedures without anaesthesia and the damage to the mother's perineum and sepsis could ensue. A repair is usually required after the incision

			(episiorrphaphy) and traditional practitioners cannot perform it. The traditional procedure risk damaging the rectum or urethra.
Breech presentation	The woman is held upside down by the legs and shaken to encourage repositioning of the foetus	Breech tilt exercise where the woman takes the hips above the heart with the head towards the floor [233].	The traditional procedure appears cruel and dangerous but it is based on the same principle that the baby naturally wants to have the head down and therefore will leave the pelvis and flip.
	Massaging the stomach of the pregnant woman until the baby repositions	External cephalic version - this is where an obstetrician or midwife turns the foetus into a cephalic presentation.	In both procedures, pressure is applied to the abdomen to turn the baby and even though the procedure is fairly safe, there is the risk of causing some damage to the placenta or the foetus.

Correlations between traditional remedies and modern health care treatments may provide an explanation for some of the successes of traditional practitioners in managing complications and therefore their enduring use within the community. In equipping health facilities with state of the art facilities to manage women in need of emergency obstetric care, health systems ought to recognise that a proportion of women would not use them based on contextual factors outlined in this chapter. Health systems need to ensure that alternate care practices provided by traditional practitioners are safe for the women who use them.

Traditional medicines in pictures

7 Chapter Seven

7.1 Results two: Fitting the local explanatory model and the perceived role of key community members in responding to maternal complications

Introduction

This chapter used the explanatory model to identify life-threatening maternal complications within the community. Based on the definition of life-threatening maternal complications provided by the healers, a simple screening tool (see appendix 7) was developed and applied to women who had given birth six months prior to the interview. All women who qualified as per the community definition were administered a biomedical and socio-cultural audit tool (see appendix 8). The audit tool was a semi-structured questionnaire which was answered by the woman and all who cared for her during the life-threatening morbidity event. The tools elicited care practices and health seeking behaviours that are critical to surviving a life-threatening maternal complication.

The findings from the biomedical and socio-cultural audit were useful in getting key community stakeholders to think about community-oriented initiatives that can promote maternal health and facilitate access to care when complications occur. Discussions were held with community leaders as well as modern health care providers on the findings from the audit that had a community focus. As noted in the background information, community leaders play a crucial role in the successful implementation of health interventions and therefore it was necessary for the researcher to feed back to the community leadership, findings on community-related factors that either contributed to life-threatening maternal morbidities or mediated the health seeking pathways when the complications occurred. These included delays in recognising the problem, delays in making the decision to seek care, delays in arriving at a health facility and costs incurred during the health seeking process. These issues were discussed within the broader theme of community issues that cannot be addressed by focusing on only health facilities. Specifically, these included maternal health problems that involved the household - particularly men - and those that involved the wider community.

The discussions are presented under broad themes as follows:

7.1.1 Section one: Fitting the local explanatory model of life-threatening maternal complications

7.1.2 Section two: Delays in the health seeking process

7.1.3 Section three: Men and family planning services

7.1.4 Section four: Male attendance at antenatal care

7.1.5 Section five: Community involvement in maternal health

7.1.1 Section one: Fitting the local explanatory model of life-threatening maternal complications

This section of the findings tested how well the local explanatory model helped in identifying life-threatening maternal complications within the community. The section provides data for objective two of the research study. Women who survived life-threatening maternal complications during their last pregnancy were identified retrospectively using the local explanatory model for life-threatening maternal complications in order to audit the circumstances surrounding their complication and the challenges they faced in seeking care.

7.1.1.1 Socio-demographic characteristics of women who were screened

A list of 1000 women, representing a quarter of annual deliveries in the KND was obtained from the NHDSS. Of that number, 903 women were contacted and screened. The rest were either not met on the day of the visit or migrated from the study area. Half 453(50.2%) of the participants were young women (15-25) and 357(39.5%) of them had never been to school. Most 773(85.6%) of the women delivered in a health facility and antenatal attendance was almost universal (99.7). Table 14 presents the detailed background characteristics of the women.

Table 14: Socio-demographic characteristics of women screened

Category	Variable	n=903	%
Age			
	15-25	453	50.2
	26-35	346	38.3
	36-48	104	11.5
Level of education			
	None	357	39.5
	Primary	314	34.8
	Secondary	202	22.4
	Tertiary education	10	1.1
	Vocational/Technical	3	0.3
	Other	17	1.9
Number of births			
	1	292	32.3
	2-3	331	36.7
	≥4	280	31.0
Place of delivery			
	Health facility	773	85.6
	On the way to facility	19	2.1
	Home (nurse)	19	2.1
	Home (TBA)	42	4.7
	Home (Other)	48	5.3
	Abortion	2	0.2
Antenatal care			
	Yes	900	99.7
	No	3	0.3

The mean number of antenatal attendance was 6.1 (Range: 1-10). Most 506 (56.0%) of the women reported falling sick during their last pregnancy. Morbidities that were reported are summarised in Table 15.

Table 15: Morbidities during pregnancy (screened women)

Cause of illness	n[a]	%[b]
Prolonged labour	93	18.3
Retained placenta	17	3.4
Ruptured uterus	3	0.1
Infection	21	4.1
Haemorrhage	49	9.7
Abnormal lying	28	5.5
High blood pressure	46	9.0
Shock	19	3.8
Respiratory distress	87	17.2
Spirit child	1	0.0
Witchcraft	1	0.0
Malaria	216	42.6

[a]Numbers do not add up to 507 because a woman could suffer multiple complications.
[b]They represent the proportion of respondents who suffered the particular morbidity during pregnancy

Based on the community definition of a life-threatening maternal complication, any woman who suffered at least one of the above-mentioned conditions and reported a possibility of dying if care was not sought outside the home, was identified to have survived a life-threatening maternal complication. After applying the criteria to the 903 women who had recent births, the prevalence of life-threatening maternal complications as per the community criteria was 19.8% (179). Out of the 179 women who qualified as having survived a life-threatening maternal complication, 148 of them were administered the audit tool. The rest could not be traced for the interviews either because they were not met at home or they had migrated.

One way of assessing how well the screening tool performed was to calculate the sensitivity and specificity of the tool. Sensitivity is how well the tool identified true positives while specificity is how well it identified true negatives. The screening tool could however not be tested for these parameters because the audit tool that was used to confirm the screening results was only administered to women who were identified by the screening tool as having survived a life-threatening maternal complication. Without administering the audit tool to the women who did not qualify as life-threatening maternal complications, it would be impossible to determine the number of women who survived a life-threatening maternal complication but were missed during the screening exercise. However, the findings from the audit were compared to the gold standard which is based on physician diagnosis. The physicians used the ICD codes and an adapted form

of the WHO near miss criteria and identified 105 (70.95%) cases as having survived life-threatening maternal complications.

7.1.1.2 Socio-demographic characteristics of the audit respondents

Almost all the respondents were either Kassenas 66 (44.6%) or Nankani 76 (51.4%). Most of them were farmers 69 (46.6%), had never been to school 61(41.2%), were in monogamous relationships 96 (64.9%) and were married or living with their partners 136 (91.9%) at the time of the audit. Most of the women 122 (82.4%) delivered in a health facility and 143 (96.6%) of all the pregnancies ended in a live birth. Table 16 shows the detailed socio-demographic characteristics of the audit respondents.

Table 16: Socio-demographic characteristics of the audit respondents

Characteristic	n =148	%[a]
Ethnicity		
Kasem	66	44.6
Nankani	76	51.4
Builsa	3	2.0
Other	3	2.0
Marital status		
Married/Living with a partner	136	91.9
Divorced	1	0.7
Separated	5	3.4
Widowed	3	2.0
Never married	3	2.0
Type of marriage		
Polygamous	52	35.1
Monogamous	96	64.9
Occupation		
Housewife	30	20.3
Farmer	69	46.6
Informal business/ low skilled	45	30.4
Professional	4	2.7
Highest level of school attended		
None	61	41.2
Primary	53	35.8
Junior high	17	11.9
Senior high	15	10.1
College	1	0.7
University	1	0.7
Place of delivery		
Home	19	12.8
Health facility	122	82.4
On the way to the health facility	5	3.4
Other	2	1.4

[a]Proportions do not necessarily add up to 100 due to rounding up to one decimal place.

7.1.1.3 The pathways to survival for life-threatening maternal complications

A biomedical and socio-cultural audit was conducted among all women who survived a life-threatening maternal condition; 148 of them were interviewed. The purpose was to document the health seeking pathways when complications occurred. Specifically, the section traces the sources of care for life-threatening maternal complications and documents the delays that occurred along the health seeking pathway. This was done using the adapted pathway to survival framework.

To qualify as a life-threatening maternal complication, a woman had to have sought care outside the home. However, 26% of the women initiated care at home before seeking health outside. It took an average of 38.9 hours from recognition of the symptoms as severe to initiating care seeking outside the home. When families recognised the first danger sign of complication, 30 (21.7%) of the women sought care from a health facility on the same day, 16 (10.8%) on the second day and 92 (66.7%) three or more days after. Only 57 (38.51%) women made the decision by themselves to seek care at the health facility. In almost half (46%) of the cases, the decision on where to seek care was influenced by a relative.

Availability of transport when respondents needed it as well as the mode of transport were used as indicators for determining the presence or otherwise of the second delay. About a third 28 (31.46%) of the women walked to the health facility and a similar proportion 34 (33.3%) reported difficulty in accessing transport to an appropriate place of care. Fifty-seven of them incurred transportation cost to the health facility. The average cost was 10.9 Ghana Cedis (5.8USD).

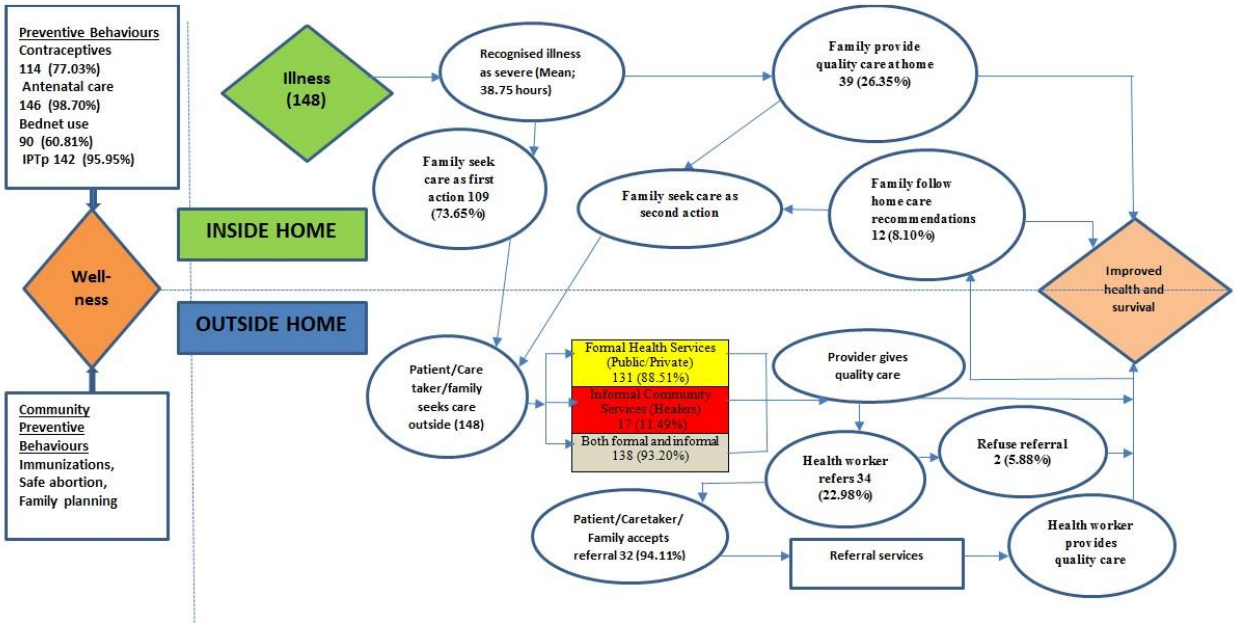
Although the focus of the current study was on community-related factors, instances of the third delay in the health seeking process were also assessed. This was based on respondent's own assessment of whether there were delays in receiving care when they arrived at the health facility. Fifty-five (39.9%) women reported delays in receiving treatment. The mean duration between arrival at the health facility and treatment was estimated at 48.52mins (Range: 10-180). Only 12 (8.7%) women reported incurring direct costs during treatment at the health facility. The average cost was 27.4 Ghana Cedis (14.5USD).

Both formal and informal sources of care were used by the women. Seventeen women sought care from traditional healers and 10 of them recovered from their complication after receiving treatment from the healers. Only 34 of the women were referred to another facility after both the formal and informal providers failed to treat the complication. Out of the 34 referred cases, only two did not accept the referral and sought care elsewhere.

Most respondents 131 (88.1%) sought treatment for their complications at a health facility. Only 12 (8.11%) women used the traditional healer as the first source of care and about 5 (9.4%) others also did so as a second source of care. Only 7 (4.7%) women used three sources of care before recovering from their morbidities. These excluded treatments that were initiated at home.

Most of the women who suffered a life-threatening maternal complication practiced some preventive behaviours. Antenatal attendance was almost universal 146 (98.7%) with a mean attendance of 6.3 (Range: 1-10). Contraceptive prevalence (77.03%), bed net use (60.81%), and intermittent preventive treatment during pregnancy (95.95) were all high. Figure 5 below shows the health seeking pathways of the women in the audit study.

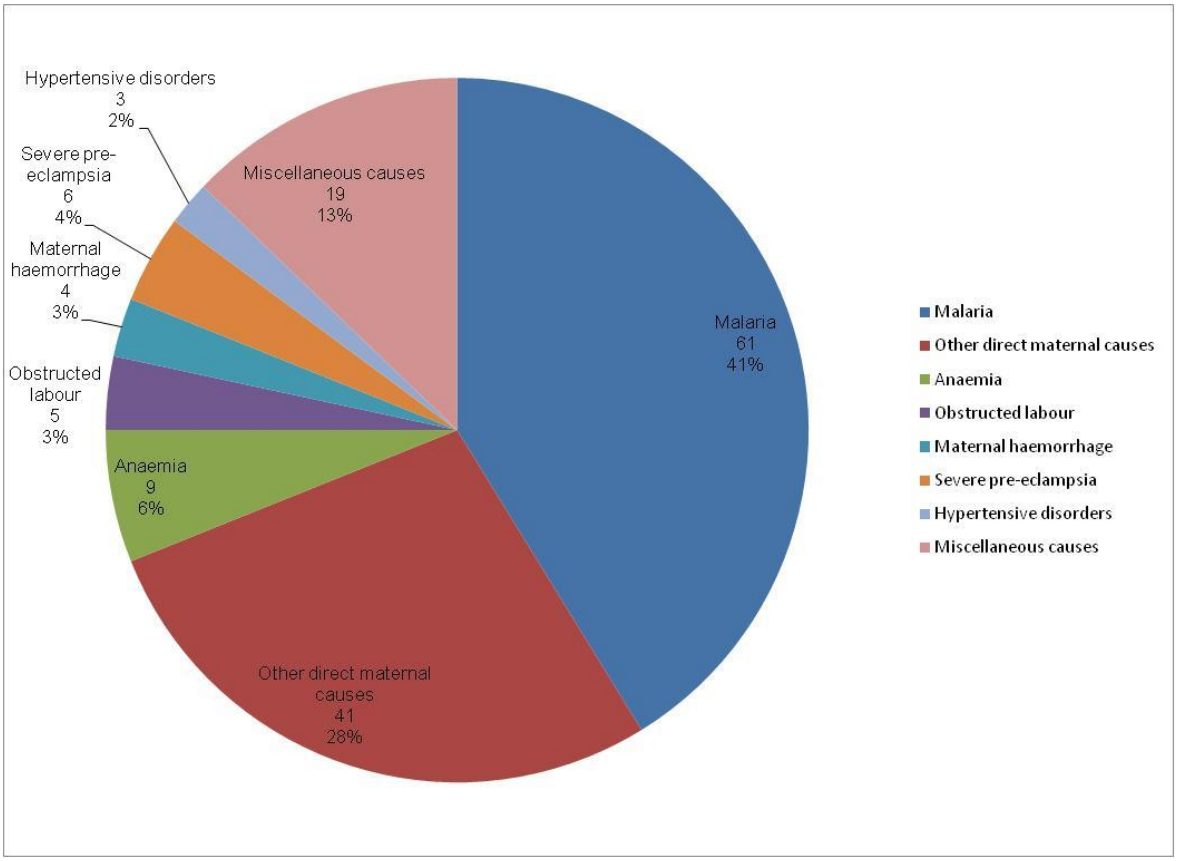
Figure 5: The pathway to survival for life-threatening maternal complications



7.1.1.4 Causes of life-threatening maternal complications using a clinical criteria

Respondents provided both open narrative accounts and structured responses to questions related to the morbidity event that they survived. The audit reports were then reviewed by two physicians who independently assigned a probable cause of the morbidity using the ICD codes and an adapted form of the WHO near miss criteria as a guide. Where there were discordance between the physicians, consensus coding was used to arrive at the probable cause of the life-threatening event. The pie chart in Figure 6 presents the main causes of the life-threatening maternal complications as per the clinical criteria

Figure 6: Causes of life-threatening maternal complications



Malaria is an indirect cause of maternal mortality and it accounted for 41% of the life-threatening maternal morbidities. The categories, other direct maternal causes and miscellaneous causes, accounted for 28% and 13% of the causes respectively. The categories which are contained in the ICD codes, were not very useful in providing the actual cause of the morbidity event.

7.1.1.5 Unwanted pregnancy

Thirty-four (22.9%) of the women who survived a life-threatening maternal complication indicated that they did not want the last pregnancy and 18 (52.9%) of those women did nothing to prevent pregnancy. This suggests an unmet need for family planning of 12.2%. Only one of the women did not know what to do to prevent pregnancy while 12 (66.7%) reported that their partners did not want them to use any method. The rest (5) had other reasons for not using contraceptives.

7.1.1.6 Implications of the findings

The findings show the feasibility and usefulness of using the local explanatory model for life-threatening maternal complications to retrospectively identify life-threatening maternal complications within the community. In settings where informal or traditional providers are involved in the management of maternal complications, this approach could be useful in measuring the prevalence of life-threatening maternal morbidities at the population level.

The quantitative findings confirm what the traditional providers reported in the explanatory model. Traditional healers are actively involved in the management of maternal complications and it is important to know the quality of care that is provided at that level. Regardless of the number of women who use these services, every pregnant woman has a right to life and it is important that the health system ensures that they receive appropriate care for their complications.

Delays were registered at every level of the health seeking process. Particularly worrying was the delay to seek care at the health facility. Most women in need of emergency care depend on a relative to make the decision to seek care at the health facility. When that decision is made, women again are confronted with the challenge of how to get to the health facility. At the health facility, women also reported delays in receiving care. Both the first and second delays have a community focus - the first delay relates to the dynamics of decision making at the family or household level and the second delay could go beyond the family to include transportation options within the community. This is particularly important because some pregnant women with complications still walk to health facilities to seek care which invariably leads to delays.

Women in need of emergency obstetric care incur both direct and indirect costs. Considering that the study was carried out in one of the poorest regions of Ghana, these costs can be catastrophic to households. Financial barriers to emergency obstetric care still persist despite the institution of free maternal health care within the health system. This raises questions about how the policy is being implemented and suggests further thinking on alternate financing mechanisms to cater for indirect costs such as transportation.

The main reason for unmet need for family planning was the lack of partner consent which raises concerns about family planning policies within the health system. Despite the crucial role that men play in decision-making within the largely patriarchal society, the current health policy for contraceptive use does not require partner consent. This runs counter to traditional gender roles and may prove ineffective in reducing unmet need for family planning. Apart from preventing unwanted pregnancies and its associated health problems such as trauma and hypertension, unmet need for family planning also raises concerns about fertility control which directly affects the health of women and children. The level of fertility was slightly higher among women who survived life-threatening conditions (3.1) than in the general population (2.5).

It is important to recognise that the sample for the audit constitutes women who survived and therefore the indicators that were reported could be worse off for those who die. Some of the issues raised in the audit findings are clearly beyond the health system which is already grappling with limited resources for the numerous challenges plaguing the health sector. This calls for support from other stakeholders in maternal health. One of such key stakeholders is the community. In the spirit of community participation in maternal health, it was necessary for the research findings to be shared with the community leadership who take critical decisions for the well-being of the people.

Feeding back the findings from the audit study was to help address objective three of the study. Discussions were held with community leaders including community health workers on the findings from the quantitative study that had a community focus. As noted earlier, community leaders play a crucial role in the successful implementation of health interventions and therefore it was necessary for the researcher to feedback to them findings on community-related factors

that either contributed to life-threatening maternal complications or mediated the health seeking pathway when a complication occurred. These included issues related to fertility and family planning, early recognition of danger signs, delays in the health seeking process and community support for prompt access to health care.

Introduction

Men in patriarchal societies have an implicit role in making pregnancies safer. This role is shaped by their beliefs and the socio-cultural context. Husbands of 12 (66.7%) of the women who had an unmet need for family planning in the audit survey refused to let their partners use a family planning method. This section therefore focused on men's perceptions of childbirth and family planning as well as their fertility preferences and how they could be made partners in increasing access to contraceptives. The results are grouped under broad themes as follows:

- 7.1.2.1 Men's perception of pregnancy and childbirth
- 7.1.2.2 Men's fertility preferences
- 7.1.2.3 Men's perception of family planning
- 7.1.2.4 Changing fertility preferences and family planning programs

7.1.1.7 Men's perception of pregnancy and child birth

Men generally had a positive attitude towards pregnancy because it is a blessing from God. They perceived pregnancy as an exciting phenomenon as it confirmed their reproductive capability and fulfilled their desire to procreate to extend their lineage. It also satisfied community expectations as there is usually social pressure on couples to reproduce following marriage. A community elder explained the cycle of life and the expectations that are associated with it in the following extract.

> *"When a woman is pregnant in this community, it is good luck because when a human being is born, people ask to know whether it is a girl or a boy. If it is a girl and gets to fourteen years, people ask to know whether she has gotten married. If it is a boy and gets to twenty years, they also ask to know whether he is married. If she gets married, after three or four months they look to see if her abdomen is rising up. So in this community, whenever a woman gets pregnant, it is happiness for people" FGD-OL-NAYAGNIA*

Men were not excited about pregnancies that occurred out of wedlock or during marital conflicts or those that occurred before a previous child was weaned from breast milk. Pregnancy also

evoked mixed feelings in men mostly due to uncertainties about the outcome. Pregnancies that are characterised by complications make men unhappy as contained in the excerpt below.

> *"There are times a woman can become pregnant and there is no happiness in the family especially when that pregnancy has various complications and you send her around the facilities and they don't get her treated. For instance, a pregnant woman can have miscarriage or she can deliver and the baby dies. So sometimes fear of these misfortunes make us have mixed feelings when our wives are pregnant" FGD-OL-KAYORO*

Men shared a common anxiety about the outcome of pregnancy; the survival of both mother and baby. They posited that the lives of the woman and the foetus are threatened during pregnancy because pregnancy is a disease which weakens the woman's immune system and predisposes her to other illnesses. They argued that because pregnancy is a disease, pregnant women have to attend antenatal care and their partners have to regularly consult soothsayers to ensure their good health and well-being. This was well captured by a chief in the extract below.

> *"It is a disease; because when your wife is pregnant, you do not know whether she is going to deliver a stone, a live baby or whatever. If it were not a disease, a pregnant woman would not have been attending antenatal. It is because anything can happen. If you are healthy why should you go to the hospital? If she is healthy why should the husband consult a soothsayer? It is not a disease that kills immediately but it is a disease that should be attended to all the time" FGD-OL-NAAGA*

7.1.1.8 Men's fertility preferences

Men believed that children immortalised them. *"(It) means that if you die and you are survived by a child, your memory will never be erased" (FGD-OL-NAGAGA).* Men had expectations that children would provide for them in their old age and a successful child could change the fortunes of the family.

> *"When a woman is pregnant, it is good because if someone didn't give birth to you, you wouldn't also have gotten married and want to produce a young one of your kind. If you don't have your own kind what will you do in the farming season? Children are like our*

"min-dua" (planting seed), so it is a good thing. In the past, when a woman delivers, people gather in the house and celebrate the birth of that new born baby but now things have changed; in today's world, that does not happen again" FGD-OL-KAYORO

The community leaders expressed preference for many children because it is associated with honour and prestige. Many children added to the labour force on the farm and also increased the probability of having a successful child who can care for the family. Men expressed a preference for male children and that if a woman gave birth to only girls, it was necessary to continue reproducing until she delivered a male child. They also noted that the more the number of children, the more willing couples are to mend their relationships in times of conflict. The quote below explains how men generally felt about having many children.

"We want a name (popularity); people will say these are this man's children. In our community, I have not seen any man who will have two or three children and say they are enough. He wants to have five or six or even ten children". FGD-OL-NAAGA

"The reason why we want to have so many children is that children vary. If you have only two children and you say the number is alright, you do not know what those left behind (unborn) would have done for you. So it is compulsory that you should have the desire for many children so that if one goes astray, the other one will take the right path". FGD-OL-NAYAGNIA

7.1.1.9 Men's perceptions of family planning

Family planning was understood differently among men and so different local linguistic terms were used to identify the concept. For instance, in Nankani, words such as "*adoge-ku" (put an end to child birth), "adoge-make" (having enough births), adoge-yalayala" (birth spacing)* were used to refer to family planning. These references drew different acceptance levels from men. *Adoge-ku* is the local terminology for sterilisation or tubal ligation. *Adoge-ku* was universally rejected by men because it makes the woman barren. Most of the community leaders also disapproved *adoge-make* because it suggests giving birth to fewer children. They were generally of the view that only God can determine the number of children that a couple has. They identified *adoge-yalayala* as the most acceptable form of family planning but questioned the relevance of

the use of artificial methods since it was already their way of life. They said it was necessary to always allow the previous child to be weaned-off breast milk before the next pregnancy. This typically took between two to three years for the next pregnancy. It was common to hear men say that family planning does not imply that a couple should not have children but that it helps them space their children to avoid sibling competition and maternal depletion.

> *"A child gets to three years before a woman delivers again. This makes mother and child strong. It enables the woman to rest a little in the fourth year before she gets pregnant again. It helps the woman to work well and it also helps the child to be strong". FGD-OL-MANYORO*

> *"When my wife delivers, we take a break and make sure that those children are seen through before I think of having more. There is no one who wants few children or delivers few and starts to do family planning so as not to deliver more. We want many children; it's just taking care of them that is difficult. I am older than all these people and I have only one child who is in Kumasi (a city that is about 600km away), so if they were 2, 3 or 4, at least, one would have remained to take care of this work (to serve as an elder of the community) or help me". FGD-OL-NAKOLO*

Most men who preferred many children were not comfortable with the concept of family planning in any form. They held the view that the purpose of marriage was to procreate and family planning prevented couples from playing that reproductive role. They held the view that the payment of dowries was based on the traditional expectation that the woman would bear children to replace the bridal price and so there was loss of bridal wealth when women decided to limit their reproductive capabilities. It was an affront to men's authority when women used contraceptives without consulting their partners. Men reported that the process empowers women to take autonomous decisions and that makes them disregard male authority. Particularly, men had concerns about women taking contraceptives after the first birth.

> *"But the problem with women of today is, as soon as a woman has one child, she goes to do it without the knowledge of her partner. Then she comes back and will not have any*

more children. That means I have lost the cows I used to marry her and that will not give me any profit. That is the problem with family planning". FGD-OL-KURUGU

"We all want to have many children. If a community doesn't have people then that is not a community. We want many children. If I see a person who has done this family planning here, I will remove that person from the community because I want our community to grow." FGD-OL-NAKOLO

Men associated most maternal complications with the use of family planning methods. Some recounted how their mothers in the past had no difficulty during delivery in contrast with the frequent caesarean sections that currently pertain. They singled out Depo-Provera as the main cause of complications during pregnancy. Others also associated family planning with female promiscuity and disrespect for their husbands. They believed that when women used family planning methods, their inability to conceive made them promiscuous.

"Do you know why some pregnant women get operated on when they are going to deliver? It is the family planning injections which contribute to that problem. During the days of our fathers, when they married their wives who delivered twelve children, there was no operation. But these days the world has changed; the family planning is causing all these problems". FGD-OL-NAYAGNIA

"When some of the women do family planning, they think they have attended a "university for penis". She will always go out sleeping with men. If you marry a woman and she becomes everybody's wife, it is worrying. The women should change; if they think because they have done family planning they can do whatever they like, sooner or later, their husbands will fight them and they will pack home." FGD-OL-NAYAGNIA

7.1.1.10 Changing fertility preferences and family planning programs

Despite cultural prescriptions to have many children, generally, men's desire for many children was reported to be changing. Factors influencing this transition included the changing role of children - increased enrolment in schools as opposed to keeping them on the farms or shepherding animals, low mortality rates, increased cost of education and health care as well as general increase in cost of living. Men were aware that having fewer children and providing them adequate care yielded better returns to having many children. The demands associated with many

children made it almost impossible for men to save money and therefore had to rely on support from relatives and friends when their wives were in need of emergency obstetric care.

The community leaders called for an end to the current approach for accessing contraceptives where the woman could visit the health provider alone to access a method. They argued that women were their "property" and therefore they could not access contraceptives without the permission of their husbands. They said the current collusion between their wives and health workers to access family planning was not promoting peace in their homes and therefore called for an end to the practice. The community leaders called for the promotion of natural methods of family planning and advised health workers to engage more with men who are the heads of the households. They specifically requested the use of their traditional leaders to engage men in their programs. This was to ensure that family planning programs are responsive to the social and cultural context.

7.1.1.11 Summary of the findings

Pregnancy and child birth are exciting events within the KND and men as heads of the family recognise it as a tool for extending their lineage. Men in the research setting have a preference for many children as in confers on them honour and prestige. Current economic hardships, progress made in reducing child mortality and pressure on parents to educate their children is however beginning to alter their fertility preference in favour of fewer children.

As future fathers, men need to make responsible reproductive health choices in order to promote the health of their wives. Men recognised the need to space births in order to protect the health of both mother and child. They are however against the use of modern methods of contraception which they blame for complications during pregnancy. Men believe that it is God who gives children and therefore man has no right to deliberately limit his or her reproductive potentials. Men are against the current family planning program that allows women to access contraceptives without informing their partners. As heads of the family, men feel they ought to be consulted on a critical issue such as using contraceptives. They feel a loss of bridal wealth when their wives use contraceptives and fail to give them their desired number of children.

7.1.1.12 Implications of the findings

Men in the KND tend to favour large families as a way of staying socially connected and increasing their chances of success in future. Efforts towards reducing family size would therefore be a challenging issue to deal with.

Gender norms in the KND shape spousal communication and this includes issues around family planning. The district is largely patriarchal and without engaging men, women have very little choice in using contraceptives. Contraceptive methods and services have however been geared towards women to the neglect of men who exert a lot of influence on reproductive health decisions in the household. This implies that the current family planning program that allows women to access family planning commodities without consulting their husbands, conflicts with the gender norms and is therefore bound to face resistance from men.

The absence of proper engagement with men has contributed to misconception about the association of family planning and maternal complications. Men appeared to lack understanding of the methods and fears around the use of contraceptives and promiscuity further compound the problem. These misconceptions tend to create a negative attitude in men towards the use of modern contraceptives and therefore limits spousal communication on the use of a method.

Without introducing gender equity in family planning programs, the fertility preferences of men would continue to be at variance with that of women with a potential for conflict if the latter is granted access to methods without consultation. There is therefore an urgent need for family planning programs to find innovative ways of engaging men in their programs. Efforts towards resolving issues of unmet need that have focused on making the commodities available would not make significant impact on the population if programs are not designed to gain the trust of men.

7.1.2 Section three: Delays in the health seeking process

Introduction

Delays were reported throughout the health seeking process. These included delays making the decision to seek care, delays in arriving at an appropriate place of care and delays in receiving care. The first two delays have a community focus and these were discussed with community leaders to further elucidate the problem and suggest feasible community-based interventions. This section has the following subsections:

- 6.1.3.1 The decision to seek care - The first delay
- 6.1.3.2 Arriving at an appropriate place of care – The second delay

7.1.2.1 The decision to seek care – The first delay

Traditionally, the decision on where to seek care is made after consulting with soothsayers; first to determine the cause of the illness and second, to seek guidance on the appropriate place for care. This role falls to the men in the compound, usually the compound head, who visits the soothsayer on behalf of family members. Within the traditional health system, not all illnesses can or should be treated in a health facility and therefore choosing the wrong place for care could spell misfortune for the family. A woman in need of emergency obstetric care may therefore have to wait for the consultation of soothsayers to be completed before care can be sought. A women's group leader who participated in the focus groups explained that

> *"We are only women; if a woman who has just delivered falls sick, it is the responsibility of the man to go out and consult a soothsayer to know why it is so. Women cannot know why the newly delivered woman is sick. The men also find out whether if the woman goes (to the health facility) she will survive or not". FGD-OL-MANYORO*

Women who exercise some level of autonomy are described as being disrespectful. Women cannot unilaterally initiate care seeking without causing offense. Women who act independently disrupt the social hierarchy and challenge the power structure. This is commonly understood, and for some community members, a life-threatening event such as a severe maternal morbidity is still insufficient justification for a woman to override the deep-rooted social norm. Women who

encounter misfortune after independently seeking care risk being labelled as witches. The excerpt below conveys some of the views held by the community leaders.

> *"For a woman to go without informing her husband, it means she is showing off; she does not respect her husband. She wants to show that she can take care of herself. So she can do whatever she wants without informing her husband". FGD-OL-YUA*

> *"Infact, traditionally, a woman cannot go to the hospital without the knowledge of the compound head. If the husband is not at home, they will ask her to wait for him to come. It may take him a whole day or two to return; is it true or not? Meanwhile the woman is suffering and they are waiting for someone to come. It is a problem; if she goes without informing anyone and the pregnancy miscarries, they will say she is a witch and she will not be allowed into the house. That is what also leads to the delay". FGD-OL-NAAGA*

The powerlessness of women is compounded by their economic dependence on their husbands. Although maternal health care services are free within public health facilities, indirect costs associated with utilisation of these facilities such as expenditure on transportation and food, generally require that the woman has cash when seeking care. In the absence of the man, such resources may not be available and the woman has to wait for the husband.

> *"She has to inform her husband because he has to give her some money to go to the hospital. Even if she has health insurance and will not pay for the treatment, she will drink water over there and she may even go in a vehicle". FGD-OL-GAANI*

The community leaders admitted that some of the women make more money than their husbands. They reported that some women are either gainfully employed or work in the informal sector as traders or farmers and therefore do not need any financial support to seek care. However, regardless of the woman's personal financial resources, she risks offending her husband if she initiates care seeking without first obtaining the consent of her husband. As a women's group leader put it, o*nce you have decided to attach yourself to (marry) him, you have no right to have your own thoughts". FGD-OL-YUA (Women Group Leader).* Once a decision is made by the head of the family, women can neither contest nor disobey because they risk incurring the wrath of their husbands. These decisions include the place of delivery and health seeking.

"If a woman is in labour, it is the man who decides whether the woman should deliver at the facility or not. If the woman goes without the husband's permission, she will be sacked together with her baby from the husband's home". IDI-DIRECTOR OF HEALTH

The data showed that young males are more receptive to female autonomy in the district and that strict gender roles as presented above are rooted in the traditions of the people which have been affected by modernity. The attitude of the young males appeared to have been influenced by education and migration. Most of the young men were educated and reported traveling to the southern part of the country during the dry season for job opportunities. This was mostly in the cocoa farms in the Ashanti region of Ghana where lineage is matrilineal. Exposure to the Ashanti lineage system appeared to have influenced their views and attitude towards female autonomy. The young men reported that it was within the woman's right to initiate care seeking or choose a place for delivery in the absence of the husband or compound head, especially for maternal emergencies. They however added that it is imperative for the woman to inform the husband as soon as she can.

"She can go without informing you; if you leave home for your farm and she falls sick, she can go to the hospital. You cannot quarrel with her when she comes back home; who knows what will happen if she delays. She can go." FGD-OL-PINDAA

7.1.2.2 Arriving at an appropriate place of care - second delay

The community health compounds are generally a walking distance from most community members. However, women and their families face transport challenges during referral to either the district or regional hospital. This is because passenger transport is only available in the villages on market days which come on every three days. The community leaders observed that most maternal emergencies occurred during the night when passenger vehicles were not available and so they often transport women on either bicycles or motorbikes depending on whichever means was available. They recognised that this mode of transporting pregnant women was not appropriate but explained that within the community context, those were the only options available to them. One community leader explained their challenges in the following quote.

"There is no vehicle in this community and picking a pregnant woman on a motor bike is very bad. You have to search for a vehicle, run to Navasco to get a vehicle and by the time you take her there for treatment, it may be too late. Then they will blame you for delaying. These problems mostly occur in the night; mid night and you cannot get a vehicle. If you go to town, the vehicle owners will think about the money rather than the human being you are going to save. When you go to the clinic here, the nurses will say they do not have a vehicle, what can they do? If you go and you do not get a vehicle quickly, can you carry her there on your shoulders?" FGD-OL-GAANI

None of the communities which participated in the discussions reported a community-facilitated referral system for maternal emergencies. Poor road infrastructure limits transportation options in these communities. In the past, donkey carts were used to transport women to health facilities but current alternatives include bicycles, motorbikes and cars. Most individuals own bicycles and motorbike-ownership is increasingly common within the communities. A three-wheeled motor cycle, popularly known as "motor-king", has gained notoriety in the communities and is used for passenger and cargo transport. Government buses are non-existent in these communities and so passenger transport is completely controlled by private providers whose main aim is to make profit. Due to bad roads, the private providers only relocate their vehicles to these communities when they become unattractive to urban dwellers.

"I will think about what we can do to help; but now people buy motor bikes, they can help the pregnant women to get to the hospital. During the olden days some of us used donkey carts to send women to the hospital". FGD-OL-MANYORO

A few of the community leaders, especially the chiefs, reported that their personal vehicles had become community ambulances for transporting emergency cases to referral facilities.

"This is my 3rd car I have bought; when there was no single car in Kayoro some people called me "Kayoro Ambulance". I could travel and come mid-night whether rain or whatever time it is, they come to me for help. I carry them there and at times some deliver on the way and I bring them back. Others will not even have money to pay for services rendered at the facility; I foot (pay) their bills for them". FGD-OL-KAYORO

Some of the elders confirmed the efforts of their chiefs in assisting pregnant women get to an appropriate place of care and expressed hope that the future generation of young people who have access to education will help them out of their current predicament.

> *"It is a community problem; chief has a vehicle and anyone who falls sick in this community and is referred to Navrongo, is sent there. If he has money, he gives the sick person or pregnant woman. We will pray that our youth who are in school can get a vehicle for us; until then, there is nothing we can do because we cannot even take care of our own wives and children let alone take care of others when they are sick". FGD-OL-NAAGA*

Also, delays in arriving at an appropriate place of care were often due to financial constraints, including such things as the cost of transportation and supplies needed for a stay in a health facility. Long distances to referral facilities compounded this problem. Even though the health workers indicated that maternal health services, including the use of ambulances are free, the community leaders said that they are usually asked to pay for fuel.

> *"At times you have to take her to town and the town is far away; we are not near to the town. There is no vehicle here; picking a pregnant woman on a bicycle to town, it is difficult. There is a sandy stream here and you cannot cross it. Sometimes it is lack of money to get a vehicle that will send her. Even if you get a vehicle; there is a hospital vehicle and if you call it and they come, you will be asked to give them money to buy fuel for the vehicle. They will ask for a million (50USD); as we are sitting here, where are we going to get one million? If you do not sell a cow, where are you going to get it from? That is what leads to the delay, not that we do not want to take the pregnant woman for treatment". FGD-OL-NAYAGNIA*

7.1.2.3 Summary of findings

Delays are recorded at every stage of the health seeking process. As heads of the family and decision makers, men control family resources, consult soothsayers and are potential facilitators of their wives' access to timely and appropriate care. This traditional role has often led to delays in seeking care especially during complications. Women in need of emergency care depend on

either their spouse or the head of the family to make the decision to seek care at the health facility. Women who take independent decisions to seek care are viewed negatively and any misfortune associated with their action could lead to their expulsion from the home.

When the decision is made to seek care at a health facility, women again are confronted with the challenge of how to get to the health facility. No community-facilitated referral system exists within the KND. Transport options to referral facilities are limited and private providers who are commonly used are expensive for most rural dwellers, thus contributing to delays in arriving at an appropriate place of care. Sometimes, chiefs have to use their personal vehicles to transport women to referral facilities.

In rural communities, vehicles to transport pregnant women can only be accessed on market days that come on every 3 days. Referral facilities are however not within a walking distance and so women may have to wait for days or use other inappropriate transport options such as motor-bikes and bicycles to reach the referral point. Where there are no transport options, pregnant women with complications walk to health facilities to seek care which invariably leads to delays. Availability of transport does not also guarantee access to such transport facilities as the cost of using the facilities is often not within the reach of many community members.

7.1.2.4 Implications of the findings

Both the first and second delays have a community focus - the first delay relates to the dynamics of decision making within the family or household and the second delay could go beyond the family to include transportation options within the community.

Gender imbalances render women powerless in making decisions that affect their health. Women's opinions are irrelevant in patriarchal settings where any demonstration of autonomy risks rejection by their husbands and attract negative societal labels. This has implications for the health of women in terms of utilising health information and timely access to appropriate care. A generation of young men who are socialised to view women as partners and to support their wives throughout pregnancy could allow women to act independently without consequences.

When maternal complications occur, emergency obstetric care is needed to save the life of the woman. However, due to family and community dynamics, several consultations could be made before initiating care seeking. These consultations tend to delay the woman's access to prompt care which could increase her risk of dying. These consultations are rooted in the traditions of the people and may be difficult to alter. Therefore, health systems seeking to improve prompt access to emergency obstetric care would have to be tactful in getting community members and men in particular to recognise the importance of expediting health seeking and in some cases ceding their decision-making role to women. This may require an understanding of the dynamics of male influence in health seeking which is crucial in confronting masculinities and negotiating compromises to improve the health of women. It may also require the use of different engagement strategies with men to recognise emergency situations as well as empower women to take autonomous decisions using both social and economic interventions.

Also, because the health system plans interventions in isolation, where they fail to transport a woman in need of emergency obstetric care to a referral facility, families are usually left stranded. From the findings, it is clear that despite some fears and anxieties, communities are generally willing to set up a community referral system. This would however require guidance from experts within the health system. A community referral system would facilitate prompt access to emergency obstetric care in places where there are no ambulances. Where ambulances exist, the system could function as an alternate. The absence of a functional referral system throughout the KND is one of the major causes of delays in arriving at an appropriate place of care when complications occur. The absence of a referral system is partly because the health system is currently overburden by efforts to offer primary health care to the people and therefore it may require the efforts of other stakeholders in maternal health to assist communities with referral facilities. A community referral system that is initiated by the community leadership and supported by the health system could hold promise in ensuring prompt access to care when complications occur.

7.1.3 Section four: Male attendance of antenatal care

Introduction

One overarching theme that emerged from the interviews with health workers was a new health policy that sought to encourage men to accompany their wives for antenatal care. This was one effort to promote early recognition of pregnancy-related danger signs which was reported in the audit findings. The health workers reported during the in-depth interviews that the health system had observed that pregnant women often have challenges with recognising danger signs of complication and therefore a new health policy had been introduced to encourage men to accompany their partners for antenatal care in order to access information on pregnancy-related danger signs. This couple-based antenatal care approach is to ensure that an additional family member has the capacity to assist the pregnant woman in early recognition of pregnancy-related dangers signs. The discussions generally focused on the relevance of the policy, men's perceptions and attitudes towards antenatal care and men's concerns about attending antenatal care with their wives. The findings are presented under the following headings:

- 7.1.4.1 Relevance of the policy for men to attend antenatal care
- 7.1.4.2 Men's perceptions and attitudes towards antenatal care
- 7.1.4.3 Men's concerns about attending antenatal care
- 7.1.4.4 Factors that facilitate men's attendance of antenatal care

7.1.3.1 Relevance of the policy for men to attend antenatal care

According to the health workers, men who attend antenatal care also have access to critical information on the reproductive health of their wives, information on obstetric danger signs and how to prepare for the birth of their baby. Also, as heads of the household, men in antenatal care could increase adherence to guidance provided at the clinic. They also have the opportunity to test for HIV in order to reduce the risk of transmitting the virus to the foetus.

Most men were unaware of the initiative to encourage them to attend antenatal care. For those who were aware of the initiative, a few supported it. They argued that since it took two of them to make the pregnancy, both of them have to be responsible for the health of the woman and the outcome of the pregnancy. They also recognised that some women felt reluctant to go for antenatal care after the first visit and men needed to ensure that they adhered to the schedules.

Besides, "*Your wife is your friend; if you have time to go with her, it does not spoil anything; it is good" (FGD-OL-PUNGU).* Some shared stories to highlight the relevance of the policy.

> *"Let me tell you a true story; a woman went for weighing and she was told the type of foods to eat. When she got home and told her husband, the man asked her to go back to the hospital for those foods (laughter by respondents.) If the man had gone with his wife to the clinic, he would have also heard the type of foods his wife should eat. It would have been more helpful". FGD-OL-MANYORO*

Some men were of the view that normally, they would not accompany their wives for antenatal care but a health policy could encourage such attendance. They said compliance was more likely if the policy had the support of the chiefs, because *if your chief tells you to dance, (you) cannot say your hips are hurting. FGD-OL-NAKOLO*

7.1.3.2 Men's perceptions and attitudes towards antenatal care

Generally, men in the KND do not accompany their wives for antenatal care. Therefore, they were surprise to hear the question on whether they accompany their wives for antenatal care. One community member reported that "*there is no man in A who does that (accompanies the wife for antenatal care); not even a single one" (FGD-OL-PINDAA).*

Socially, the idea of attending antenatal care with one's wife was strange to most community members. Statements such as "*we are not used to that (FGD-OL-PINDAA)"*, *"I have never seen that"(FGD-OL-SIRIGU)* and *"they say women should go for weighing and not men" (FGD-OL-KURUGU)",* were common. Health workers were of the view that men often assumed that issues in the clinic were for women and therefore their presence there was irrelevant.

> *"It was never practiced like that before so now it is not normal for a man to be accompanying his wife for antenatal care. People will think you have come there for a different reason and not the antenatal care." FGD-OL-KAYORO*

> *"They think it is the woman's issue and they don't see their importance in coming". IDI-MIDWIFE*

In both Kasem and Nankani, the words used for antenatal care are *maŋem* and *makrɜ* which

translate as "weighing" in English. Men wondered what their role was at the antenatal clinic when the purpose was to "weigh" pregnant women. Also, men prioritised other roles over supporting their wives in this way. The responsibility of men to work and provide for the family takes precedence over public health recommendations such as accompanying their wives to the clinic. Concerns about what the family will eat and who will attend to other children if both husband and wife are absent were raised by participants.

> *"If it is during the rainy season when there is farm work and then both of you go there, who will do the work? Who will care for the children and what will they eat since you and the mother are at weighing?" FGD-OL-KURUGU*

> *"The reason why we cannot do that is we are always engaged in one activity or the other. When we wake up, we sweat before we get something to eat. So while the woman is attending the antenatal care, the man will remain at home and work so that when she returns there will be something for both of us to eat. That is why we have no time to go with them". FGD-OL-NAAGA*

7.1.3.3 Men's concerns about attending antenatal care

Underlying men's reluctance to attend antenatal care is a perception that the overt expression of one's affection and concern for his wife is inappropriate. Some community leaders said the practice of publicly expressing affection is shameful and can only be borrowed from other tribal groups such as the Akans in southern Ghana or the "Whiteman".

> *"We are not used to it; we are not "Gambue" (Akan tribe in southern Ghana) Gambue like holding their husbands and putting their arms around their necks. Here, if you even touch your wife while you are walking with her, people will see you in a different manner". FGD-OL-NAAGA*

> *"It is not our tradition; our forefathers did not do that. If you do that, they will say you are a useless man. They will mock and insult you". FGD-OL-KURUGU*

> *"It has not been part of the custom here. It is only recently that when a man marries a woman they can now sleep together in one room but those days the woman slept with the mother in-law". IDI-MIDWIFE*

Men who accompanied their wife's to the clinic were called "kaana-kadong" (women's rival) or "bakana" which means "man-woman"; suggesting that the man exhibits female tendencies. Most of the men were of the view that accompanying their wives to the clinic is embarrassing and cannot be promoted within the community.

The community leaders also maintained that men did not need to attend antenatal clinics in order to support their wives. They argued that men often question their wives about medications given at the clinic, offer reminders to them to comply with drug regimens and also remind them of their clinic days.

> *"We do; and sometimes the woman will show you the medicines given to her. You may also ask to know and she will say, 'Why do you ask?' That also brings a big problem." FGD-OL-KURUGU*

> *"When it is time for her to go for weighing, we ask them whether they have gone for weighing or not. If they say they have not gone for weighing, we tell them to go. FGD-OL-GAANI*

The community leaders claimed that men often assist their wives with household chores such as fetching water or firewood because they recognise the risk involved in having pregnant women engage in hard labour. Support was also in the form of increased affection and care, provision of good food, money for clinic expenses, consulting soothsayers and pouring of libation. The men reported that it was necessary for them to continuously monitor the health of their pregnant wives by pouring libation and consistently consult soothsayers throughout the period of the pregnancy. This traditional role was deemed necessary to prevent illnesses caused by evil spirits, witches and charms or show appreciation to the ancestors for recovery from illnesses.

> *"If your wife is pregnant, your enemies can interfere with the pregnancy, witches can also interfere with the pregnancy and kill the pregnant woman. So the man won't sit down; he will go round (consult soothsayers) to see to it that his wife gives birth safely." FGD-OL-PINDAA*

> *"In fact like my brother said, it is not all of them who do it. Immediately the woman gets pregnant, he thinks he has done his responsibility and it is now*

left with the woman to carry on. You know when a woman is pregnant you should give her much love. This is because if she gets angry the baby inside her will also get angry. He should give much love so that that the baby will grow well. A man can go out saying he is going to the market to chat leaving his wife at home. If you go to the market, you will find him sitting at a pito bar drinking. So like he said, some men do it while others leave their pregnant women and go out". FGD-OL-MANYORO

7.1.3.4 Factors that facilitate men's attendance of antenatal care

When men had to transport their wives to antenatal clinics, they were more likely to engage in the care their wives received. However, this only happened when they had to travel long distances to access care.

> *"My house is far from the clinic so when she was pregnant and paddled a bicycle to the clinic and back, she lost the pregnancy. So when she became pregnant again, I had to pick her on the bicycle to and from the clinic. I heard everything she was told at the clinic". FGD-OL-MANYORO*

Participants said men attend antenatal clinics when they suspect that the woman is not interested in keeping the pregnancy. This was mainly to prevent any attempt to seek abortion services.

Women with complications were also more likely to have their husbands attend antenatal clinics with them. This was due to two reasons; first, due to the illness the woman has difficulty in walking and therefore has to be transported and second, because they want to have first-hand information on her recovery. The few men who accompanied their spouses for antenatal care were given restricted access to treatment and examination rooms and therefore did not feel part of the process.

The health workers said they are usually pleased to welcome men to antenatal clinics. It was also reassuring for them to receive feedback from men who took interest in the clinic activities.

7.1.3.5 "One man who last came with the wife, met me in the market and said oh madam, you people last said my wife will deliver on the fourteenth and she is still walking around. I told him not to worry because sometimes we have 1 week or 2 beyond the due date. That means he is interested and knows the expected delivery date of the wife". IDI-MIDWIFEIncreasing male attendance at antenatal clinics

The need to increase male involvement in maternal health in general was recognised by all participants. Initiatives that were pursued by health workers included a conscious effort to consistently engage men in reproductive health discussions during routine home visits and at community meetings or durbars. According to the health workers, community meetings were preferred as men were usually absent during home visits. Durbars were reportedly effective in reaching a good number of males and attendance was best on market days but men often got drunk before arriving at the durbar ground. Other suggested strategies included drama and radio programs

Incentives to increase male attendance of antenatal care include giving women who come with their husbands' preferential treatment throughout the antenatal care process. Men who attended antenatal care were also commended and publicly acknowledged through applause.

Health workers also encouraged the formation of father support groups within the communities to facilitate the sharing of knowledge and peer support for young fathers. Surprisingly, none of the community leaders mentioned the work of the groups in the discussions. This questions either the effectiveness of the intervention or the appropriateness of the approach being used to form the groups.

> *"It is because they have realised these problems like men not (being) interested in accompanying their wives to the facilities, and their refusal to ensure that women should be provided good nutritional foods and clothing during pregnancy to ensure safe delivery, Ghana Health Services said that any time they have a community durbar or workshop, we should go and educate the people on the importance of these things. Why the men need to give all the necessary support to their wives during pregnancy and even after. Also, in our home visits we have been doing all these and yet they don't want to change. We will also not stop; time will come when they will change and pay attention to their wives." IDI-MIDWIFE*

The health workers acknowledged that changing behaviour is a challenge, especially in societies where individuals can suffer social derision and stigma after embracing change. Consequently, it was suggested that the approach be gradual and tactful in order not to offend communities with strong opposing cultural values.

> *"My suggestions would be that, in areas where male involvement in the maternal health is low, we should do more community sensitisation through drama or radio, organise durbars and we should take this thing slowly because we are changing human behaviour. These are people who are 40 to 50 years old who have been living with the women and thinking that once a woman is pregnant it is hers till the child comes out, I have nothing to do and all of a sudden you want them to start accompanying their wives to antenatal clinic, when the wife has laboured they should come for postnatal care and family planning. They have not been doing it for a long time so my suggestion is that we should involve them slowly." IDI-MEDICAL ASSISTANT*

Community leaders suggested the use of chiefs to mobilise and disseminate information on male involvement. The effectiveness of this approach lies in the traditional role of the chief as the community gate-keeper and the custodian of traditional norms and practices. Traditional norms which conflict maternal health interventions are best altered using chiefs and elders as advocates. Traditional chiefs have the power to sanction community members who go against the status quo in the community and this was often mentioned in the interviews and discussions. For instance, a health worker reported that some chiefs have instituted by-laws which compel men to ensure that their wives attend antenatal care or face potential fines.

> *"Just to add, if they want to implement such a law, they need to come down to our chief and he can also organise his elders together with a fixed date and time just like we were told to do so here today. We will agree and do but if you meet me on the way and put such an issue to me, I wouldn't even listen to you. I will only be saying yes, yes to you but I wouldn't agree afterwards and if the chief should ask me that did you meet people on your way, I will reply no, I never met anyone on my way (laughs)." FGD-OL-MANYORO*

> *"In my former station, the chief told the men that if they don't allow their wives to attend ANC, they will pay a fine and all the men agreed and allowed their wives to attend ANC and it was fine. We even formed men's group and we talked about family planning, child health and pregnancy issues and it was helping us". IDI-MIDWIFE*

Most of the community leaders said they were too old to learn new initiatives in maternal health. They were however of the view that young men could benefit from targeted health campaigns so that as they transition into adulthood, they would view support for their wives during pregnancy as a way of life. They emphasised the need to properly articulate the kind of support that women need from them during pregnancy and how that support should be offered.

7.1.3.6 Summary of findings

Men are being encouraged to attend antenatal care in order to improve access to information on the reproductive health of their wives, participate in HIV screening and to learn how to prepare for the birth of the child. Men who attend antenatal care can support their wives by helping identify pregnancy-related danger signs. While most men thought the idea of encouraging them to attend antenatal care was not a feasible policy in their communities, others embraced it with the view that it is important for men to be part of the care process until the birth of the child.

The community leaders found it strange, unnecessary, and embarrassing for men to attend antenatal care with their wives. They wondered what their role during antenatal care was when they had more pressing responsibilities at home. Men prioritise their responsibility to work and care for the family over the public health recommendation to accompany their wives to the clinic.

Men were however willing to transport their wives to the clinic if the distance between the home and the clinic were far or if the woman was ill. Men at antenatal clinics were given restricted access to treatment and examination rooms and therefore did not feel part of the process. Women who attend antenatal care with their husbands were given preferential treatment while the men were publicly acknowledged.

The influence of male support groups, which is one of the strategies being pursued by the Ghana Health Service to encourage men to attend antenatal care, was not visible at the community level. Innovative tools such as radio, drama, and sensitisation programs that target young men and use

chiefs as advocates may increase male acceptance and participation in antenatal clinics. Chiefs have the power to set up by-laws and compel people within their jurisdiction to comply with public recommendations or face potential fines.

7.1.3.7 Implications of the findings

Encouraging men to attend antenatal clinics would be challenging if strategies to do so are not carefully thought through. Involving men in antenatal care is an important mechanism for fostering support for pregnant women and thus improving pregnancy outcomes.

The findings suggest that the current antenatal care model is not friendly to men. The antenatal clinic environment is dominated by women with hardly any content and infrastructural adaptation to make them attractive to men. Besides, men risk social derision and stigma if they are sighted accompanying their wives to the clinic. Encouraging men's attendance of antenatal clinics would therefore require efforts from both the health system and community leaders.

Antenatal care infrastructure and programs would have to be re-aligned to ensure that time spent there by men is worth the while. Incentives geared towards encouraging male involvement would have to go beyond applauding men and giving their wives preferential treatment to include participation in antenatal care activities such as listening to the foetal heart beat, counselling on obstetric danger signs, HIV testing, and access to information on their wives' medications and antenatal care schedule. It would also require that program planners work with community leaders to break through stigma that is associated with male involvement in antenatal care.

7.1.4 Section four: Community involvement in maternal health

Introduction

This section of the results did not address any particular community issue that came out of the audit results. It however addressed key issues related to community involvement in maternal health. Based on all the community issues that were raised in the previous sections, the researcher sought to gain some insights into on-going community initiatives and some of the potentials that they could harness to improve maternal health within their communities. Specifically, the section addresses who, why and how health systems engage communities in maternal health, the mobilisation of social support for the deprived and suggestions on how community involvement in maternal health could be improved.

The results are presented under the following sub-headings:

- 7.1.5.1: Involving communities in maternal health
- 7.1.5.2: Social support and mobilisation of resources for maternal health care
- 7.1.5.3: Improving community involvement in maternal health

7.1.4.1 Involving communities in maternal health

Involving communities in health interventions was viewed by the health workers as necessary for the successful implementation of those interventions. As one health worker put it,

> *"You know, health cannot be executed by health workers alone. The whole community must be involved and own even some of the facilities we provide so that there will be sustainability. If you put in interventions without involving the community they wouldn't work. So you have to solicit their support and participation". IDI-DIRECTOR OF HEALTH*

With regards to maternal health, the study answered questions on which community members are involved, why they are involved and how involvement in maternal health interventions is organised.

From the health workers point of view, there are different types of stake holders in maternal health within the community and they must all be involved in the implementation of health interventions. These stake holders were captured succinctly in a response by a medical assistant.

> *"I would call them stakeholders, the pregnant woman is a stakeholder, the community members are stakeholders and the community members include the in-laws of the pregnant woman, the husband of the pregnant woman the brother of the pregnant woman and all these people have interest in the woman's health and the baby's health so they are stakeholders and you can't ignore stakeholders and think that things would work; they wouldn't". IDI-MEDICAL ASSISTANT*

The health workers said they encourage community involvement in maternal health because their primary responsibility is to save lives of women and there are many community factors that hinder the realisation of that goal. They said, most of those factors such as cultural beliefs and practices are beyond their control and therefore require the support of community stakeholders.

> *"It is necessary because without the community, we cannot do anything; we are actually here to save lives in the community. The women come from the community and they have some cultural beliefs that say if the male is not there and the woman is to deliver or the male does not give the go ahead, the woman should not go to the health centre. Sometimes they believe that if the woman is in labour and she delivers at home, it means she is a strong woman or she is brave. Sometimes it shows that she is not cheating on the husband. If the community is involved in whatever we do here, especially the chiefs, they can help us change those believes so that they know the importance of early seeking of health care or delivery at the facility". IDI-MEDICAL ASSISTANT*

Community involvement takes various forms within the KND. These range from participating in sensitisation efforts to instituting by-laws to improve maternal health. For instance, a critical mass of trained community volunteers help to sensitise community members on maternal health and identify, register and refer pregnant women to health facilities for care. Activities of these

groups are monitored by a community health committee. This committee is made up of a maximum of seven people - a community health officer (head), a chief, a TBA, two community-based agents, a teacher and an agricultural extension officer - and it meets quarterly. Teachers assist the committee to package persuasive health information especially those related to sanitation, hygiene, family planning and other preventive behaviours. The agricultural extension officer provides guidance to community members to improve their farm produce and thereby increase their incomes. The health workers said traditional healers are not included in the committee because they are not in every community and that the TBA is a representative of all traditional practitioners on the committee. In addition to their role on the committee, TBAs are trained to care for pregnant women and either refer them to the health facility for skilled delivery or call the midwife to conduct a home delivery where labour has already set in. Routine home visits give community nurses the opportunity to engage families and encourage dialogue among couples. The nurses also reported the existence of a pregnancy school program that is used to reinforce messages delivered during antenatal care and to encourage peer support during pregnancy.

> "*We have a pregnancy school which is held once every month. We let all the pregnant women come here and we educate them on some of the things we talk about during ANC. We allow them to ask each other questions and answer by themselves and because they are usually many, they share a lot of ideas and learn from each other and that makes them not forget about things they learn here. Also, during the pregnancy school, we try to ask the women to convince their husbands to at least, once a while, to accompany them to the facility especially during ANC visits". IDI-MIDWIFE*

Community leaders facilitated the implementation of health interventions within the community through the introduction of health personnel to the community and mobilising community members for health campaigns through durbars. They also play a critical role in recruiting community volunteers and mobilising community members to build community health compounds in order to attract nurses to their communities. One health worker reported that the chief in her community had instituted a by-law to encourage facility delivery.

> *"Here (in this community), it is a policy implemented by the chief that any woman in labour should not deliver in the house; the husband will pay a fine and because of that most women come to deliver at the facility to avoid the payment of the fine. So the community helps a lot and without them, the pregnant women cannot do anything especially conveying them to the health centre". IDI-MIDWIFE*

The community leaders said they were not aware of the community health committee. They confirmed most of the other activities but complained that the health system usually decides on interventions and only solicit their support during the implementation process.

7.1.4.2 Social support and mobilisation of resources for maternal health care

A repertoire of different forms of social support exist within the KND. Most of these focused largely on individual economic benefits from groups and associations. Communities also collaborate during social events such as marriages, childbirth, festivals and burial ceremonies. Throughout the interviews, there were only two communities that had some sought of formal community collaboration to promote maternal health. The chiefs in these communities reported taking the initiative to galvanise support from their communities to protect and support pregnant women. They had innovative ways of raising funds to support severely ill community members including pregnant women. These were in the form of fines paid by community members who flout community by-laws. Fines which are usually in the form of animals are liquidated and kept by the chief for community projects or activities that benefit community members as captured by a chief in the following extract.

> *"There are by-laws against the beating of pregnant women and pregnant women delivering at home. We charge offenders and when we have gathered enough money, we will procure a motor-king to help all sick people get to the health facility". FGD-OL-NAAGA*

Community leaders acknowledged the breakdown of the extended family system that hitherto formed a cohesive network and provided social protection for the vulnerable within families. Associations and groups within the community were formed based on the underlying principles

of the extended family system and therefore its collapse significantly affected collective actions to identify and address issues of concern to communities. Failure of the extended family system was attributed to increasing economic pressure on the few who provide economic support for the usually large families. It was also blamed on modernisation which tends to focus individuals on their nuclear families.

The community leaders also noted that in the past, closer ties existed among community members and this made the communities function well. They described a common collaborative effort throughout the district that saw community members mobilise themselves to farm and help raise or mend structures for their chiefs. Gifts to chiefs in the form of animals, poultry and foodstuffs were common. This gave community members the locus to solicit support in terms of food and other social services from their chiefs in difficult times. The chiefs said they were able to meet the community demands during those periods because they cultivated large farms and reared many animals. According to the community leaders, this collective responsibility no longer exists. Currently, chiefs have to pay for any labour that community members offer. A similar arrangement existed at the compound level but has also phased out as articulated by an elder in the text below.

> *"During the olden days, everything was always referred to the compound head. Anytime there was a problem, he would call the whole family together to discuss it and to handle it together. Now that you are working, your salary would have been coming to the compound head, anyone who travelled to Kumasi(community members migrate to Kumasi during the dry season for short-term employment usually on cocoa farms) and returned home had to give whatever money he had to the compound head. If a man got married and wanted to dowry his wife, it was the responsibility of the compound head. He did everything for everybody; that family cohesion existed. But now all that has stopped; it is each one for himself. If you do not have time for your wife, no one will have time for her. FGD-OL-MANYORO*

Most of the communities in the study had never thought about pooling resources to support vulnerable community members during emergencies. Discussants recognised the need for such an initiative since it could provide ready cash for individuals in times of emergencies. They however feared that current socio-economic hardships within the community could hinder such an

initiative. Community leaders identified increasing poverty within the community as the main constraint for their inability to ask community members to pool resources for their common good.

> *"We would like to contribute twenty pesewas each to save; but right now if you ask us to bring out twenty pesewas each, those who can bring out the twenty pesewas will not be more than three people. You may think they do not want to do it. He just does not have anything at all; he wants to participate but he has nothing. That is why we cannot keep something aside to save ourselves". IDI-OL-GAANI*

> *"Like I have said, here poverty is high. I pick these pregnant women to deliver at the facility and end up paying for them because they don't have money to pay. Even their husbands can't help them. So even if we want the people to contribute to such a fund many people will not be able to pay but it is a nice idea we can think about it and see what to do". FGD-OL-KAYORO*

Other constraints included lack of trust in the management of funds, possible abuse of a fund accruing from such an initiative, inadequate knowledge on appropriate collection mechanisms and possible sanctions for community members who do not contribute. Corruption was also a limiting factor as one community member put it, if *you buy a vehicle from that money, someone will like to eat out of the vehicle (use the vehicle for personal benefits) and leave the rest (FGD-OL-GAANI).*Some discussants feared that some people will contribute and not benefit from it and that could affect the sustainability of the initiative.

> *"If we want to have such support for pregnant women, this family planning we are talking about, somebody's wife may not have time for it. She will be delivering every time; meanwhile you will contribute so many years while your wife is not pregnant yet. A man's wife will benefit from it, the following day his younger brother's wife will also benefit from it, while you are always contributing for over ten years. In such cases, the man will refuse; if he contributes for a year he will stop. FGD-OL-NAYAGNIA*

Other concerns about a possible community fund to support maternal health have been summarised in Table 17 below.

Table 17: Concerns about pooling resources to support maternal health

Concern	Quote
Cost associated with pregnancy is the husband's sole responsibility	*"We all depend on the hoe; no one trades. If anyone faces a problem he either sells some groundnuts or a goat. If you have a cow you can also sell it. It is not that we do not respect one another but we just can't come together to contribute to solve problems". IDI-OL-KURUGU*
Birth arrangements is the responsibility of families and not communities	*"When that happens the family has to get some money for the husband to send his wife for treatment. The family has to run around to get the money because, there is poverty here, nobody will help you unless your family". FGD-OL-GAANI*
Money without available and reliable transport is useless	*"We should have a vehicle because a pregnant woman may fall sick; she cannot walk and we do not have a vehicle. Whether you have money or not there is no vehicle here. You have to go and get a vehicle and by the time you come back, the sickness will become more serious". FGD-OL-KURUGU*

According to the community leaders, women in the community respond better to community initiatives such as pooling resources for interventions than men. Social and economic network groups that involved women were identified as the only groups which are able pool resources for their mutual benefit. They reported that none of the groups specifically targets support for pregnant women but group members in need of financial support are able to access funds and repay later.

> *"The women have a women's group and if a woman's case becomes serious and she has to go to another level for care, the women will give her some money from their savings". FGD-OL-KURUGU*

Although there were no formal arrangements for shared benefits within the community, participants explained that there is expectation that individuals or families that are better off will support other community members when they are in need. This explained why vehicles owned by some chiefs had become community ambulances even though maintenance of the vehicle is

entirely the responsibility of the chiefs. Sometimes, the support is an act of generosity but most times, there exist an expectation that community members will either pay back or reciprocate the kind gesture in a different form. Support for pregnant women included transport to a referral facility and money for health facility associated costs.

> *"Nakong has not saved any money for that; if someone gets a problem, they run to anyone who is better off to see if he will help them. For us as a community to save money, that does not happen. As I said, they run to someone who is better resourced than them to borrow. Then they sit as a family to see how they can pay that debt." FGD-OL-NAKONG*

As with all other illnesses in the community, community leaders reported that community members ensure that they provide sick pregnant women emotional support to help them recover. This is expressed through traditional greetings which require individuals, especially women, within the clan or family to visit the pregnant woman each morning to find out her health status and empathise with her. In solidarity with the family, individuals within the clan also suspend all forms of celebrations that involve drumming and dancing in order to provide the right environment for the severely ill pregnant woman to recuperate. An elder summarised the emotional support that is usually provided in the following quote.

> *"There is support; but that is when the pregnant woman falls sick. The whole compound will know she is not well. Then they will all find out what the problem is. They will go into her household to greet her and find out how she slept (if she had a good sleep). The nearby compounds do not crack jokes if they hear that she is sick; they will not make noise, they will neither sing nor dance. They will all go to greet her and also pray for her". FGD-OL-MANYORO*

7.1.4.3 Improving community involvement in maternal health

Health workers suggested setting up motivation packages for both TBAs and volunteers in order to motivate them to bring pregnant women to the health facility thereby increasing facility delivery and prompt access to care in case of an emergency. They said giving them soap and reimbursing their transportation costs whenever they accompany a pregnant woman to the health facility could motivate them to do so at all times.

"I will suggest that those volunteers should be motivated. For instance when a TBA is able to bring a pregnant woman to the facility we can give her soap and T & T (travelling and transportation allowance) for the volunteers". IDI-MIDWIFE

Community leaders suggested the setting up of a community fund to support pregnant women attend hospital and facilitate access to transport during emergencies. Most of the communities suggested the purchase of a motor-king to transport pregnant women to the referral point but a few were ambitious enough to suggest the purchase of a vehicle. The community leaders recognised that the motor-king is not appropriate for transporting pregnant women but that due to widespread poverty, it will take a long time for them to pool enough funds to buy a vehicle. They also acknowledged that their interest to pool resources has to be backed by community members' willingness and ability to contribute which they thought would be a major challenge. Others however were positive about the outcome of such an initiative and stressed the role of the chiefs in such an endeavour.

"As I have said earlier, we can start taxing every community member to contribute to such a fund and those who will not be able to pay cash we can let them give something else other than money; like a bowl (2kg) of foodstuffs or an animal and we will sell those items and pay the money into the fund and if its "big enough" (much) we can buy a motor-king or even a car since a pregnant woman cannot sit on a donkey cart to a facility because it can worsen her situation". FGD-OL-KAYORO

"It can be done; if chief calls us all and asks us to contribute fifty pesewas ($0.15) each to save for such a purpose, it can be done". FGD-OL-NAAGA

Some maintained that getting vehicles or ambulances for emergency referrals is the sole responsibility of the government and not communities. They were therefore of the view that the government should provide every community an ambulance to transport patients in times of emergency. This was well captured in one of the discussions in the extract below.

"Picking a pregnant woman on a motor bike is very bad; if we could get help from the government; if they could give us a vehicle to be stationed at the clinic that could also help us. We are poor but the government has money, so they should get us the vehicle.

During their campaigns they promised us and we voted for them, so it is their duty to get the vehicle". FGD-OL-PINDAA

7.1.4.4 Summary of findings

Community involvement in maternal health was viewed as necessary for the successful implementation of interventions. The role of community stakeholders in maternal health was particularly emphasised. Community involvement ranged from sharing knowledge with community members, training local providers such as TBAs and community volunteers and encouraging the institution of by-laws to compel certain behaviours. Others include father and mother support groups, a pregnancy school and the existence of a community health committee which the community leaders said they were not aware of. Typically, community leaders are not involved in the planning and development of maternal health interventions but only serve as facilitators for implementing them.

Collective arrangements to support maternal health were rare within the study communities and this was blamed on the breakdown of the extended family system which is the foundation for the establishment of such collaborations. Community members expressed interest in pooling resources for their collective benefits but said such an initiative would be limited by poverty, lack of trust, corruption and the reciprocity of benefits. Some community members also viewed care for pregnant women as the sole responsibility of husbands and their families and not that of the community.

Suggestions to improve community involvement in maternal health include the provision of a motivational package by the health system to volunteers and TBAs who accompany pregnant women to the health facility. The community leaders also suggested the pooling of funds to support pregnant women during emergencies and the purchase of a vehicle for transporting all emergency cases including pregnant women to the referral facility.

7.1.4.5 Implications of the findings

There is a general recognition within the health system that as consumers of maternal health interventions, communities have a critical role to play in the successful implementation of these interventions. This role goes beyond perceiving communities as beneficiaries of maternal health

interventions to include their involvement in defining maternal health problems within the community and the range of interventions that are needed to overcome them. Community leaders, for instance, can support the health system identify and align health interventions with cultural norms within communities.

However, involving communities in maternal health interventions in the KND falls short of this model. Maternal health interventions have been limited to knowledge sharing and partnering communities to implement interventions. In doing so, the full range of traditional practitioners involved in maternal health care within the community have not been engaged by the health system.

Despite evidence of the critical role played by traditional healers in the management of maternal complications, they are conspicuously missing in the engagement process and none of the current interventions particularly target their activities. Emphasis has also been placed on TBA referrals without recognising that, depending on the severity and context, TBA intervention may be necessary to save the life of the woman. The health system may therefore have to consider equipping traditional practitioners with some minimum skills to manage complications before getting them to the nearest health facility.

Also, the community leaders recognised that when communities work together as a cohesive group, they achieve a lot as opposed to working individually. However, community collaborations which hitherto relied on the principles underlying the extended family system have reduced significantly. The community leaders blamed this on chronic poverty, lack of trust and corruption.

Women in need of emergency obstetric care incur some costs which could be catastrophic considering the low income levels of the population. Pooling resources could therefore support poor and vulnerable families seek modern health care. This is particularly important where emergencies occur and families have to spend valuable time mobilising resources before taking the woman to the health facility. Currently, pooled funds do not exist for families in critical need in the KND and this could be contributing to the search for alternative care including traditional remedies.

8 Chapter Eight

8.1 Discussions, conclusions and recommendations

Introduction

Despite broad agreements on the relative strengths of evidence from facility-based near miss audits, this multi-method approach provided adequate depth and breadth of information on the local understanding of life-threatening maternal complications and the relevance in auditing maternal complications within the community. Life-threatening maternal complications are generally caused by known medical and culture specific conditions such as witchcraft, bad intentions of people and spirit children. These causes occur mostly during pregnancy with possible fatal consequences for women. Depending on beliefs about the aetiology of the life-threatening maternal complication, the woman could be treated at a modern health care facility or by a traditional healer and choosing the wrong provider could have negative consequences for the woman.

The approach to data collection gives insights into the social and underlying factors that contribute to life-threatening maternal complications within communities in low-income settings and demonstrates that current methods for investigating maternal morbidities are not sufficient in providing a complete understanding of how and why they occur and the key groups or individuals who influence the health seeking and treatment process. The results emphasised the relevance of considering the socio-cultural context in morbidity investigations in order to stimulate the appropriate response from both the health system and communities.

This chapter discusses the implications of these findings with particular reference to the broader concept of community involvement in maternal health especially where complications occur and the role of the health system and communities in facilitating access to care. Recommendations for improving community involvement in maternal health and current methods for investigating maternal morbidities are made throughout the discussion.

8.1.1 Involving traditional healers in maternal morbidity audits

It is often assumed that optimal care for maternal complications is only available in health facilities. However, long before the advent of modern medicine, people depended on traditional remedies for survival. Yet there is still no policy guidance for traditional practitioners to manage maternal complications especially in societies which rely on them for healing. In some communities in low income countries, traditional healers provide the only available care [160] and therefore have to be equipped with some basic skills and guidance to manage maternal complications safely. Currently, there are no universal standards among traditional healers for the treatment of maternal complications. They base their healing approaches on their culturally unique perceptions of the nature and cause of the morbidity.

Healers are available, accessible, affordable, acceptable and trusted by communities to provide care as reported in this and other studies [225–227]. The common religious faith and practice shared by healers and the community is an important binding force. As noted in other studies, trust between healers and their clients comes from a shared culture and world view [160,236]. Beyond access to skilled care, beliefs about the aetiology of maternal complications, patient dissatisfaction with modern health care providers and failures of modern medicines in terms of efficacy and therapeutic outcomes contribute significantly to the enduring role of healers.

Despite their enduring role, traditional healers have persistently been neglected in the design and implementation of maternal health interventions. Although they are active in the management of maternal complications, current maternal morbidity investigations do not include cases that use traditional healers. This has largely been due to the absence of data on their activities to inform on either formalising their operations in managing some complications under the WHO task-shifting strategy or refocusing them to play roles that do not involve life-threatening maternal complications. In Sudan, a study showed that after engaging traditional healers in distributing oral contraceptives, the proportion of women aged 30-34 using contraceptives increased from 25% to 38% over a two year period [237] and in Nepal, the overall use of contraceptives rose from 13% to 21% for a similar duration [238].

Ghana has opted for the integration of traditional medicine in its health care system, but the process has been slow and more academic than practical. Registering and accrediting traditional practitioners, though challenging, has not been proactive. The process has also been stalled because of problems with data on registration of their products, inappropriate premises for practice, inadequate record keeping and inadequate facilities for diagnosis [239]. Evidence from this study suggest that most traditional healers may not be able to meet these expectations due to high illiteracy, the nomadic nature of their operations and strict secrecy of their recipes. Besides, experiments to determine the potency and therapeutic efficacy of their products before registration may be misleading as the power of their products are linked to rituals which are often unique to the healer. Unlike modern medicine, conducting a clinical trial on some traditional medicines is almost impossible as some of the healing techniques of healers include the supernatural which cannot be evaluated using scientific methods.

In view of this, accessing information from traditional healers either for registration and licensing or for the purposes of monitoring maternal morbidities would demand careful negotiation from the health system. The process would have to be guided by understanding of the traditional set up, respect for the work of healers and trust that their knowledge will be protected [240]. The health system stands to gain, if for instance, nurses and other health professionals working in remote areas, where the consumption of traditional medicine is common, initiate strategies to identify and engage healers in order to monitor their activities especially as they relate to managing maternal complications. A recommended guide for engaging healers has been provided in Table 18. These recommendations are broad in nature and should be adopted based on the particular context of the health system.

Table 18: Recommended guide for integrating traditional healers

Intervention	Strategy
Registration/Licensing	Use community health officers and volunteers to identify, register and license qualified traditional practitioners
Trust	Careful negotiation for information, protect intellectual property rights through legislation and transparency
Training	Train traditional providers to offer some level of intervention in

	case of emergency
Refocus	Gradual shifting of roles from managing complications to recognising maternal danger signs, making referrals, and distribution of contraceptives
Collaboration	Recognise them as partners in maternal health, encourage working closely with modern health care providers with mutual respect and understanding as cherished values

In low-income settings, both health infrastructure and human resources for health are generally limited and therefore a proportion of the population rely on other health providers such as traditional healers for treatments. It is therefore imperative for health systems to acknowledge the pluralistic nature of health care and the fundamental right to choice and adopt strategies to engage traditional healers in order to promote maternal health. For instance, in managing maternal complications, the traditional healers do not observe any known hygienic or safety practices. Where hygienic practices are poor, there is the increased risk of infection which could threaten the woman's life [241]. Unsurprisingly, puerperal sepsis was identified as one of the leading direct causes of maternal mortality in the KND [190]. Involving traditional healers in maternal morbidity audits would likely reveal more critical concerns that will require interventions from both the health system and the community.

One facilitating factor for engaging traditional healers is their willingness to collaborate with modern health care providers even though the nature of the collaboration was not clearly defined in the study. Findings from a review of projects in several countries showed that traditional practitioners are willing to work in primary health care and establish a good relationship with modern health care providers [240]. A similar finding was reported in Ghana where about 96% of traditional practitioners expressed interest in working with modern health care providers [242]. There is however a real reluctance from the health care system to take on the health professional's guilds to the detriment of maternal health.

8.1.2 The community model for auditing life-threatening maternal complications

The results suggest a paradigm shift in our evaluation of the care that pregnant women with complications receive. The reality is that, beyond modern health care is a large traditional

medical sector that is preferred by some populations for managing maternal complications[160]. Maternal morbidity audits should therefore be extended to the community if health systems want to fully understand the conditions under which women die or survive when complications occur. This can be done through a close collaboration with traditional healers who specialise in treating maternal complications. Auditing maternal complications that have been managed by healers would likely reveal cultural beliefs such as infidelity, ill intentions on the part of both pregnant woman and delivery attendant, some food taboos, witches or evil spirits as causes of life-threatening maternal complications which may not necessarily resonate with conventional knowledge in maternal health care. A study in rural Bangladesh identified similar life-threatening maternal morbidity causing agents [243], suggesting that the beliefs may be grounded in some observations which may require further research. An understanding of these local contexts and the value of traditional knowledge to the management of maternal complications to traditional societies could better inform on a health strategy that guides traditional healers to safely manage complications where there is no modern health care. For some societies, this could make a difference between life and death when complications occur.

A community-based placebo-controlled trial of rectal artesunate versus placebo in Ghana (Kassena-Nankana District), Tanzania and Bangladesh highlighted the use of traditional healers and soothsayers for febrile convulsions and other conditions that alter consciousness [244]. Recognising this reality, the study matched field staff with traditional healers within the district to recruit severe malaria cases [245]. Using the practitioners' local explanatory model, health systems could benefit from a similar approach to identify life-threatening maternal complications within the community from traditional healers. Although the use of the local explanatory model to screen for life-threatening maternal complications could not be evaluated using both sensitivity and specificity analysis, the fact that the physicians were able to identify about 71% of the cases as life-threatening maternal complications gives some value to the screening tool.

The interviewers who conducted the audit were university graduates with no clinical training. Considering that the level of concordance between the physicians was significant, one can conclude that the quality of the data was high. This finding is corroborated by many studies which suggest that well-trained lay people can obtain accurate information when using culturally and linguistically appropriate questionnaires [90,100,101]. However, it is important that graduate

level interviewers are considered since the tool can be intellectually demanding. Experience in probing is also critical in making adequate information available to facilitate the coding process.

Currently, there is no guidance with regards to timing between the date of a life-threatening maternal complication and the date of interview. Such guidance is only limited to mortality audits which are not very specific [107,111–113]. The maximum duration between the date of complication and interview in the current study was 4.3 months and none of the interviewers reported difficulty in getting respondents to recollect circumstances surrounding the complication. Four months could therefore be a good starting point where the complication did not result in a stillbirth or a foetal or new born death. Where death occurs, the audit team should consider the mourning culture of the people before initiating the interview process [81]. In general terms, long recall periods are likely to impair the respondent's ability to recollect relevant information while short periods may cause distress and affect her willingness to engage with the audit team [89,97].

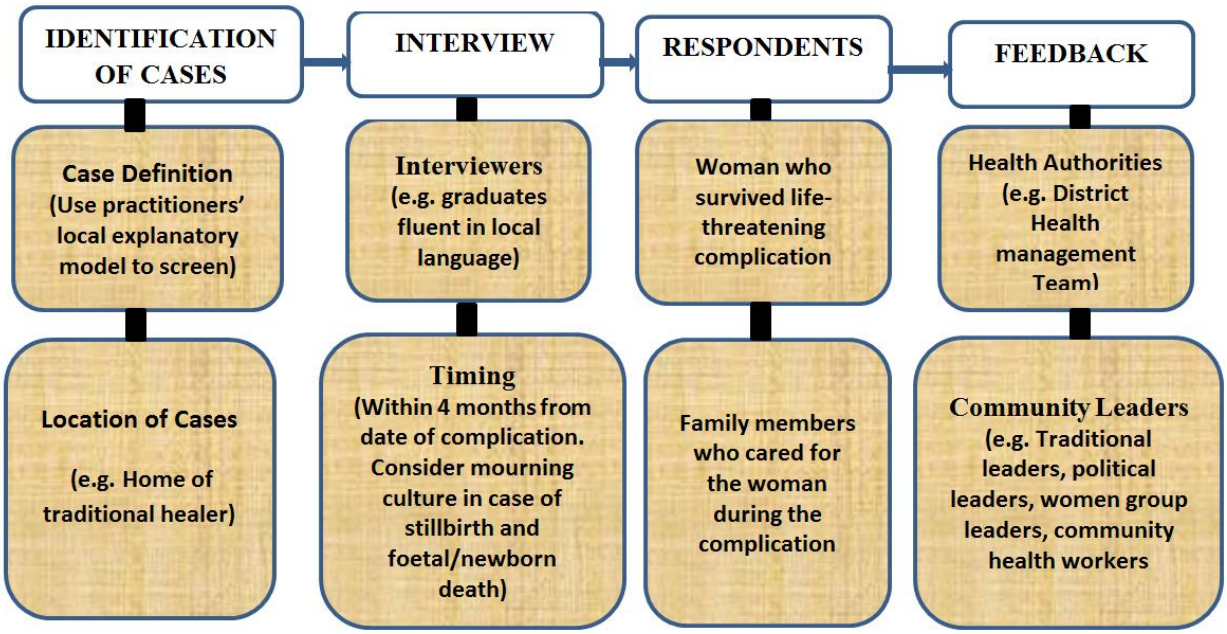
Unlike community-based case reviews in which the researcher has to depend on relatives and carers of the deceased for information on the circumstances surrounding the death, in auditing life-threatening maternal complications, the woman survived and therefore we have the opportunity to hear her and document actual experiences. Where she was unconscious and was not aware or cannot remember some events, family members who cared for her during the complication could be invited to participate in the interview. This would most likely limit the effect of recall bias.

Finally, the results from a community audit of life-threatening maternal complications should be fed back to community leaders and of course, the health authorities. The community leaders demonstrated that when they are empowered with information, they are capable of thinking through their problems and fashioning out community-oriented interventions to improve maternal health. This finding is supported by a study in Nepal which showed that if communities are empowered in the process of death inquiries, they can strongly impact both maternal and neonatal outcomes [148]. Currently, very few countries have systems for community audits that empower communities [96] and therefore making the involvement of communities an integral part of the audit process could improve pregnancy care and access to emergency obstetric care when complications occur. Health authorities would have to broaden their scope of morbidity audits

and push beyond standard clinical causes to highlight those factors that prevent symptom recognition, delay care seeking, steer women away from modern health care providers and limit the ability of a mother to get timely and appropriate care when needed. By auditing life-threatening maternal complications within the community, the study demonstrated the feasibility and usefulness of data from such a model and may fundamentally alter future approaches to auditing maternal morbidities.

Figure 7 summarises these arguments in a recommended community model for health systems to for auditing life-threatening maternal complications within the community.

Figure 7: Community model for auditing life-threatening maternal complications



8.1.3 Building an effective community involvement model for maternal health

All stakeholders involved in maternal health within communities must be identified and their roles clearly defined in order to build a concerted community effort towards improving the health of women. Currently, the complete range of traditional practitioners involved in maternal health care has not been engaged and community leaders who are critical in every community engagement process have traditionally been given a narrow role. An effective community involvement model would however require that they assume a much broader role because they have the authority to formulate by-laws to compel positive behaviours such as utilisation of

health facilities for child birth. Also, community leaders can be instrumental in aligning maternal health interventions to the traditions of the people to make them more acceptable as well as eradicate cultural norms and practices that pose risks to maternal health.

An effective community engagement model should take into consideration the socio-cultural contexts in the design and implementation of maternal health interventions. For instance, men consistently reported a lack of awareness of maternal health programs that involved them because cultural norms tend to limit their participation in maternal health programs. This is particularly so in patriarchal societies where men are restrained by strict gender norms and efforts to rise above such norms are perceived negatively. Strategies to engage key stakeholders such as men would therefore require that health experts adopt the bottom-up approach as recommended by Rifkin [246] and work with all stakeholders to identify, design, implement and evaluate maternal health interventions.

8.1.4 The powerlessness of women in the decision-making process

Gender inequality is rooted in culture and has long been recognised as a critical factor in health decision-making. In patriarchal settings, the decision to seek care is ascribed to males [191,247]. Therefore, the exercise of female autonomy including care seeking for maternal emergencies was viewed by men as disrespectful and an affront to their authority. Previous research in the study area reported similar findings [191,193,248]. Although, women are disproportionately affected by the burdens of illness and disability, they have little influence on when and where to seek care. This raises the issue of female autonomy. Over the years, efforts towards empowering women have focused on getting more girls in school, promotion of livelihood programs and discouraging traditional practices such as female genital cutting which adversely affects the health of women [249,250]. Although these initiatives have improved maternal health within low-income countries, their level of impact is not very clear as women continue to defer the decision to seek care to men. Arguably, these gendered interventions have had little impact because they focused mainly on women who are not custodians of traditions and whose status in the decision making hierarchy is determined by men.

The current research suggests that, interventions that focus on men may lead to women exercising more autonomy. Globally, involvement of men in reproductive health programs has been

associated with positive outcomes such as increase in contraceptive uptake [248,251], increased attendance of antenatal care during pregnancy [252] and increased uptake of interventions to prevent HIV transmission [250–253]. The mechanism for these associations draws on the role of men as decision makers for health seeking. However, over the years, male involvement in pregnancy care has been limited by strict gender norms and traditional perceptions of pregnancy [253,257] which are difficult to change. Several years of association with such customs makes it more challenging to get adult men in particular, to think differently. Innovative engagement strategies that are led by influential men such as chiefs and elders could help change gender norms and re-orient men to increase their involvement in maternal health.

The current research reported the emergence of a generation of young men who believe in female autonomy especially with regards to seeking care for maternal complications. This has the potential to improve timely access to maternal health care because women are often more knowledgeable in danger signs during pregnancy than men but have little influence on care seeking [39,258]. An opportunity to utilise their knowledge could therefore improve maternal health outcomes significantly.

8.1.5 Improving the referral system for maternal emergencies within the community

When the decision to seek care has been made, transportation challenges affect timely arrival at an appropriate place of care. This is particularly so for communities in low-income settings where availability of transport varies according to geographical location [259] and market days. A potential exists within communities for improving prompt access to care for complications. This relates specifically to mobilisation of resources to support pregnant women in need of emergency obstetric care. The reliance of women on people within their social networks for economic and logistical support has not always translated into timely and safe arrival at an appropriate place of care [184] and so a community approach may be required to achieve this.

Fortunately, community members expressed willingness to mobilise resources to procure three-wheeled motor-cycles for emergency referral purposes and to pay for health facility associated costs. Although the idea of transporting a pregnant woman on a motor-cycle may not be ideal, it is preferred to non-motorised transport such as bicycles, carrying, walking or the use of animals

as was reported in other studies [259]. Besides, this referral model has been shown to be cost effective and as a useful means of referral for emergency obstetric care in low-income countries [260]. Communities would however require the expertise of health professionals to function as a cohesive unit to facilitate the mobilisation efforts as well as the setting up of the system. This is necessary in order to help communities overcome concerns related to trust, sustainability and reciprocity of benefits. Also, the emphasis on poverty in the findings as a limiting factor in such a collective effort suggests the need for a multi-sectoral approach to dealing with maternal health care issues within the community.

8.1.6 Acceptability of the health care system

Women who arrive at the health facility for care often face challenges which tend to affect future utilisation of health facilities for care [184]. The health system is often misunderstood by community members; misconceptions related to service delivery at the different levels of care as well as caesarean sections tend to impede utilisation of modern health care facilities. Health worker insubordination continues to persist and health infrastructure lacks the needed adaptation for the implementation of focused interventions.

Also, despite the free maternal health care policy in Ghana, women in need of emergency obstetric care incur both direct and indirect costs [236–239]. Considering that most of the women work in the agricultural sector where poverty is concentrated, these costs can be catastrophic to households as was observed by Dalaba et al.(2015) [265]. This raises questions about how the policy is being implemented within the health system. Proffered suggestions to make the free maternal care policy a reality include free ambulance services as well as poverty alleviation programmes that can make households resistant to health financial shocks to reduce the risk of catastrophic health expenditure due to maternal complications [265]. In addition to these policy options, effective monitoring is required to either eliminate or reduce the level of under the counter payments. Free insurance covers may also be necessary in eliminating direct costs resulting from the absence of equipment or drugs that culminates in the use of private providers. Further thinking may also be required on alternate financing mechanisms to cater for indirect costs related to the person accompanying the sick.

8.1.7 Study limitations

Analysis of the quantitative data was limited because only individuals who qualified as life-threatening maternal complications as per the community criteria were interviewed in the socio-cultural audit. Consequently, it was impossible to verify if true life-threatening maternal complications were missed by the screening tool.

The study relied on self-reports of morbidity events which could be misleading. Also, the duration between the morbidity event and the date of interview ranged from 2 days to 4 months and this could have affected the recall of events by the participants.

Also, there was no opportunity to observe actual treatment practices of the healers during the study period. Ethical and privacy restrictions precluded the identification of patients through traditional healers so it was not possible to explore women's direct experiences of treatment by traditional healers. However, there was a consistency across the healers in the description of their understanding of complications and the treatments they provided.

8.1.8 Conclusions

Efforts to meet the millennium development goals have seen several innovations and investments in technology to address maternal complications. Recent approaches for monitoring progress made in managing maternal complications have attempted to balance enhanced access with efficiency, given the scarcity of resources [266]. Furthermore, task-shifting efforts have attempted to extend the responsibilities of allied health professionals to compensate for the limited number of highly trained medical staff [267].

However, these strategies rely on a persistent assumption that women with pregnancy-related complications will report to modern health care facilities. They also assume that failure to do so reflects 'delays' along the way [24]. Such an idealistic approach to health care provision however fails to recognise choice, and the perennial lack of both health infrastructure and professionals in many rural communities. The focus on health facilities, although important, fails to provide guidance for monitoring and managing maternal complications in societies which depend on the traditional healing system to save lives. This has limited the design of maternal health

interventions over the years to improve the management of maternal complications within such communities.

Traditional health beliefs and systems have endured despite the widespread adoption of evidence based medicine and practice. Arguably, the slow growth in various complementary medicine practices is evidence not only in the recognition of the efficacy of some of these practices, but also of the critical challenges of ensuring access to some form of care to those who would otherwise have nothing. Three decades following the launch of the safe motherhood initiative, access to and utilisation of emergency obstetric care remains less than optimal for some communities and failure to explore locally acceptable, albeit suboptimal alternatives seem like a missed opportunity.

Finally, conducting audits on life-threatening maternal complications only for quality improvement within health facilities tend to focus attention on proximal causes and excludes consideration of other contextual factors. A further advantage in reviewing life-threatening maternal complications within the community is the potential to identify and engage key players in the family and the community to improve maternal health. A maternal morbidity audit model that integrates community engagement in the process is likely to get community leaders to think about interventions that need not directly address a specific cause but may nonetheless mitigate a pathway of causes. The process of feeding back audit findings is in itself interventional as it can contribute to increasing awareness of preventable causes and empower communities to participate and engage in health programmes to increase their responsiveness and accountability.

8.1.9 Recommendations

The findings demonstrate the relevance and feasibility of conducting community audits on life-threatening maternal complications within communities. They also revealed some opportunities for health systems to improve maternal health. These have been summarised as follows:

Health systems all over the world have the responsibility to ensure that no woman is exposed to needless risk that threatens her life. Therefore, while health facilities are being equipped with state of the art facilities to deal with emergency obstetric cases, health authorities should not lose sight of the fact that a proportion of pregnant women would not use them based on contextual

factors. It is therefore imperative to identify all sources of care and bring them on board in our efforts to improve maternal health.

In settings where the use of traditional healers for maternal health care persists, health systems should equip healers with some minimal skills to manage complications before getting them to the nearest health facility. In such cases, formalising their activities and establishing guidelines for their operations would be necessary to ensure that lives are protected. This would also ensure that all women who survive complications are captured during morbidity investigations. Data from auditing life-threatening maternal morbidities are useful in the identification of risks and protective factors that either jeopardise the health of women or facilitate their survival.

As consumers of maternal health interventions, communities should be given a broader role to play in the identification, design and implementation of health interventions. Community leaders such as chiefs and elders, assembly members and women group leaders should be encouraged to take the lead in the identification of maternal health issues, galvanise the support of communities for maternal health interventions and play a key role in the implementation of the interventions. Health systems should seek the support of community leaders in shaping traditional perceptions and in over riding traditional norms that are inimical to the health of women.

The involvement of men in maternal health should be more aggressively pursued by health systems. Men attending antenatal care should be allowed to listen to the foetal heart beat, receive counselling on obstetric danger signs, have access to HIV testing, and information on their wives' medications as well as their antenatal care schedules. Infrastructure for maternal health care programs should be designed to accommodate men who decide to visit with their wives. Program planners should work with influential males such as chiefs, elders and assembly members who can help re-orient adult males on masculinities which adversely affect women. In the long-term, interventions should focus on young men in order to produce a generation of males whose partners can act independently without consequences and who will support their wives throughout pregnancy.

Public health experts should work with communities to implement their suggested interventions. This should include facilitating consensus building, establish procedures for accountability in order to build trust and provide guidance on sustainability of the projects. This is necessary in

order to facilitate the implementation of community referral systems and to pool resources to support the less privileged.

8.1.10 Recommendations for future research

A few areas for future research emerged from the thesis and these are summarised below.

1. The current research has created opportunities for further research into the feasibility of identifying and conducting morbidity audits with women who receive care for life-threatening maternal complications outside health facilities. A prospective study that maintains contact with all traditional healers who manage maternal complications would facilitate the recruitment of cases to observe their recovery or otherwise.
2. Research is required to test the effectiveness of the different engagement strategies that were proposed for integrating healers into the formal health care system. This is necessary in order not to offend the sensibilities of both traditional and modern health care providers.
3. A prospective cohort study that allows for women who are treated by healers to be identified and followed over a period of time to observe the long term effects of the traditional remedies would be useful in better pursuing an integration agenda. This would also allow for a further understanding of traditional methods that correlate with modern medicine.
4. Large-scale community interventions using community leaders to test the feasibility and effectiveness of interventions used by community leaders to ensure safe deliveries is warranted. These include punishments for non-institutional deliveries, setting up a community fund and using a three-wheeled motor cycle as an ambulance for transporting referral cases. In the face of limited resources, research could be used to test the feasibility of using Geographic Information Systems to locate hotspots for particular causes of maternal complications or negative health behaviours for such targeted community interventions.
5. There is the need to investigate women's perceptions of male views concerning male involvement in maternal health.

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10 Appendices

10.1 Appendix 1: Publications related to the thesis

ORIGINAL ARTICLE

Cultural imperatives and the ethics of verbal autopsies in rural Ghana

Raymond A. Aborigo[1,2]*, Pascale Allotey[2], Paulina Tindana[1,3], Daniel Azongo[1] and Cornelius Debpuur[1]

[1]Navrongo Health Research Centre, Navrongo, Ghana; [2]Global Public Health, MONASH University, Sunway Campus, Selangor, Malaysia; [3]The Ethox Centre, Department of Public Health, University of Oxford, Oxford, United Kingdom

Background: Due to a paucity of statistics from vital registration systems in developing countries, the verbal autopsy (VA) approach has been used to obtain cause-specific mortality data by interviewing lay respondents on the signs and symptoms experienced by the deceased prior to death. In societies where the culture of mourning is adhered to, the use of VA could clash with traditional norms, thus warranting ethical consideration by researchers.

Objective: The study was designed to explore the ethics and cultural context of collecting VA information through a demographic and health surveillance system in the Kassena-Nankana District (KND) of Ghana. Study Design: Data were collected through qualitative in-depth interviews (IDIs) with four field staff involved in the routine conduct of VAs, four physicians who code VAs, 20 selected respondents to the VA tool, and eight opinion leaders in the KND. The interviews were supplemented with observation by the researchers and with the field notes of field workers. Interviews were audio-recorded, and local language versions transcribed into English. Thematic analysis was performed using QSR NVivo 8 software.

Results: The data indicate that cultural sensitivities in VA procedures at both the individual and family levels need greater consideration not only for ethical reasons but also to ensure the quality of the data. Discussions of some deaths are culturally prohibited and therefore lead to refusal of interviews. Families were also concerned about the confidentiality of information because of the potential of blame for the death. VA teams do not necessarily engage in culturally appropriate bereavement practices such as the presentation of tokens. The desire by families for feedback on the cause of death, which is currently not provided by researchers, was frequently expressed. Finally, no standard exists on the culturally acceptable time interval between death and VA interviews.

Conclusion: Ethical issues need to be given greater consideration in the collection of cause of death data, and this can be achieved through the establishment of processes that allow active engagement with communities, authorities of civil registrations, and Institutional Review Boards to take greater account of local contexts.

Keywords: verbal autopsy; research ethics; bereavement practices; demographic and health surveillance; maternal mortality; institutional review boards; feedback; confidentiality; Ghana

*Correspondence to: Aborigo A. Raymond, Navrongo Health Research Centre, Post Office Box 114, Navrongo Ghana, [redacted]

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Accurate information on overall and cause-specific mortality is essential to prioritize the activities of health systems and to invest scarce public health and medical care resources efficiently (1 3). The infrastructure for the collection of vital statistics, supplemented by medical expertise, is critical to this process. However, in many parts of the world, particularly in low-income countries, this system is compromised by a combination of poor administrative systems, lack of human resource capacity, and nonconformity by citi-zenry to reporting regulations. Many people die at home, and the cause of death is particularly difficult to determine even if a death is notified. The verbal autopsy (VA) method was developed to address this problem (4 6). Interviews are conducted with relatives of the de-ceased to obtain details about the circumstances leading to the death, including the signs and symptoms of any illness prior to the death. These data are then assessed to

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determine a probable cause of death based on techniques ranging from expert physician decision making to mathematical algorithms (7 9).

The World Health Organization recommends the use of VAs in order to improve the comparability of causes of death from systems without medical certification of deaths (6). For countries with deficient vital records, MEASURE Evaluation has developed Sample Vital Registration with Verbal Autopsy (SAVVY) for strength-ening vital events monitoring and measurement, includ-ing causes of death (10). In the context of research, Demographic Surveillance Systems (DSSs) have adopted VAs for investigating deaths (11). In order to enable cross-country comparisons, significant efforts have been made in standardizing the protocols for VA data collec-tion and in enhancing the validity of cause of death determination (12 14). However, in standardizing the protocols, the ethics of the procedure has not been given adequate attention. There has been less methodological development to address issues related to protecting VA participants and maximizing benefits to communities than there are to validate and standardize the method. According to Chandramohan et al., VAs can aggravate the grief and emotional distress of families and communities (15).

Other procedures related to revisiting death narratives such as vital registrations are also likely to cause some degree of distress and may account in part for levels of civil registrations. However, civil registration is a critical function of the state, not only to support national policy but also to trigger legal processes relating to the state of the deceased. There is no doubt that civil registration processes need to be improved, not only to acknowledge the distress of bereaved relatives but also in terms of the infrastructure, accessibility, and quality of the records
(6).

The collection of data using the VA procedure provides an opportunity to explore and address the role of distress in reporting deaths and determining the cause of death. Arguably, distress may affect the integrity of the data collected and can raise significant ethical concerns for both researchers and civil registration authorities who visit families for death narratives.

The aim of this qualitative study was to explore the cultural context of VA data collection through a demo-graphic surveillance system in Ghana. The specific objectives were:

. To describe bereavement practices in the district;
. To investigate the experiences of field staff involved in VA data collection; and
. To identify ethical issues in VA data collection from the perspectives of community members, respondents of VAs, and VA teams.

Methods

The research site: The study was conducted in the Kassena-Nankana District (KND), of Ghana which has a population of about 150,000 with three related but distinct ethnic groups. The district is one of the poorest in Ghana with subsistence farming being the mainstay of the people. The KND is largely patriarchal with strict gender roles. Generally, caring for sick people is the role of women, and only rarely do men take up such responsibilities. A study by Tindana et al. in the research setting found that their sample of parents of children who had previous research experience were all women (16).

The district is home to the Navrongo Health Research Centre (NHRC), which runs the Navrongo Health and Demographic Surveillance System (NHDSS) as a con-tinuous vital registration system that monitors the health and population dynamics of the inhabitants of the dis-trict. The surveillance covers an area of 1,675 km^2, with 30,500 households. The entire population is followed on a 120-day cycle to monitor vital events, including births, deaths, and migrations. The system also registers and monitors pregnancies and their outcomes to enhance the reporting of births, as well as neonatal and maternal deaths. Most deaths that occur in the surveillance site are identified by community-based data collectors and followed up by trained field staff who collect data for VAs. VA data are collected using a structured questionnaire standardized by researchers within the International Network of field sites with continuous Demographic Evaluation of Populations and Their Health (INDEPTH) (17). The data are independently coded by three physi-cians to assign the cause of death using the International Classification of Disease, 10th revision (ICD-10) (18). Where at least two of the physicians agree on a diagnosis, it is accepted as the cause of death. Where there are disagreements, the case is set aside for further review by a third physician. In case of further disagreement by the third physician, the case is coded as undetermined. A detailed description of the NHDSS has been reported elsewhere (19 21).

At the commencement of surveillance activities (about 21 years ago), the NHRC did not have an ethics commit-tee and so the research tools, including the VA tools, were not taken through any formal ethics review process. Approval for surveillance activities was obtained from the Ministry of Health. Currently, the NHRC has an Institutional Review Board (IRB) with a Federal Wide Assurance (FWA00000250), and both the VA and other surveillance data collection tools have been reviewed and approved by the Board (NHRCIRB115).

Following the regulatory approvals, intense community engagement activities were pursued by the NHRC before initiating data collection in the field (22). Community meetings were held with people and opinion leaders in various communities, and the objectives and procedures

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involved in surveillance activities were explained to them in order to obtain their support. Verbal consent was sought at the individual level, and the content of the form included the purpose of the study, procedures involved, risks and benefits of participation, opportunity to with-draw, confidentiality of the data, and contact persons in case individuals needed further clarification.

Study design

In-depth interviews (IDIs) were conducted with key informants, and data were triangulated with observation and field notes. The data were collected in August 2010.

Two graduate-level research assistants who were fluent in the local languages of the study area and had about three years of experience in moderating focus group discussions (FGDs) and conducting IDIs within the research setting were employed to carry out the inter-views. They were trained on the research protocol and the data collection tools and consent procedures for a period of two weeks. The data collection tools were pilot tested in the field, and all necessary amendments made before they were deployed to the field. All the commu-nity-level interviews were conducted in the local lan-guages (Kasem and Nankani), while those with the field staff and coders were done in English.

Sample

For the purposes of data collection, the NHDSS has divided the district into five zones the East, West, North, South, and Central zones. The East and South zones are Nankanis, while the North and West zones are Kassenas. The Central zone is cosmopolitan and was therefore not included in the sampling frame. One of the zones was randomly selected to represent each of the ethnic groups the East for the Nankanis and the North for the Kassenas. Within the zones are clusters that are made up of a maximum of 99 compounds. One cluster was randomly selected from each zone. The community key informant (CKI), whose catchment area included the selected cluster, was invited for an in-depth interview two in all.

In establishing the NHDSS, a team of CKIs were engaged by the centre to record all pregnancies, births, and deaths that occur in their localities to complement routine interviewer coverage (19 21). Community leaders select CKIs based on their honesty, literacy, knowledge of the traditions of the community, and willingness to work for a token fee. The CKIs assisted the research team in identifying two chiefs, two 'landlords', and two district assembly members for IDIs. Chiefs and landlords are the repositories of traditional knowledge, while as-sembly members may have both traditional and political knowledge of their communities. CKIs, chiefs, landlords and assembly members are opinion leaders. The deter-mination of who was invited to participate in the study was left to the discretion of the CKIs, who were guided by their traditional knowledge of the community and a minimum criterion to select individuals who could provide cultural knowledge on bereavement as it relates to the VA process. The researchers could only con-firm the appropriateness of the participants during the interviews.

The NHDSS has four core field staff responsible for VA data collection. All four were included in the list of respondents to explore their understanding of the local culture and their experiences with VA data collection. Other key informants included four out of the five expert coders (the fifth was not available) to explore their views about potential ethical issues that they may have identified in their review and utilization of VA data. Coders are research clinicians who understand and appreciate the VA process, and therefore their views were relevant in shaping the data collection process. Limitations in the data that they use in making the cause of death determina-tion could lead to a significant number of cases being classified as undetermined, as identified by Allotey and Reidpath (23).

Finally, the 10 most recent (within two weeks of the study) community members to have granted VA inter-views were purposively selected as community respon-dents for the study. Ten additional interviews were conducted to make 20 when an initial review of the data revealed further themes to be explored. Two weeks was considered short enough to reduce recall bias so that respondents could adequately share their experiences during their encounter with the VA team. Unsurprisingly, all the community leaders identified were male, and family members interviewed about VAs were female.

Data management and analysis

All the interviews were tape-recorded and transcribed in English, and thematic analysis was performed using QSR NVivo 8. Two researchers coded the interviews indepen-dently. Interpretation of the results incorporated the varied views of the research participants. Verbatim quotes from each of the groups are used to elucidate the issues discussed in this article.

Ethical considerations

The study was approved by the NHRC IRB (NHR CIRB093). Informed consent was obtained from partici-pants in their preferred language after they were told the purpose of the study, procedures involved, risks and benefits of participation, right to withdraw or refuse to participate during the interviews, procedures to ensure that participants are not identified in relation to their study information and contact people in case interviewees needed further clarification.

Results

Bereavement and mourning

Deaths in the KND are marked by elaborate funerals consisting of traditional performances and rituals with a focus on mourning the loss. Mourners and sympathizers include close and distant relatives, prominent people in the community, and friends of the deceased and those of family members. The elaborateness depends on family wealth and social status. Regardless of the wealth of the family, however, there are traditional expectations that all visitors to homes where a death has occurred contribute something in cash or in kind to show sympathy and to acknowledge the real loss in resources to the family as a consequence of the death. In real terms, these in-kind contributions may be drinks, kola nuts, and livestock. This contribution is necessary regardless of the age or role of the deceased. However, the value of the contribu-tion varies depending on the social status of the deceased, as the following shows:

> Let's take it that it's a chief who died, you have to go to an elderly person who is always with the chief and can give you the information. So going to see those people, you must send kola-nuts and drinks to greet them before you ask them. (VA respondent)

As with most traditional practices, there have been some changes with increasing development of the rural areas. The duration of mourning, for instance, used to be predictable and related to the time of burial and the age of the deceased. However, with the advent of refrigeration this period is harder to determine, as illustrated by the excerpt below.

> It depends on who has died and whether the family has money or not. Nowadays, we have fridges and those who can afford it can put their dead people there while they prepare for the funeral but that is for the old people who die. They put the dead person in the fridge to prepare for the funeral, to inform in-laws, friends, relatives and people who live outside the village because they all have to put resources together for the funeral. Sometimes it can take a year before the funeral but that is if you have [wealth]. If you have money you can give those who come to mourn with you beer and take-away (pre-packed lunch); if not, you just give them water or pito [locally brewed alcohol made from sorghum]. (Opinion leader, assembly member)

Engaging with relatives of the deceased

Although the bereavement and mourning practices were well known by the field staff, they did not always follow these procedures during visits for VA data collection. As part of the standard procedure of the research centre, and in adherence to ethics requirements, researchers and field staff from the research centre are not authorized to offer any gratuities to avoid any perception of coercion to participate in research. The engagement with bereaved families is limited to offering sympathies and obtain-ing verbal consent before carrying out the interview. The limited engagement had been noted by some of the respondents.

> That one, I think that if the Centre [Navrongo Health Research Centre] can always give us some-thing that we can give to them after interviewing just to say thank you as a way of sympathizing with them because in our local homes when you go to greet someone in the house you have to show some level of respect or concern. When the Centre is able to do this, the people will be ready to give the correct information . . .. They [Navrongo Health Research Centre] say they don't have money to do that and that they don't want the people to be forced to take part because of that. (Data collector)

Emotional distress

Emotional distress was described in different terms by participants. Community leaders spoke about the im-portance of both nuclear and extended families and the extent of grief depending on the relationship and the role of the deceased. Data collectors spoke about encountering severe distress in families where the loss was of an only child or where both mother and infant were deceased. They reported several instances where data collectors were denied interviews by relatives of the deceased.

> Mostly they refuse to do [the interview] because she has lost her only child and your interview has nothing to do with its come back. (Data collector)

Similarly, respondents who were in a close relationship with the deceased and those for whom the deceased was the sole source of income also expressed distress and reluctance to engage in VAs.

> Because I lost my old lady and she came to remind me of her again and when she asked me the question and I was narrating to her, it was disturbing me in the heart and I wanted to stop her from asking me those questions. (VA Respondent)

The nature of the death and therefore the core subject of the VA were also significant in the severity of distress caused by the VA interview. Specific circumstances that caused more distress included death from a short illness or a road traffic accident because these were sudden and unexpected. The grief process for such deaths was there-fore described as qualitatively different.

> For the road traffic accidents when you get to that point, it is always pathetic because many are always crying. When you ask for the history, it is that part that they start to shed tears. For instance, when they narrate it and you start to write, before you raise your head, they have already started crying. (Data collector)

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The VA team reported that efforts have been made over the years to be sensitive to cultural issues by extend-ing the period between the death and interview, but the strategy has not been very successful as some women still break down in tears during the interviews regardless of the length of time following the death.

So there may be problems because often the concerns are that their relatives have died and people are mourning and you go and remind them again. It is something which is a bit of a problem at times, so what they have done over the years is to be very sensitive to those cultural issues and give some time to the people to get over the death before you approach them to talk about it and even [then] I am told when you are talking about the child death particu-larly, the mothers break down and cry. (Coder)

Timing of VA interviews

Field staff reported that there are no specific instructions from the research perspective on how soon after death the VA should be conducted. The only instruction is that it should be recent enough to avoid recall bias. This means technically that interviews can be conducted as soon as the field staff is notified of a death, or much later if the death is not identified until the census round. There was no cultural guidance either; that is, there are no taboos on when the events leading up to the death could be spoken about. However, there were instances where mourning and associated rituals were carried out over a protracted period of time. Data collectors either had to wait out this period or risk offending cultural sensitivities by ignoring them.

For neonate, infant, and child deaths all are seen as children so after the burial it can take two weeks before we go to conduct the interviews because if you go immediately they may still be mourning and they wouldn't be able to give you the right informa-tion. But for maternal death that is an adult, a week or two is okay. The 'spirit child' usually takes longer than the rest because they don't even want to admit that such a person was killed because they see it to be a disgrace to their families since everyone has the perception that a 'spirit child' is capable of destroy-ing a whole house so they have to eliminate it before it starts to kill people. (Data collector)

Furthermore, the availability of functioning morgues has resulted in protracted funeral arrangements for ethnic or religious groups that do not have strict requirements for how soon after death the burial needs to occur. Although generally it takes between one and three months before VAs are conducted, sometimes VAs are carried out within a week of the death.

So at times it takes about a month before we go to interview the person, and other times it can take only one week. (Data collector)

Feedback on cause of death

Within traditional systems, knowing the cause of death is important; it holds meaning for the bereaved, and it is important to guide the spirit of the deceased. The 'spiritual' cause is often determined by soothsayers, traditional practitioners, or religious people. Such con-sultations are usually commissioned by compound heads. In order to avoid confusion in the family, the outcomes of such consultations are often kept secret and dealt with according to traditionally laid-down protocols.

There are bad spirits in this world. Nobody dies out of nothing but there are certain deaths that you can never know their cause but the compound head who doesn't sleep at night will know. They can go to a 'vuru' [soothsayer] to know all what happened but when they find out they keep it secret. They don't let it out to people else it will cause confusion in the house. Only the elders get to know. If you people can tell us why the person died, maybe we will not go out looking for it again to cause problems. (Opinion leader, landlord)

When researchers seek consent from families to deter-mine a clinical cause of death, the expectation given is that the data collected will lead to further information to provide some meaning to the loss. However, it is not standard practice for researchers to return to individuals or families to provide them with this information once it has been processed. The reason given is that coding is based on expert decision making rather than the exact cause of death. Feedback has traditionally been at the community level, where the broad causes of death are explained to community members.

That is not our business. In conducting VAs, our business is to look for the cause of death, period. At a later time we can talk of interventions not to individuals or families because at the end of the year usually there are reports that are generated and there are disseminations that are carried out in the communities on all studies and these things are captured there as causes of death. What is probably killing the people or what are the diseases that are killing the people. But as [of] now, we do not go back to tell the families the causes of their relatives' deaths. Our business is to ask them about the causes of the deaths and how your relative died and we will use our scientific methods together with your narrative and assign a particular cause to it. Some cases we can't confirm it exactly so we actually have no business to go back and say 100% this is the actual causes of a death that killed Mr A or Mr B. (Coder)

Lack of feedback at the family level was raised by all families and communities. Some specific questions were raised where there was a possibility that it was a preventable illness.

If they tell you and you know, you can always prevent yourself from these diseases so that in future, such a thing will not happen to you because you might not know but those who came and conducted the interview will know so when they give you the feedback it will be better. (VA respondent)

Confidentiality of VA data

Respondents highlighted a number of concerns about confidentiality relating to the process of data collection, the content of the information that was collected, and ultimately what the cause of death may turn out to be. One particular concern was the one-to-one interview ideal which reflect Western norms of medical information given but may not necessarily apply in collectivist societies such as that of the Kassena-Nankana District. For instance, when data collectors went to collect data within the com-pound, they could not control who was present during the interview particularly since a death was the sort of event that brought family members together to support each other. Not only was it difficult to guarantee confidenti-ality within the household, but also there were implica-tions, both positive and negative, for the quality of the data collected.

If a man dies and you are interviewing his wife and the compound head is around you cannot sack him. He also sits and listens because you have already explained to him why you came. So where the woman cannot provide certain information that you need, the compound head can chip in and say can you remember this or that happened? (Data collector)

Concerns about confidentiality were also raised about deaths that were potentially as a result of stigmatizing diseases.

In this community, if people see you growing lean, they will start pointing hands and saying things, so if you people let the people know that what they were talking of is true, it will bring problems to us [the family]. (VA respondent)

The coders cautioned against giving out information that had the potential to stigmatize communities and advised VA teams to be careful not to confuse their role as researchers with that of criminal investigators. As researchers, VA teams are bound by certain ethics, which include protecting their participants.

The problem may arise when you give out informa-tion that has to do with, excuse me to say, a stigmatized disease, for instance like the cause of death being HIV/AIDS or a narrative that suggests a death was due to HIV/AIDS. These are where ethical issues may arise where repercussions could befall the family members of the deceased. These are sensitive or medically sensitive information which we do not have a degree of control over because we are not in a hospital setting. Also, under the law, we can be called to bear witness in court if it is a criminal case and this can be tricky. We wouldn't know what to do. (Coder)

Regard for cultural prohibitions

In the Kassena-Nankana society, it is considered a taboo to mourn or discuss the death of a chuchuru (spirit child)[1] in the family. Bad omens such as the death of family members that are often associated with a 'spirit child' make it culturally inappropriate to probe mothers for information about the circumstances of the death. According to the community members, talking about a 'spirit child' exposes the family to the risk of having the child reborn with the same characteristics, beha-viours, and consequences. VA procedures, however, require that data collectors visit close relatives of the 'spirit child' to enquire about the circumstances sur-rounding the child's death. Though the VA team is aware that asking people to talk about a 'spirit child' violates traditional norms and could jeopardise community relationships that support cohort maintenance, they are obliged by the VA process to still visit such families.

[I]t can take so many years and if the house members don't realize it early, it [spirit child] can grow old to about 10 years or until 'we napiiri o, o pa debam' [God is able to identify it for us]. Because in most cases it can kill its own relatives until such a time that they realize it is not a good thing, then they tell the 'kwo-bia' [tribal playing mates] because if you have a 'chuchuru' [spirit child] in your house and you even go out to consult with the 'vura' [soothsayers], it [spirit child] will quickly go and block all the ways they can use to know that it is a chuchuru such that you cannot identify it. But, the tribal play mates can 'fogibayiga' [prepare them-selves spiritually, and] identify and kill it. (Opinion leader, chief)

Like I have said, if a chuchuru dies and the chuchuru undertakers come to carry it away, no-body comes to greet the funeral because the perception is that if people come to greet, it will come back again. So they go to throw it away and never to come back at all. (Opinion leader, CKI)

Data collectors often find out about a 'spirit child' through the use of euphemisms like 'the child was thrown into the bush'. Community members believe that some 'spirit children' are able to hide themselves from sooth-sayers and are not discovered until the child is up to 10 years old. If the family is 'fortunate', then God will help them identify the spirit child, but generally, it is believed that only the kwo-bia (tribal playmates), who have the spiritual powers, can identify them.

[1] A ''spirit child'' is a child born with physical abnormalities such as teeth at birth or whose birth is followed by a series of mysterious events such as incurable diseases or death of family members.

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You know nobody wants to have a spirit child in his home because it is a very destructive being. So the moment you realise that it is a spirit child we get some particular people to kill and bury it in the bush. (VA respondent)

Also, in the Kassena-Nankana tradition, it is prohibi-ted to discuss the death of a traditional authority such as a chief or a landlord prior to the formal announcement of the death by the family. Funerals of this category of people are elaborate and logistically demanding. Families therefore require adequate time to gather resources and to inform all who need to be present at the funeral.

In our 'Kassena-chonga' [Kassena tradition] it can take about one or two months before people get to know that the chief is no more. Nobody talks about it until it is announced and others get to know when they see certain things happening around the house. The landlords too, they hide and bury them. For instance, if a landlord dies anywhere, they will secretly come and inform the chief that one of his subordinates is no more. So if there is a problem and he was supposed to be around him to solve it you will know because they will send a representa-tive. They secretly bury him and get the necessary people to perform the necessary rites before they let people hear about it because it also pulls crowd. (Opinion leader, chief)

Table 1. Key findings

3. Traditional expectations exist for all visitors to homes where a death has occurred which include the contribution of something in cash or in-kind to sympathize and acknowledge the real loss in resources to the family.
4. VA teams do not offer gratuities to families of the deceased based on perceived coercion to participate in the VA process.
5. Emotional distress is influenced by the relationship between the respondent and the deceased, the role of the deceased in the family, the lost of an only child, the lost of both mother and infant and the nature of the death.
6. VA teams have no standard protocols for the timing of VA interviews. This includes how long after death and at what stage of the funeral the interview should be conducted.
7. It is not standard practice for VA teams to return to individuals or families to provide feedback on cause of death but community members are expressing interest in receiving feedback.
8. All carers for the deceased are usually brought together for VA interviews and this has implications for confidentiality and the quality of VA data.
9. Discussion of some deaths are culturally prohibited and therefore lead to refusal of interviews.

Discussion

This study reveals the cultural sensitivities in VA proce-dures at the individual, family, and community levels that need greater consideration not only for ethical reasons but also to ensure the quality of VA data. Discussions of some deaths are culturally prohibited, and confidenti-ality is needed for cohort maintenance. VA teams are called upon to engage in culturally appropriate bereave-ment practices such as the presentation of tokens and to provide feedback on cause of death. The need for VA teams to consult with communities for guidance on the most appropriate time interval between death and VA interviews was emphasized. A summary of the study findings are contained in Table 1.

DSSs, established primarily for longitudinal research and used for community-based intervention trials, are subject to ethics principles. Critical for the success and, arguably, the ethical conduct of the research is the need to establish and regularly negotiate a relationship with the community. A good relationship with the community is important to mitigate the pervasiveness of ongoing data collection. Essentially, this means that DSS research teams need to take on community engagement activities that complement data collection. Such activities will go beyond the community engagement process outlined by Tindana et al. (22) to include adherence to local customs, such as funeral rituals that require gift giving that should not necessarily be assessed under the ethics criteria of incentives or coercion (24 27). Indeed, any use of VA, including civil registrations, should be guided by basic principles of collaboration (28) with communities and should seek as a final outcome the empowerment of communities to ensure that the process of accessing mortality data does not impose practices that conflict with traditions This can be achieved through commu-nication and meaningful consultation with communities to establish partnerships during the design of VA surveys and throughout the data collection process.

The involvement of CKIs or community advisory committees who are knowledgeable in the local customs and culture of the people would further support VA teams regarding the extent to which traditional protocols need to be observed, particularly for families of the deceased. This could include timing of the interviews, gifts to be presented to the bereaved family, and tradi-tional expectations for specific deaths. In some cases, visits to sympathise with the bereaved family prior to the day of the interview may be recommended to learn the best approach to conducting the interviews and also to prepare relatives of the deceased for the impending interview. Considering the huge number of deaths that civil registrations using VA approaches deal with, it may be impossible for such systems to go beyond sympathiz-ing with relatives of the deceased in their engagement process. However, professionals engaged in the process should be capable of preparing individuals or families psychologically for the impending VA interview by sympathizing with them appropriately.

Although intense community engagement activities were carried out at the start of surveillance activities in the KND in 1992 (19, 20, 22), individuals participating in VA interviews may still require information with regard to VA procedures and the overall objective of the activities. This is often conveyed to respondents during the informed consent process, which has tradi-tionally been verbal. Data collectors are not required to document the consent of participants before carrying out their interviews. However, considering that the VA process is beyond minimal risk, there has been a call for written informed consent for participants in VAs (15). In settings where VA is used for civil registrations, individuals and families will be required by law to participate in VA interviews, but this does not absolve the professionals involved in the process from providing them with information on VAs and the objectives of the procedure in a sensitive manner.

The ethical principle of respect for persons, which acknowledges the right of the individual to choose to either participate in a research activity or not, is necessary in the process of enrolling people into VAs. It has been argued that there is total cooperation of inhabitants in surveillance communities, which 'can threaten the ability of individuals or households to make truly autonomous opt-in decisions' (29). This is because a decision by individuals and households within surveillance commu-nities, or under compulsory registrations, to opt out has been made almost impossible by their location and by law. Recounting events surrounding the death of a close relative could bring about severe emotional distress (15). In research settings, this demands that the individual is given the opportunity to make an informed decision based on a culturally appropriate consent process. This includes the language used in seeking consent, the feasibility of using written consent, and the possibility of using other approved approaches such as pictographs and ethnographic methods.

Also, Chandramohan et al. (15) have indicated that some field staff on VAs come from surveillance com-munities, and therefore confidentiality of information cannot be guaranteed. Due to linguistic barriers and the cultural sensitivity of death enquiries, the use of such data collectors may be inevitable. The situation is even more complex when, in order not to compromise the quality of the data collected, all family members who cared for the deceased are brought together to provide information during the interviews. Although this collective provision of information could threaten confidentiality and poten-tially stigmatize families and communities, it does offer an opportunity for cross verification and validation of the VA data. It is unlikely that the collectivist societal structure that exists in many countries where VAs are performed can be subjected to change and so it may be more feasible and appropriate to consider how the VA mechanism operates effectively within these contexts. One option is to consider separate interviews with all carers for the deceased but the onus lies with VA teams and civil registrars using VA to set up internal structures to protect participants.

Individuals and families who suffer a significant loss may require counselling to calm down their feelings, thoughts, and experiences prior to mortality enquiries. In this regard, it has been suggested that VA data collectors be adequately equipped with counselling skills (15). However, before providing such services, individuals engaged in mortality enquiries will need to understand the bereavement culture of the communities they work in, the different models of mourning, and the different factors that may affect the grief response of individuals and families. Factors that were reported to significantly affect the grief response included the relationship be-tween the respondent and the deceased, the role of the deceased in the family, the loss of an only child, the loss of both mother and infant, and the nature of the death. These factors are similar to those found by Chandramohan et al. (15). For VAs in both research and civil registrations using active methods of data collection, it is important that the counselling approach adopted is designed in collaboration with the community to ensure its relevance. As demonstrated from the results, data on 'spirit child' deaths, for instance, would require critical negotiation to facilitate disclosure by families. Clearly, VA staff in both research and civil registrations would have to be equipped with appropriate counselling skills as part of their professional training.

The culture of mourning in traditional African society usually takes a long time to complete (30). The prolifera-tion of functioning morgues has further compounded this problem. This demands that data collectors allow enough time for the family to mourn the deceased before contacting them for VA interviews. The appropriateness of this lies in the suggestion that recall bias is not a problem in recounting tragic events such as death (31, 32). General recommendations regarding the length of time between death and VA interviews range from three months (33) to two years (31, 34). However, beyond the issue of recall bias, researchers and state registra-tion authorities may need to explore more systematically what the appropriate cultural compromise would be for specific deaths and provide the needed guidance to field staff as they endeavour to collect VA data.

In countries where Islam is dominant, like Malaysia, there are cultural imperatives for burials to occur within 24 hours of a death and religious beliefs that preclude post-mortem examinations, which are often perceived as mutilation of the body. Indeed, in such settings, VA approaches may be preferred for cause of death determi-nation. Similarly, within the context of many African cultures, for instance, death is considered inevitable and

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the loss is often mitigated by the possibility of reincarnation (35). Within several African cultures, the belief is held that the discarnate soul is born again in another body a number of times. The re-embodiment is dependent on the type of funeral rites that are performed, parti-cularly to protect against the reincarnation of social outcasts, public miscreants, lepers, and witches (36). These beliefs are powerfully illustrated in rituals follow-ing the death of children in the KND believed to be 'spirit children' or chuchuru. The belief in 'spirit children' is closely bound to maternal and perinatal morbidity and mortality (23, 37), and it is culturally inappropriate to discuss the death of a 'spirit child' without provoking traditional sensitivities. The belief system is considered important enough to override any public health require-ment to determine cause of death. These belief systems clearly extend to various degrees across many cultures, and the VA protocol and other requirements for ascer-taining cause of death need to embed approaches to managing these belief systems within the process of data collection.

Individuals contribute information towards the determination of cause of death, but these individuals do not benefit directly from the VA process. As advanced by the Belmont report, an injustice occurs when some benefit to which a person is entitled is denied without good reason or when some burden is imposed unduly (38). Individuals can benefit from feedback on the probable cause of death of their relative if such information can help either the individual or family take precautions against an impend-ing health crisis. Fottrell and Byass (39) have argued for the use of mortality measures to detect humanitarian crises for public health interventions at the population level. This article extends the discussion to crisis at the individual and family levels. From the study, respondents have often expressed the desire to know the cause of death of their relatives during death narratives, but this request has not been met by VA teams. The arguments offered in the data for not providing such feedback is that cause of death based on VA data does not have the full confidence of physicians. There is, however, no funda-mental reason why a physician's opinion based on a VA is different from feedback from a physician issuing a death certificate. Feedback is especially crucial in the case of communicable diseases in order to avoid a health crisis for the family. One could argue that if data from VAs are reliable to inform priorities in health interventions, then such data could be useful to the spouse of an individual who died from HIV/AIDs. Consequently, even though the results of VAs may not have the full confidence of physicians, as purported in the data, they may form the basis for further investigations by the individual or family. The process of feeding back cause of death may risk stigmatizing individuals and families and therefore care must be taken to ensure that only individuals who can benefit from the information receive it. For state registrations systems, feedback to individuals or families may not be feasible due to the huge populations involved but may be a necessary part of the VA process in the research context.

Where individuals opt for feedback on the cause of death of their relative, the surveillance system should be able to provide ancillary care for any investigation that leads to the discovery of the suspected illness in the respondent. Ancillary care is that which is not required to make a study scientifically valid, to ensure a trial's safety, or to redress research injuries (40). Practical steps have been outlined to guide researchers in providing ancillary care (41). According to Carrel and Rennie, the principle of ancillary care is commonly misunderstood to apply to only clinical trials, but participants in routine surveillance systems have the right to such care (29).

Study limitations

Detailed description of the mourning culture for spe-cific deaths and its effect on distress was not studied as they were beyond the scope of this article. A longitudinal study design will be required to study these relations.

Also, the selection of our sample was based on time to interview and not necessarily the cause of death. We are therefore unable to tell what the impact on our results would have been if our respondents were selected based on the cause of death.

Finally, due to the design of the study, we are unable to give quantitative measurements to the different levels of distress associated with the factors that were reported to influence it.

Conclusions

With increasing focus on improving the capacity of developing countries to undertake research for health, the establishment of IRBs for ethical research has been given priority (42). This is evident in the increase in funding and other types of support available to enhance the ethics review process in research. In considering the ethical merits of research protocols, IRBs are guided by international guidelines and principles from key docu-ments such as the Helsinki Declaration and the Belmont Report (38, 43). There is, however, no formal procedure for considering the ethics of other methods involving death registrations, such as compulsory civil registrations. That notwithstanding, the principles guiding research studies are almost universally accepted. Although they arise from a particular historical and cultural context and were conceived primarily for the purpose of monitoring clinical and experimental research with human subjects, the principles can be adopted with a commensurate critical analysis of the type of investigations and the cultural context in which the investigations are being carried out.

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ORIGINAL RESEARCH ARTICLE

Obstetric Danger Signs and Factors Affecting Health Seeking Behaviour among the Kassena-Nankani of Northern Ghana: A Qualitative Study

Raymond A. Aborigo[1,5], Cheryl A. Moyer[2], Mira Gupta[2], Philip B. Adongo[3], John Williams[1], Abraham Hodgson[4], Pascale Allote[5] and Cyril M. Engmann[6]*

[1]Navrongo Health Research Centre, Ghana; [2]University of Michigan, USA; [3]University of Ghana, Ghana; [4]Research and Development Division, Ghana Health Service, Ghana; [5]Monash University, Sunway Campus, Malaysia; [6]University of North Carolina, USA.

***For Correspondence:** [redacted]

Abstract

Improving community members' knowledge of obstetric danger signs is one strategy for increasing the use of skilled care duri ng pregnancy and the puerperium**.** This study explored knowledge of obstetric danger signs among a range of community members, examined the sources of their information, and the perceived factors that affect health seeking behaviour in rural northern Ghana. We conducted 72 in-depth interviews and 18 focus groups with community members. All interactions were audio taped, transcribed verbatim and analysed using NVivo 9.0. Community members demonstrated knowledge of a wide range of obstetric danger signs, including excessive bleeding, stomach aches, waist pains, vomiting and fever. Pregnant women learn about danger signs from a range of providers, and regular contact with formal providers typically coincided with increased knowledge of danger signs. Traditional remedies for problems in obstetrics are plentiful and cultural beliefs often restrict the use of allopathic medicine. Increasing knowledge of obstetric danger signs is necessary but not sufficient to overcome cultural preferences for traditional treatments for pregnancy danger signs. *(Afr J Reprod Health 2014; 18[3]: 78-86)*

Keywords: Obstetric danger signs, knowledge of danger signs, health seeking behaviour, antenatal care, maternal health, Ghana

Résumé

Améliorer la connaissance des signes de danger obstétrical par les membres de la communauté est une stratégie visant à accroître l'utilisation des soins qualifiés pendant la grossesse et le post-partum. Cette étude a exploré la connaissance des signes de danger obstétrical parmi un éventail de membres de la communauté. Elle a étudié aussi les sources de leurs informations, et les facteurs perçus qui influent sur le comportement menant à la bonne santé dans les régions rurales du nord du Ghana. Nous avons effectué 72 entrevues en profondeur et de 18 groupes de discussion à cible auprès des membres de la communauté. Toutes les interactions ont été enregistrées sur bande audio, transcrites et analysées à l'aide de NVivo 9.0. Les membres de la communauté ont fait preuve d'une connaissance d'un large éventail de signes de danger obstétrical, y compris les saignements excessifs, des maux d'estomac, des douleurs à la taille, des vomissements et de la fièvre. Les femmes enceintes apprennent des signes de danger grâce à une gamme de fournisseurs et les contacts réguliers avec les fournisseurs officiels ont coïncidé en général avec une meilleure connaissance des signes de danger. Les remèdes traditionnels pour des problèmes pendant la grossesse sont abondants et les croyances culturelles limitent souvent l'utilisation du médicament allopathique. Améliorer la connaissance des signes de danger obstétrical est nécessaire mais pas suffisante pour surmonter les préférences culturelles pour les traitements traditionnels pour des signes de danger de la grossesse. *(Afr J Reprod Health 2014; 18[3]: 78-86)*

Mots-clés: signes de danger obstétrical, connaissance des signes de danger, comportement menant à la bonne santé, soins prénatals, santé maternelle, Ghana

Introduction

Although maternal mortality ratios have dropped globally, the rate of decline has been slow in sub-Saharan Africa[1]. Since the launch of the Safe Motherhood Initiative in 1987, several efforts have been made to improve maternal health and reduce maternal mortality[2]. These have mainly focused on improving referral systems for emergency obstetric care, improving access to skilled attendants at delivery, and monitoring progress through maternal mortality and morbidity audits.

Increasing knowledge of obstetric "danger signs" is one strategy aimed at encouraging the utilisation of skilled care during pregnancy and the puerperium[3-7]. Yet many pregnant women and their families in developing country settings have limited understanding of obstetric danger signs[8-10], causing delays in reaching a facility with trained providers when complications occur[9]. Knowledge of obstetric danger signs is related to the first of the three critical delays identified by Thaddeus and Maine; the other two being the delay in arriving at a health facility, and the delay in providing adequate care[11].

Every pregnancy carries some degree of risk[6,12], and for every maternal death, between 15 to 30 women who survive childbirth suffer from short- and long-term disabilities such as obstetric fistula, ruptured uterus, or pelvic inflammatory disease[13-15]. Complications can occur any time from conception to the postpartum period. Fortunately, many obstetric complication can be effectively managed if warning signs are detected early and acted upon promptly[11]. Information on obstetric danger signs is usually delivered to pregnant women during antenatal clinics, but the quality of the service in low-income settings has been described as inconsistent[16]. In northern Ghana, only 65% of women attending ANC report being told about obstetric danger signs[17].

This study explored knowledge of obstetric danger signs among a range of community members, examined the sources of their information, and the perceived factors that affect health seeking behaviour.

Methods

This study was nested within the Stillbirths and Neonatal Deaths Study (SANDS) conducted from July-October, 2010 in the Kassena-Nankana East and West Districts (KNDs) in Northern Ghana[18-20].

Research site

The research was carried out in KNDs under the purview of the Navrongo Health and Demographic Surveillance System (NHDSS). The pre-dominantly rural districts have a population of 152,000[21]. The two districts are served by one hospital which acts as a referral facility for six health centres and about 33 community health compounds.

Sampling

Purposive sampling was done across two geographical zones within the KNDs to maximise the diversity of respondents: women with newborn infants - categorised according to place of delivery, parity and literacy - grandmothers, compound heads, household heads, community leaders, formal health care providers and traditional health care providers. "Women with newborn infants" were defined as women who had given birth within 8 weeks of the study in order to optimise their recall of information given on danger signs during pregnancy by health workers.

"Grandmothers" were defined as any woman who had at least one grandchild born within the previous year. "Formal health care providers" who have the responsibility within the health system to provide information on obstetric danger signs to pregnant women and their families included physicians, community health officers (CHOs), midwives, and medical assistants. "Traditional health care providers" included traditional birth attendants (TBAs), herbalists, and other local healers not recognised by the formal medical establishment.

We conducted in-depth interviews (IDIs) with 35 women with newborn infants, 8 traditional birth attendants and local healers, 16 community leaders (chiefs, assembly members, women group leaders, community key informants (CKIs) and 13 health workers. A total of 18 focus group discussions (FGDs) were conducted with household heads, compound heads and grandmothers.

Data collection

All IDI and FGD instruments were developed, pretested, and revised to ensure validity. Six trained field staff employed by the NHRC conducted all IDIs and FGDs, which typically lasted between 45 and 90 minutes. All interactions were transcribed into English, but local expressions without equivalent translations were retained in the local language. Interviews with health care providers were conducted in English and transcribed verbatim.

Data analysis

Three of the researchers coded the text 'in vivo'. This involved making written notes on hard copies of the transcripts and reviewing the notes together. A preliminary coding structure was agreed upon and a codebook was created. Transcripts were imported into NVivo 9.0. Focused coding (using the initial coding structure as a guide) was conducted by four separate coders, including one of the researchers. Data were looked at separately by category of respondent and then in aggregate.

Ethics

Ethics approval for the study was obtained from the institutional review boards of the Navrongo Health Research Centre (NHRCIRB091), the University of Michigan, and the University of North Carolina. Participation in the interviews and discussions was possible only after we obtained verbal consent from potential participants.

Results

The findings were inconsistent across types of community respondents with regard to knowledge of obstetric danger signs, sources of information regarding danger signs, and factors affecting health seeking. Thus, data are presented in aggregate rather than separated by respondent type.

Knowledge of obstetric danger signs

Community members were able to list a wide range of obstetric danger signs. These included vaginal bleeding, vomiting, headaches, dizziness, edema of the legs, abdominal pains, waist pains, fever, and prolonged labour. A few respondents also mentioned the absence of fetal movement, loss of appetite, body weakness, looking pale, broken water, and difficulty in breathing. Both community members and health workers reported that women with previous births and antenatal history are more likely to be aware of obstetric danger signs than their counterparts.

"For those who have given birth before, when some things happen to them, she will know it is a sign of danger because during the other pregnancy she never experienced this, so she will go to the clinic."(IDI, TBA)

Vaginal Bleeding

Vaginal bleeding was well recognised as a danger sign. However, it was sometimes difficult to distinguish in the course of the discussion whether this related to abnormalities in menstruation or bleeding in pregnancy. Regardless, the pre-dominant response was to not seek treatment at a health facility for bleeding.

"When the pregnant woman is bleeding from her vagina, we have herbs for its treatment. Women don't go to the clinic for its treatment because of poverty, so we use herbs in treating that one." (FGD, Household heads)

Vomiting

Community members reported that vomiting is a normal phenomenon during pregnancy, yet others were of the view that once a pregnant woman starts vomiting, she must visit the health facility. Continuous vomiting was reported as dangerous to the woman and the fetus and therefore required medical attention to avoid miscarriages.

"There are some when they are pregnant they vomit a lot, so they have to go to the hospital to check it out to see whether the pregnancy would hold (carried to term) or not." (FGD, Grandmothers)

Pain

Pain was listed as an important indication of potential danger, occurring in the abdomen, waist, chest, pelvis, or elsewhere in the body. Interpretation of the significance of the pain was easiest for those who had a prior experience of pregnancy, but generally, it was considered a medical emergency. Sometimes, pain was confused with labour symptoms, thus prompting a visit to the health facility for appropriate diagnosis.

"If I am getting any pains different from my previous labour then I would have to go to the hospital to get help."(IDI, Woman with newborn

infant).

In some communities, herbs are used for managing abdominal pains during pregnancy.

"The reason is that if you are pregnant and since you do not see what goes on in the stomach, you have to take some drugs to see whether the pains will stop or if you come to the clinic and they realise that they cannot treat you, they will refer you to the big hospital. If you get to the hospital they will examine you and will know what is worrying you and will treat you." (IDI, CKI)

Waist pains were often mentioned with another sign; either with abdominal pain, headache, edema of the legs or vaginal bleeding. Regardless, most community members reported that a woman having waist pain ought to seek medical attention.

Headache

Headaches, which community members often associated with malaria, were most often either ignored or self-managed with analgesics. Severe headaches that occurred with other symptoms compelled some pregnant women to seek treatment outside the home.

"They do go (to the hospital), but those who do not know will also take those herbs that treat headache that they call 'zuu-masede'('cold' headache). They will go there with a fowl (for the traditional healer) to treat the headache and others too will go to the hospital."(FGD, Household heads)

Fever

Participants agreed that fever is a sign of illness in pregnancy, but they differed as to whether to seek care for such a symptom, and what type of care to seek. According to some community members, a pregnant woman with untreated fever could develop psychological problems.

"... If the people around understand her situation, they will say it is fever and will take her to the hospital ... so that it will go away. And those who will not will be following bad spirits, saying the woman has been poisoned. In such cases, the people will make the problem worse and it might develop into what we call 'zologo' (madness)." (IDI, Women's group leader)

Source of information for obstetric danger signs

Health professionals confirmed that as part of routine antenatal services, expectant mothers are given information on danger signs in pregnancy through verbal communication, pictures on the walls in the clinic, and pictures on the back of ANC cards illustrating danger signs. Pregnant women who attend ANC are expected to be competent in the recognition of danger signs in pregnancy.

"When they come for antenatal registration, we educate them on the danger signs of pregnancy. So we tell them about all these things. So when they see them, they know that her life and the child's life are in danger so they have to come." (IDI, CHO)

In addition, women share information when they congregate in the market place, carry out communal labour, travel long distances to fetch water, or during women's group meetings. Women who have delivered previously often share their experiences with first-timers and their peers. This was reported as an important mechanism for pregnant women to share information on obstetric danger signs.

"When they(health workers) warn me, anytime I am with my fellow pregnant women doing work or fetching water, I have to tell them what I was told."(IDI, Woman with newborn infant)

"Over here we have women's groups, and anytime we meet each other we talk about it. When one of us is experiences something she can discuss it with her friend, and if anyone knows, she will explain." (IDI, Woman with newborn infant)

TBAs and grandmothers also provide information to pregnant women. TBAs reported advising expectant mothers on how to manage danger signs or where to seek care.

"If you see any pregnant woman around, you can go to her house and have a chat with her and tell her what to be doing to keep her healthy. Also, you

can advise her to be going for antenatal care services in the clinic." (IDI, TBA)

Factors affecting health seeking for obstetric danger signs

Providers complained that despite being given information on danger signs and appropriate care seeking, some women do not follow their advice. Non-compliance was attributed to either women's uncertainty about the severity of symptoms or poor understanding of health messages. First-time mothers and illiterate women were singled out for non-compliance.

"..Some (women) you (will) talk (to), and after that, you will ask and they will still be confused. ...Those who can read, if they take the cards and just turn behind, they will see the danger signs there." (IDI, CHO)

Even though some pregnant women may know the danger signs in pregnancy, participants reported that there are families that prohibit hospital attendance or the use of allopathic medicine.

"...if someone doesn't allow a woman to go to a facility, it is because the woman is in a house that still has old taboos. Most of them still pour libation concerning their health because they do not go to the hospital." (IDI, Women's group leader)

Most of these individuals treat themselves with herbs at home or they consult traditional healers.

"...usually the tendency is to self-medicate, following that maybe a visit to the traditional healer, and only then will they go to the clinic." (IDI, Medical Doctor)

Women whose hospital treatment fail or whose symptoms were perceived to be caused by evil spirits or witches, were reported to use herbalist and traditional healers for treatment. One participant cited a case where hospital treatment failed and the nurse asked the pregnant woman to seek treatment at home. The reverse, where traditional treatments are initiated and the cases later end up at the hospital, was also reported.

"There was a woman who was pregnant and the pregnancy was 'porisa' (bleeding) and she took it to the hospital. ... She said there was a day when the nurses told her that she has to come to the house for them to look for local treatment for her so that if the pregnancy will stay she will know. But she should come back to the hospital after applying the herbs for two weeks so they can observe the progress of the pregnancy." (FGD, Compound heads)

One household head recommended the blending of both traditional and allopathic medicine for the management of obstetric danger signs.

"But the local herbs are also there; for me, I think we should to fifty-fifty; use the white man's medicine and local herbs. When the woman tries the hospital and it does not help, she can try the local herbs so that she can get well." (FGD, Household heads)

In addition, pregnant women may recognise that a particular sign or symptom could be dangerous to her health, but the choice to seek care may not be hers. Decision-makers may be her husband, the elderly male in her household, or the compound head. Once a decision to seek care is made, then the choice of either traditional or allopathic treatment must be considered.

"It's one thing for them to recognise that this is a danger sign, and it's another thing to make the decision, and the decision is not made by her. A lot of the times it has to be in conjunction with the partner. And even when the decision has been made to seek treatment, then you are right at another decision-making point; should we go the traditional route or should we go orthodox?" (IDI, Health worker)

Table 1: Strategies to improve knowledge of obstetric danger signs at the community level

Strategy	Quote	Implementers	Platforms	Target Population
Individual Counseling	*"What the nurses can do is to have one on one discussions with the pregnant women during antenatal to know each woman's problem". (IDI, woman with new born infant)*	Midwives, CHOs	Antenatal clinics	Pregnant women
Peer Counseling	*"When we go for antenatal the nurses talk to us and when we come home we also talk to each other".(IDI, Women group leader)*	Pregnant women	Social gatherings	Pregnant women who do not attend antenatal
Community meetings	*"Outside of ANC, we would need a whole lot of community sensitisation. Meeting opinion leaders and these should be channeled through the chiefs to the people; the natural flow; how generally information flows in the community. That's from the chiefs to the elders to opinion leaders. Yeah, these are people to rope in, in order to get information like this to seep down to women in the community. Of course women should be greatly involved in this".(IDI, Medical Doctor)*	Midwives, CHOs	Meetings	Opinion leaders (Chiefs, elders, women group leaders, assembly members)
Group Discussions	*"If you could have focus group discussions of just women only, they would be able to bring up their problems or issues that they feel really strong about. And then this would be fed back to the men folk, and then a consensus builds. And you'll be surprised if you get opinion leaders to buy into this, how the information will spread like wildfire in the community". (IDI, Medical Doctor)*	Midwives, CHOs	Focus Group Discussions	Pregnant women, TBAs , traditional healers, Opinion leaders (Chiefs, elders, women group leaders, assembly members)
Engaging the Significant others	*"Every pregnant woman is a sick person so have to be taking advise always. That is why people like us always advise them".(IDI, TBA)*	Midwives, CHOs	Home visits	Mother in-law, grandmother, older women in the compound, household and compound heads, TBAs
Periodic community sensitization	*"We need to have durbars periodically to educate the women about these signs. Also, the health staff, community volunteers, and traditional birth attendants need to educate them too". (IDI, CKI)*	CHOs, Community volunteers, TBAs, Assembly members, Women who have ever suffered a complication	Community Durbars	Community members including pregnant women
Improve health worker handling of pregnant women	*"I can tell you, there was an instance, I won't mention the health facility, but there was a health facility at one point where clients wouldn't just patronise that particular health facility because there was the perception that, the clinician there wasn't the best clinician in terms of PR (public relations), the personal relationships. So for a long time, people weren't patronizing that clinic, including pregnant women". (IDI, Medical Doctor)*	District Health Management Team	In-service training	Midwives and CHOs

Suggestions for improving community knowledge of obstetric danger signs

Respondents made suggestions for improving community knowledge of obstetric danger signs at the community level which are summarised in Table1.

Discussion

Community members in rural northern Ghana demonstrated knowledge of a wide range of obstetric danger signs, including excessive bleeding, stomachaches, waist pains, vomiting, and fever. Pregnant women learn about danger signs from a range of providers, and regular contact with formal providers typically coincided with increased knowledge of danger signs. Traditional remedies for problems in pregnancy are plentiful, and cultural beliefs often restrict the use of allopathic medicine.

Many studies carried out in the field have recorded pregnant women's limited knowledge of obstetric danger signs[22-25], yet our data suggest that basic knowledge of obstetric danger signs was common. Nonetheless, widespread misconceptions about the cause of such danger signs influenced care seeking.

In Ghana, health workers counsel women about obstetric danger signs and provide all women attending ANC with cards illustrating potential danger signs. However, according to Nkiema et al. (2009), pregnant women are not routinely advised on obstetric danger signs during ANC visits in sub-Saharan Africa[6]. Considering that only 65% of women attending ANC in Ghana reported receiving such information[17], the health system may need to re-examine current approaches for delivering such information. Suggested approaches could include individual and peer counseling as well as group discussions with pregnant women.

Our data suggest that families also require information on obstetric danger signs in order to adequately support pregnant women. Community members suggested varied approaches for reaching them with such information. These typically included community meetings, group discussions with community stake holders, engaging the significant others, and periodic sensitizations through durbars, which are formal community-wide gatherings that include cultural activities such as drumming and dancing and provide an opportunity for information to be shared with a large number of people[26]. Although durbars are usually called by researchers and health authorities, the mobilisation of the community is usually done by the community leadership which includes chiefs, assembly members, TBAs, and CKIs. Apart from health workers delivering messages during durbars, women with previous experiences of obstetric complications could share their experiences with community members.

Our data reinforce the long-held public health aphorism that information alone is insufficient to change behaviour. The community structure and norms in rural northern Ghana suggest that thoughtful engagement of key leaders is necessary to integrate long-held traditions regarding care for pregnant women with more contemporary understanding of etiology of illness and thus the recommended path for treatment.

Traditionally, the hierarchy of care seeking for symptoms such as vaginal bleeding, headaches and fever in the KNDs starts with home remedies, progresses to traditional healers, and ends up at the health facility. For example, headaches and fever are more likely to be associated with malaria than obstetric danger signs in this region, and our data suggest that pregnant women prefer to manage fever and headaches at home to seeking formal health care. This may contribute to the delays in care-seeking that result in malaria accounting for approximately 9.4% of maternal deaths in the country[27].

In addition to preferences for home treatments, women living in communities with deep-rooted cultural norms that forbid the utilisation of health facilities or treatment with allopathic medicine have difficulties accessing health care even if they recognise obstetric danger signs. This situation is compounded by the status of women in patriarchal societies where women are unable to make decisions regarding where and when they ought to seek care without consulting a male in the family. Our results are similar to those of Doctor et al., who reported limits to women's decision-making ability in Nigeria where families and households are strongly patriarchal[28]. In communities where

such traditional norms conflict with public health recommendations, creative efforts to bridge these gaps must be sought to properly address maternal mortality and morbidity.

Study limitations

One main limitation of this study is that the cross-sectional design did not allow us to relate reported knowledge of pregnancy danger signs with actual care-seeking behaviour. Future research that follows women prospectively could provide valuable insight regarding whether knowledge of danger signs during pregnancy is indeed sufficient to predict prompt and appropriate treatment seeking. In addition, detailed prospective analysis could shed light on the dynamic nature of recognition of danger signs, perceived causation, and ultimate treatment seeking.

It is also possible the data may have been affected by social desirability bias, causing respondents to report what they believed the interviewer wanted to hear. We attempted to minimize this potential bias with thorough interviewer training, however it may have adversely affected our data nonetheless.

Conclusions

Efforts geared toward increasing maternal and family knowledge of obstetric danger signs will require innovative strategies to ensure adequate comprehension of health messages during ante-natal clinics and will likely require the identification of key opinion leaders such as chiefs, assembly members, TBAs, and CKIs who can serve as champions in broader community-based efforts. However, increasing knowledge will not likely be sufficient to change behaviour unless conscious efforts are made to integrate traditional beliefs and long-held cultural traditions with current public health recommendations. In addition, there is an urgent need to increase family involvement in maternal health services and empower women at the community level to reduce unnecessary delays in care seeking.

Contribution of Authors

Raymond A. Aborigo, Cyril M. Engmann, Cheryl A. Moyer and Philip B. Adongo conceived the study, participated in its design, data acquisition and analysis and helped draft the manuscript. Mira Gupta participated in data analysis and drafting of the manuscript. Pascale Allotey, John Williams and Abraham Hodgson had significant intellectual input into the analysis and drafting of the manuscript. All authors read and approved the final manuscript.

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RESEARCH ARTICLE Open Access

Infant nutrition in the first seven days of life in rural northern Ghana

Raymond Akawire Aborigo[1*], Cheryl A Moyer[2], Sarah Rominski[2], Philip Adongo[3], John Williams[1], Gideon Logonia[1], Gideon Affah[1], Abraham Hodgson[1] and Cyril Engmann[4]

Abstract

Background: Good nutrition is essential for increasing survival rates of infants. This study explored infant feeding practices in a resource-poor setting and assessed implications for future interventions focused on improving newborn health.

Methods: The study took place in the Kassena-Nankana District of the Upper East Region of northern Ghana. In-depth interviews were conducted with 35 women with newborn infants, 8 traditional birth attendants and local healers, and 16 community leaders. An additional 18 focus group discussions were conducted with household heads, compound heads and grandmothers. All interviews and discussions were audio taped, transcribed verbatim and analyzed using NVivo 9.0.

Results: Community members are knowledgeable about the importance of breastfeeding, and most women with newborn infants do attempt to breastfeed. However, data suggest that traditional practices related to breastfeeding and infant nutrition continue, despite knowledge of clinical guidelines. Such traditional practices include feeding newborn infants water, gripe water, local herbs, or traditionally meaningful foods such as water mixed with the flour of guinea corn (yara'na). In this region in Ghana, there are significant cultural traditions associated with breastfeeding. For example, colostrum from first-time mothers is often tested for bitterness by putting ants in it – a process that leads to a delay in initiating breastfeeding. Our data also indicate that grandmothers – typically the mother-in-laws – wield enormous power in these communities, and their desires significantly influence breastfeeding initiation, exclusivity, and maintenance.

Conclusion: Prelacteal feeding is still common in rural Ghana despite demonstrating high knowledge of appropriate feeding practices. Future interventions that focus on grandmothers and religious leaders are likely to prove valuable in changing community attitudes, beliefs, and practices with regard to infant nutrition.

Keywords: Infant feeding, Breastfeeding, Early neonatal, Neonatal

Background

Infant and young child nutrition is a vital component of childhood care and a major determinant of short- and long-term health outcomes in children [1]. Good infant nutrition stimulates intellectual development and is also associated with improved infant health, stronger im-mune systems, lower risk of non-communicable diseases (such asdiabetes and cardiovascular disease), and longev-ity [2]. Protecting, promoting and supporting infant and young child feeding is therefore essential for the healthy growth and development of children [3].

For newborn infants, the World Health Organization (WHO) and United Nations Children's Fund (UNICEF) endorse breastfeeding as an integral part of the repro-ductive process, the natural and ideal way of providing complete nutrition, and a process that provides a unique biological and emotional basis for child development [4]. The benefits of breast milk, which include reduced risk of diarrhea, pneumonia, otitis media and other infec-tions, have been well established [5,6] and the strategies to guide mothers to breastfeed appropriately are avail-able [3,7].

* Correspondence [redacted]
[1]Navrongo Health Research Centre, Post Office Box 114, Navrongo, Ghana Full list of author information is available at the end of the article

As a public health measure, the Global Strategy for Infant and Young Child Feeding jointly developed by WHO and UNICEF recommend initiation of breastfeed-ing within an hour of birth and exclusive breastfeeding for six months for all infants [7,8].This position was reaf-firmed in 2011 [9]. For a child to be exclusively breast-fed, there should be no prelacteal intake of anything solid or liquid other than breast milk, medications or vitamins. Giving a child any amount of water, gripe water, juice or porridge is not considered "exclusive breastfeeding." This recommendation is worldwide, ap-plying to infants of mothers in low- as well as high-income countries.

Breastfeeding should be initiated within an hour of birth and exclusively provided for the first six months of life [10].The introduction of supplementary feeding be-fore the age of six months in low-income countries has been associated with increased morbidity and mortality, especially from diarrhea and acute respiratory infections [10,11]. In a recent Cochrane review, the authors concluded that based on the results of two controlled trials and 18 other studies, exclusive breastfeeding for six months has several advantages over exclusive breastfeeding for three to four months. The main newborn advantage included a lower risk of gastrointestinal infection, although a reduced level of iron in some low –income settings was observed by some authors. For the mother, the main advantage was more rapid maternal weight loss after birth, and a delayed return of menstrual periods which can contribute to more favorable birth spacing. No reduced risks of other infections or of allergic dis-eases were reported [12].

Breast milk is widely available, economical, and sterile, yet many infants are not breastfed according to the recommendations [13,14]. Lauer and colleagues estimate exclusive breastfeeding in West Africa for infants under six months to be only 6.1% [15]. In Ghana, West Africa, where infant and neonatal mortality rates are 47 and 29 per 1000 live births respectively, 52% of mothers initiate early breastfeeding (i.e. within an hour of birth) and 63% report exclusively breastfeeding their infants for 6 months [16,17]. A recent study of 10,947 breastfed infants in the Kintampo district in Ghana found a marked dose–response relationship between delayed ini-tiation of breastfeeding (one hour to seven days), and neonatal death, with an overall 2.4 fold increase in neo-natal death with initiation later than one day [18].The authors concluded that all-cause neonatal mortality could be reduced by 16.3% if all infants initiated exclu-sive breastfeeding on day 1 of life and by 22.3% if initi-ation took place within the first hour.

Improving initiation and duration rates of breastfeed-ing represent a unique opportunity to modify neonatal and under–five mortality rates to achieve Millennium Development Goal 4. Despite a relatively high percentage of "exclusive breastfeeding" reported in Ghana [16,17], anecdotal experience suggests there may be regional differences. In addition, exactly what mothers feed their infants aside from breastmilk in rural Ghana is not well understood. The current study sought to answer the following research questions in one region in rural northern Ghana: 1) What do mothers with newborn infants report with regard to breastfeeding initiation and supplementation? and 2) Are there cultural practices that influence what infants are given in the first week of life in this region of Ghana? In exploring the answers to those research questions, we also aimed to address po-tential implications of our findings with regard to future interventions to improve the health of infants in rural northern Ghana.

Methods

Research site

The research was carried out in the Kassena-Nankana District (KND). The predominantly rural district has a population of 151,955 [16]. Two main ethnic groups in the district, the Kassenas and the Nankanis, share one hospital located in the administrative capital, Navrongo. In addition, five community health centres in the district provide static health services to the communities. Subsistence agriculture is predominant, and poverty is widespread. There is little electricity, few health facilities and many transportation challenges, all of which are representative of rural West Africa. The district is home to the Navrongo Health Research Centre (NHRC), which has been carrying out research in the area for more than 20 years.

Sampling

The Navrongo Health Demographic Surveillance System (NHDSS) that operates within the NHRC has demar-cated the Kassena-Nankana District into five zones to fa-cilitate the monitoring of demographic dynamics. The North and West zones are inhabited predominantly by Kassenas while the East and South are mostly Nankanis. In order to elicit ethnic differences in infant feeding practices if any, ethnicity was considered in the selection of participants and interviewees. For ease of data collec-tion, one zone was randomly selected – the North (Kasem) and South (Nankani) - for each of the ethnic groups. The Central zone, which hosts heterogeneous ethnic groups, was not included in the sample frame.

The targets of this research included women with newborn infants (including those who had delivered at home and in facilities), grandmothers, compound heads, household heads, community leaders, formal health care providers and traditional health care providers. In keeping with exploratory qualitative methodology, the

sampling strategy was developed to maximize the diversity of respondents selected and as such no formal sample size calculations were conducted. "Women with newborn infants" were defined as women who had delivered an infant more than 4 weeks prior but not longer than 8 weeks. This time frame was chosen to maximize their ability to remember details of the delivery experi-ence. "Grandmothers" were defined as any woman who had at least one grandchild born within the previous year. "Formal health care providers" included physicians, nurses, midwives, and medical assistants. "Traditional health care providers" included traditional birth attendants, herbalists, and other local healers not recognized by the medical establishment. In addition to women with newborn infants, a second group of mothers with newborns who were 7 days old (early neonatal period) were also interviewed.

Community Key Informants (CKIs),who work with the Navrongo Health Research Centre to routinely collect information on vital events that occur in their communities including births, deaths, pregnancies and marriages, were contacted for a list of mothers whose infants had reached 1 month of age. The list of mothers was then categorized based on literacy, place of delivery, and number of previous deliveries. These "stratifiers" were chosen to maximize the variability of our sample, assuming that women who delivered in a facility might have different attitudes and beliefs regarding breastfeeding and infant nutrition than women who delivered at home, for example. Similarly, women who have never experi-enced childbirth before the recent delivery may have dif-ferent perceptions than women who have had one or more previous deliveries. Within each of those groups, mothers who could be contacted immediately after the child was 29 days old were purposively selected for interview. Given the small and tight knit nature of these communities, minimal demographic information was collected on each respondent to ensure anonymity.

Health care providers working in the district were also interviewed. Eight IDIs were planned with nurses/midwives. Medical assistants sometimes stand in for midwives during deliveries, and thus medical assistants were asked to participate in IDIs as well. Medical doctors are generally found only in hospitals, thus selection of doctors for the IDIs was done at the district hospital. The Senior Medical Officer (SMO) in-charge of the district hospital was purposively selected while the second doctor was conveniently sampled on the day that the interview with the SMO was held.

Traditional Birth Attendants (TBAs), herbalists, and other local healers outside the formal health care system were purposively selected within the selected zones. Their selection was done through the CKIs who identi-fied potential respondents based on the individual's knowledge and/or involvement with maternal and child health at the community level.

With regard to focus groups, in each selected zone, five community clusters were randomly selected for the purpose of focus group recruitment. CKIs who live in those communities were consulted in identifying grandmothers with relevant experience in neonatal health residing within the selected clusters. Four focus group discussions were conducted with grandmothers. Each FGD included 8 − 10 grandmothers. In addition, a random list of 20 household heads and 20 compound heads from the same community was generated from the NHDSS database for focus group discussions with household heads and compound heads. The individuals were then contacted in the order that they appeared on the list and the first 12 to grant consent were invited to participate in the discussions.

Data collection

A variety of qualitative research techniques were used, including In-depth Interviews (IDIs) and Focus Group Discussions (FGDs). All IDI and FGD instruments were developed, pretested, and revised to ensure maximum comprehension. All interviews were conducted by trained field staff employed by the Navrongo Health Research Center (NHRC). Interviewers went through at least one week-long interviewer training session led by one of the co-investigators (RA), totaling nearly 25 hours of instruction and mock interviews. All interviewers conducted a pretest interview that was reviewed and discussed to optimize data collection and ensure consistency across the interviewers. Half of the interviewers had been through the training repeatedly, given that they had worked on several NHRC studies in the past.

A total of six individuals conducted the interviews and focus groups for this project. Four were Ghanaian (two were undergraduates, two were graduate students at a nearby university; three were male, one was female) and two were from the United States (both were female med-ical students). The American interviewers conducted inter-views with English-speaking health care providers; the Ghanaian interviewers conducted all remaining interviews. Ghanaian interviewers were fluent in both the respon-dent's native language (either Kasem or Nankani) but also in English, the official language in Ghana. Although the interviewers were fluent in the local languages, the inter-viewers did not come from the communities where the interviews were conducted. There were no known rela-tionships between interviewers and participants.

In-depth interviews (IDIs) were one-on-one interviews relying upon a semi-structured instrument and detailed probes to guide the discussion. The interviews occurred mostly in respondents' homes and in the health care setting (for the health care workers) and typically lasted

between 45 and 60 minutes. All interviews were audio recorded, and notes were kept on verbal and non-verbal communication by a second field team member present at each interview. The interviews were transcribed into English, with unique words and phrases or those that were difficult to translate remaining in the local lan-guage. Interviews with health care providers were con-ducted in English and transcribed verbatim.

Focus groups were conducted with participants typic-ally gathered in a semi-circle around the interviewer. Questions were posed to the group, and the interviewer took responses from participants one by one, moving the hand-held microphone closer to the respondent who was speaking. FGDs typically lasted between 60 and 90 minutes. All focus groups were audio recorded, con-ducted in the local language, and transcribed into Eng-lish as described above.

All transcribed data, including field notes, were read by at least three of the co-investigators (RA, CM, CE) and reviewed for completeness and clarity. Any sections of the interviews that were unclear were discussed as a group, including reviewing audio files and discussing the issues with the interviewers.

Data analysis

Three of the investigators (CE, CM, RA) conducted "in vivo" coding to assist in the identification of main codes. This involved making written notes on hard cop-ies of the transcripts and reviewing the notes together. From the in vivo coding, a preliminary coding structure was agreed upon and a codebook was created. At that point, all transcripts imported were into NVivo 9.0, a qualitative software analysis package. Focused coding (using the initial coding structure as a guide) was con-ducted by four separate coders, including one of the investigators (CM). The remaining three were master's trained public health researchers.

As coding progressed, additional codes and subcodes were added to the codebook and the information gleaned was fed back to the interviewers in the field. As a result, interviews in the latter half of the data collection period focused more tightly on the early neo-natal period. This was in response to perceived satur-ation of the prenatal codes and yet insufficient information about exactly what happens at the time of delivery.

Coders held regular coding meetings during which time the meanings of any code that came into question were revisited and discussed among the group. The codebook was revised to reflect inclusion and exclusion criteria that may not have arisen previously.

Ethical considerations

Prior to the commencement of the research study, per-mission was sought from local leaders to enter into their communities to conduct the study. Permission was also received from the District director of health services and the Senior Medical Officer in-charge of the hospital to carry out the interviews with their staff. Each inter-viewee or discussant also had the aims, objectives, risks and benefits of the study explained to them. Only indivi-duals who agreed to be interviewed or to participate in a discussion did so. Permission to audio record the inter-views and discussions was also sought from the participants.

Ethical approval for the study was sought and obtained from the institutional review boards of the Navrongo Health Research Centre, and the Universities of Mich-igan and University of North Carolina before initiating the study.

Results

A total of 253 individuals from the Kassena-Nankana district in Ghana participated in either in-depth inter-views or focus group discussions between July 1 and No-vember 1, 2010. In-depth Interviews were conducted with 35 women with newborn infants, 13 health care providers, 8 traditional birth attendants / herbalists, and 16 community leaders. In addition, focus group discus-sions were conducted with 81 grandmothers, 22 com-pound heads, and 78 heads of households (See Figure 1.)

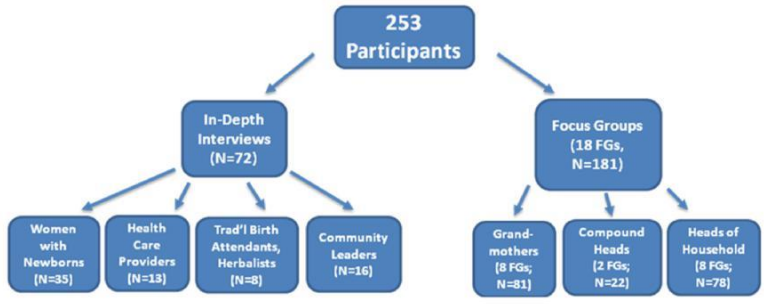

Figure 1 Participants [17].

Community knowledge of breastfeeding guidelines

Community members demonstrated knowledge of the recommended guidelines for newborn feeding. Most respondents reported being aware that the baby must be put to the breast immediately after delivery, breastfeeding should be on demand and that colostrum 'makes the baby healthy and strong. . .' (FGD, Compound Heads). Babies 'suck the colostrum because it cleans the dirt inside (the baby) and make him grow healthy' (FGD, Grandmothers). Community members also report an appreciation for the value of breastmilk: 'It is (the) milk that protects the baby against diseases.' (FGD, CompoundHeads).

Women with newborn infants and grandmothers in the community reported that nurses at antenatal clinics provided guidance on breastfeeding. Mothers are told 'to be allowing (their) babies to suck the first breast milk because it is good for their health' (FGD, Grandmothers), and that they should 'not give water until six months' time.' (IDI, mother of new born, one delivery). This was confirmed in the health worker interviews in the dia-logue below:

R: Well I know that these days, they are encouraging them to put the baby straight to the breast as soon as the baby is born.

M: So seconds?

R: Yes probably. Yes, seconds. Well I mean, once a midwife does the delivery, the first thing the midwife would do would be to try to encourage the woman to breastfeed. (IDI, Health Care provider)

However, awareness of the guidelines does not necessarily ensure appropriate breastfeeding practices. For instance, one grandmother reported that 'They have told us that the baby should not drink water until six months but some will ignore that and still give the baby water.' (FGDGrandmother).

Initiation and maintenance of breastfeeding

Participants in this study reported high levels of breastfeeding. Further, many respondents mentioned that mothers initiate breastfeeding within 30 to 60 minutes after delivery. Intervals between delivery and breastfeeding were reported to be influenced by place of delivery, sex of the child, availability of breast milk, bitterness of breast milk, and age of the mother. Typically, when a birth takes place in the community, some routines and rituals are performed before the baby is fed. These include cutting of the umbilical cord, bathing of both mother and baby, and washing of the breasts. Some of these routines are based on advice from health care providers.

The nurses have taught us that immediately (after) the baby is born and you cut the umbilical cord and the baby cries you have to teach the mother to wash her nipples very well. Then you hold the breast into the baby's mouth. If there is no breast milk and he continues suckling it will come. (FGD, Grandmother)

Some are however rooted in tradition. For instance, traditionally, 'if it is the woman's first delivery, it can take 3 or 4 days depending on the sex of the baby' (FGD, Household heads). One mother reported that 'On the first day, the baby did not breastfeed, the following day the baby did not breastfeed too, it was the third day that I breastfed the baby' (IDI, Mother of newborn).

Healthcare providers – both formal and traditional providers – said that women are encouraged to follow breastfeeding guidelines: that the child has to be put to the breast immediately after delivery, fed breastmilk alone for the first six months and only thereafter supple-ment breastmilk with family foods.

R: According to the breastfeeding practices in the hospital, exclusive breastfeeding is encouraged so immediately the baby is put to the breast. The baby is given to the mother to hold it and to start breastfeeding. (IDI, Health care provider)

M: Do mothers usually try to breast feed their babies after delivery?

R: Yes the mother is always trying to let the baby suck the breast because if he refuses to suck it means he is not well.

M: How soon after delivery?

R: Within some minutes
M: How many minutes?

R: Like five minutes (IDI, Traditional healthcare provider)

Mothers use varied signals such as the baby crying or anytime the baby sleeps and wakes up to determine whether their babies are hungry and need to be breast-fed or not. For instance, once 'a baby sleeps and wakes up, it is a must for the baby to breastfeed' (FGD, Grandmothers). Respondents found it difficult to estimate the frequency of breastfeeding for the first week of life. Those who tried to estimate the frequency of feeding gave figures ranging from 3 to 30 times a day or about 100 to 200 times a week.

Community members also reported practical difficul-ties in breastfeeding newborns. These range from mothers not knowing how to hold the breast properly to skills required to increase breast milk if the mother's supply is deemed inadequate. Some mothers are given
'local herbal concoctions to drink and some to massage the breast' (IDI, Mother of newborn, supervised delivery) to stimulate the production of breast milk. Others are also given yara'na (flour mixed with water) to drink.

I for instance, when I gave birth and I had no breast milk that is what they gave me (herbs that they peel from the back of trees) and I mixed them with millet flour with water and drunk it. When I drunk it, I saw changes in my breast milk; it gave me enough breast milk. (IDI, Mother of new born, 2 or more children).

Other methods of stimulating the production of breast milk include mixing millet flour with shea-butter and drinking it, massaging the breast with shea-butter and fetching the bark of a thorn tree and cooking it with vegetables for the lactating mother to eat. Also, where the mother cannot breastfeed, 'they will look for a nurs-ing mother who is around the community and let this woman breast feed the baby.'(FGD, Household head).
Respondents noted several factors that contribute to the early cessation of breastfeeding. Respondents indi-cated that anxiety is common among mothers whose babies do not feed well, which can result in disregard-ing feeding guidelines. One grandmother reported that although 'some women will say they have heard the law (guidelines regarding exclusive breastfeeding), but since she has not got enough breast milk to feed the baby, what will she do; they will still give the water and herbs to supplement the breast milk' (FGD, Grandmother). Data suggests that other mothers sim-ply did not want to breastfeed. Younger mothers were reported to be reluctant to breastfeed so that they can keep the shape of their breast. Healthcare providers also observed that some women have cracked and engorged nipples which make breastfeeding very pain-ful and therefore such mothers are not motivated to breastfeed.

Supplementary feeding

Newborns in the district are fed a wide variety of foods in addition to breastmilk. These include for-mula, gripe water, warm water, herbal concoctions and water from the flour of guinea corn (yara'na). Some mothers view gripe water as medicine for the baby. It is given to the baby in case of a stomachache. Warm water is usually fed to the child and it is meant to create 'appetite (for the baby) to be able to suck the mother's breast milk well' (FGD, Grandmothers). In cases where infants are not breastfeeding well, local healers often recommend supplemental feeding. As one grandmother described,

M: What do you normally do if a woman has breastfeeding difficulties?

R: Now if a woman has such a problem we send the baby to the healers and they will prescribe food to be bought for the baby to feed.(FGD, grandmother)

Cultural practices surrounding breastfeeding

Data suggests that there are several cultural traditions and practices associated with breastfeeding in this region of northern Ghana. Traditionally, first time mothers known as kacheeri in Kasem and sari sari doka in Nan-kani, are required to express their first milk into a con-tainer and put black ants in it to test for bitterness. If the ants succeed in crawling out, the milk is declared wholesome and the mother can go ahead and breastfeed. On the other hand, if the ants die, the breast milk is considered bitter (bisitoo in Nankani and yili-kweo in Kasem), dirty and poisonous and can give the child diar-rhea, which could lead to death. The mother must there-fore go through a rite called puure-nyoone in Kasem and wobi-biisa in Nankani, to purify the milk before initiat-ing breastfeeding. Puure-nyoone or wobi-biisa involves the use of herbs or shea-butter to rub or wash the breasts. The duration of puure-nyoone or wobi-biisa depends on the sex of the child. Generally, it lasts three days for mothers of male babies and four days for mothers of female babies. When a kacheeri or a sari sar-idoka has gone through these rites, it is assumed that the breastmilk is no longer bitter and the mother can initiate breastfeeding.

If it is the first time the woman delivers. They will press out the woman's breast milk into a container and put some ants inside it. If the ants die, it means the breast milk is bitter and not good for the baby but if the ants don't die then they will allow it to suck the breast milk. (FGD, Compound heads)

Also first-time mothers are expected to go through a cultural cleansing known as sooru in Kasem and kosoto in Nankani, regardless of the bitterness of their breast-milk. The process involves the pouring of warm herbal water over the mother for a period of three days if the child is a male and for four days if the child is female. In some communities, during the period of the cleansing, either a wet nurse is used or the child is fed on herbal teas because the mother is not allowed to breastfeed. While a new mother is going through sooru or kosoto,
'they would have boiled some herbs for the baby to be

drinking until it is ready to suck breast' (FGD, Household heads). These herbal concoctions include 'small quantities of the red millet, the ordinary millet, the shea nut shell and groundnut put together in water and boiled for the baby' (FGD, Grandmothers).

baby.' (FGD, Compound head) Also, the ritual of puure-

R:Some years ago when a woman delivered, they would go to another house to get another woman who had delivered not quiet long to come and feed the newly born baby until the day of pouring "sooru". On this day, the newborn would then be breast fed by its mother.

don't do those things.' (IDI, Mother of new born, 2 or

M:How long would it take to do all that?

R:If it was a boy it was three days, if it was a girl, four days for the Kassenas to pour "sooru." After that the baby could then be breast fed by the mother.(FGD, Compound Heads)

Despite multiple reports of this practice, some community members suggested that women are beginning to shy away from this practice because 'there are so many diseases with us so they (mothers) don't allow other nursing mothers to breast feed the babies' (FGD, Compound heads).

Finally, data suggest that traditional healers play an important role in helping women address breastfeeding problems, both through identifying nutritional supplements for the mother as described previously and assisting in cases where infants are not feeding properly. As one household head explained in the context of an in-fant not feeding, it is often important to 'consult our soothsayers to know why it (the infant) is not feeding and make sacrifice.' (FGD, Household heads).Sacrifices might include the killing of a chicken or other animal as an offering to the ancestors for assistance.

Macro-level themes

In addition to addressing tangible issues such as when and how breastfeeding is practiced in rural northern Ghana, the data collected here suggests three over-arching themes: 1) The importance of religion in influ-encing breastfeeding behaviors; 2) The critical role played by grandmothers; and 3) The influence of loca-tion of delivery on breastfeeding adoption and maintenance.

The role of Religion

Religion appeared to be associated with reported compliance with breastfeeding guidelines, with noticeable differences between Christians and those who practice traditional religion. Pouring of libation (pouring a religiously significant liquid on the ground as an offering to the ancestors) and feeding the baby ritual foods were activities reported frequently among those practicing traditional religion. 'On the day the baby is born, the baby will not be given anything. The compound head has to go and consult the gods before they can start to feed the

nyoone or wobi-biisa and sooru or kosoto that delay initiation of breastfeeding by 3 days for male babies and 4 days for female babies was reportedly a behavior of traditional worshippers. When asking about such rituals in Christian households, the responses were typified by the following mother's comment: 'We are Christians, we

more deliveries)

Grandmothers as Gatekeepers

The data also showed that grandmothers are extremely powerful figures in newborn health activities in this part of northern Ghana. The following exchange between an interviewer and two heads of households is particularly illustrative.

M: Does the baby's mother always try to feed it after it is born?

Household Head 1: Yes they try to breast feed it after delivery but the Grandmother . . . usually don't agree.

M: Why?

Household Head 1: They always say the first breast milk is bitter and not good for the baby's consumption.

Household Head 2: Yes that is what they say that it is not good for them since it is bitter. The mother's always want to, but the Grandmothers don't allow them to do so. (FGD, household heads)

Healthcare providers similarly note the influential role of grandmothers to promote unhealthy supplementary feeding;

(Water intake is one) habit which is a tradition which is dying a little hard. You have some of the old, you know here in this environment, the grandmothers, they have a lot of clout. When I say grandmothers, I mean, I'm talking about the mother-in-laws of the woman, the grandmother of the baby. So the mother-in-law of the woman.Their husband's mother.They (have) a lot of power. Usually they, the married woman lives in the husband's compound. So it's not her own mother who matters. Her mother is living elsewhere. So it's the husband's mother who calls the shots. And usually they want to bring their longtime experience in. . . So this is what we used to do, and this is what you've got to do. But I think that things are beginning to change

slowly. There are still some that think that the baby should be given water. Why shouldn't the baby be given water? This is a very hot environment, the baby is thirsty. So, we still suspect that some of them may quietly be giving water to the babies.
(IDI, Healthcare Provider)

Influence of delivery location

Data also suggest that many of the factors described vary by place of delivery. For example, one mother with a newborn infant suggested that 'When you deliver in the hospital, you breast feed it and continue at home,' (IDI, Mother new born, 2 or more deliveries) whereas delivering outside the hospital may prevent women from immediately breastfeeding or maintaining exclusive breastfeeding in the face of competing advice from traditional birth attendants, grandmothers, and other community members.

The role of colostrum also varies depending upon delivery location. As described, outside the hospital, colostrum is often tested to determine breast milk's suitability for an infant. Yet in hospital settings, 'these days, they make babies take colostrum at the hospital because it is thick and healthy' (FGD, Compound heads).

Discussion

This qualitative study among more than 250 individuals in rural northern Ghana suggests that community mem-bers are knowledgeable about the importance of breastfeeding, and most women with newborn infants do attempt to breastfeed. However, data suggests that traditional practices related to breastfeeding and infant nutrition continue, despite knowledge of clinical guidelines. Such traditional practices include feeding newborn infants water, gripe water, local herbs, or traditionally meaningful foods such as water from the flour of guinea corn(yara'na). These findings are similar to existing literature that suggests the introduction of foods other than breastmilk in the first 6 months is a common prac-tice in sub-Saharan Africa [19,20].

In this district of Ghana, there are significant cultural traditions associated with breastfeeding – including testing the breastmilk for bitterness before allowing a woman to breastfeed. Such a test – in which an ant is dropped into breastmilk and its demise is seen as an in-dication of the toxicity of the milk– is performed by grandmothers and other influential community mem-bers. Given the community hierarchy, such a tradition is likely to be challenging for a young mother with a new-born to overcome. Traditionally, breastfeeding is delayed by three days for male and four days for female infants by first time mothers if a test of the mother's milk shows that it is toxic. Also, prelacteal feeds are given or a wet nurse is used while the mother goes through the traditional process of purifying the breast. Changing such community-rooted traditions will require the en-gagement of the community hierarchy in breastfeeding campaigns.

Generally, there was a perception that most traditional ways of feeding infants are giving way to current recommendations. This transition is positive and appeared to be associated with religion. Individuals, who practice religions, such as Christianity, that prohibit the offering of sacrifices, consulting of sooth-sayers and performing rituals such as testing colostrum by putting ants in it, are more likely to promote and support appropriate in-fant feeding practices. Religious leaders could therefore, play a crucial role in shaping societal conduct towards breastfeeding.

Our data also indicate that grandmothers – typically the mother-in-laws – wield an enormous amount of power in these communities. These results are similar to other studies both in Ghana and beyond. In Eastern Ghana, Otoo et al.. found that one major barrier to breastfeeding cited by women was pressure from family, specifically, the grandmother [21]. The authors report women becoming confused by the mixed messages they receive and often defaulting to adding water or other supplemental foods [21]. Similarly, a study in Mozambique found that while mothers had heard the recommendation to exclusively breastfeed, other family decision makers had not and expressed skepticism about its feasibility [22].

Infant feeding is viewed traditionally as a gender role for women [23]. However, it was evident from our study that males also play a crucial role in influencing breastfeeding behavior. In the KND, compound and household heads are the gender roles of males and these groups demonstrated good knowledge of breastfeeding recommendations. Being a patriarchal society, men generally dictate the ways of life of the people. Men prepare the herbal teas, pour the libations and consult the sooth-sayers and these activities were reported to influence breastfeeding behavior. This finding corroborates with the study by Littman et al who found that a strong ap-proval of breastfeeding by fathers was associated with a high incidence of breastfeeding (98.1%), compared to only 26.9% breastfeeding when the father was indifferent to feeding choice ($P < 0.001$) [24].

Finally, our findings caution that conclusions about breastfeeding and supplemental feeding may be highly contingent upon where women delivered their babies. Babies delivered in a healthcare facility may be more likely to initiate breastfeeding early and maintain exclusive breastfeeding. In addition, our data suggest that women delivering in a facility may be more likely to give their babies colostrum than women delivering outside the facility. These findings are similar to those of

Tawiah-Agyemang et al. (2008) [19] in the middle belt of Ghana. Negative perceptions of colostrum have been well documented elsewhere and strategies to disabuse the minds of mothers and grandmothers have been developed by Linkages, Ghana [25,26]. However, aggres-sive campaigns and creation of community platforms to guide mothers to breastfeed appropriately have not been vigorously pursued.

Despite its strengths, there are limitations to this study. First, interviews were conducted by undergraduate- and graduate-student interviewers. It is possible that results might have been different if the community members perceived the interviewers to be more similar to themselves. It is also possible, on the other hand, that community members were less guarded among students than they might have been with local peers. Given the volume of information readily volun-teered and the 20-year history of the Navrongo Health Research Center conducting interviews in the commu-nity with interviewers very similar to those used in this study, we believe respondents were not inhibited by the student status of interviewers.

Second, this study relied upon self-reported data and does not include, for example, independent assessments of infant feeding practices. Nonetheless, the consistency of the findings and the wide variety of respondents who reported similar occurrences suggest that self-reported data in this case is valid. Finally, qualitative data were translated from the local language into English for ana-lysis. It is possible that nuances of meaning were lost in the translation process, despite our efforts to maintain the integrity of the data by retaining local words when no English translation was sufficient.

Implications

The results presented here have enormous implications for improving infant nutrition in rural Ghana. Perhaps most critically, our results suggest that while most women have heard and absorbed messages regarding ex-clusive breastfeeding, their family members may not. In a setting where decisions are often made by grand-mothers and husbands and community leaders rather than individual women, this suggests that public health interventions would be well served to target the broader community, specifically grandmothers, fathers and local healers when trying to increase appropriate breastfeed-ing rates. There is a precedent for this: One study in Senegal successfully utilized grandmothers to encourage pregnant women to reduce their workload during preg-nancy [27], while the Health Hut system also in Senegal has reported similar improvements in health care process indicators since the incorporation of grand-mothers and fathers [28]. We propose a similar intervention in northern Ghana, in the realm of optimal newborn health practices, specifically nutrition.

Our results also suggest that religious leaders may be an important target in improving early onset of breast-feeding, exclusive breastfeeding, and maintenance of breastfeeding. Religious practices, especially among those who practice traditional religion, appear to favor supplemental feeding from a very early age. Integrating religious leaders into future public health interventions has the potential to significantly alter community atti-tudes, beliefs, and norms with regard to what is appro-priate newborn nutrition.

Conclusions

In summary, our exploratory work suggests that delayed, supplemental and alternate breastfeeding practices abound in northern Ghana, despite respondents demon-strating deep knowledge of recommended feeding prac-tices. These practices, often imbued with great social and traditional significance may need to be re-evaluated in the light of the high neonatal and infant mortality rates in the region. Policy-makers and programmers will do well to incorporate the whole cross-section of the community in any discussion or interventional studies, especially grandmothers, fathers and religious leaders who play a pivotal role in determining newborn health practices in the home.

Abbreviations

WHO: World Health Organization; UNICEF: United Nations Children's Fund; KND: Kassena-Nankana District; NHRC: Navrongo Health Research Centre; NHDSS: Navrongo Health Demographic and Surveillance System; CKI: Community Key Informant; IDI: In-depth Interview; FGD: Focus Group Discussion; SMO: Senior Medical Officer; TBA: Traditional Birth Attendant.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

RA, CE, CM and PA conceived the study, participated in its design, data acquisition and analysis and helped draft the manuscript. SR participated in data analysis and drafting of the manuscript. GL and GA, helped in data acquisition and analysis. JW and AHhad significant intellectual input into the analysis and drafting of the manuscript. All authors read and approved the final manuscript.

Authors' information

RA, MPH, Senior Health Research Officer, Navrongo Health Research Centre. CE, MD, FAAP, Clinical Assistant Professor (Pediatrics), Maternal and Child health, University of North Carolina, Chapel Hill. CM, MPH, Managing Director of Global REACH at the University of Michigan Medical School and Research Investigator in the Department of Medical Education. SR, MPH, Research Associate at Global REACH, University of Michigan Medical School. JW, MD, MPH, MD, Principal Medical Officer/Clinical Research Fellow at the Navrongo Health Research Centre, PA, PHD, MA, Senior lecturer, School of Public Health, University of Ghana. GL, BA, Research Assistant, Navrongo Health Research Centre. GA, BA, Research Assistant, Navrongo Health Research Centre. AH, PhD, MD, MPH, Director, Health Research and Development Directorate, Ministry of Health, Ghana.

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Author details
[1]Navrongo Health Research Centre, Post Office Box 114, Navrongo, Ghana. [2]University of Michigan, Ann Arbor, Michigan, USA. [3]University of Ghana, Legon, Greater Accra Region, Ghana. [4]University of North Carolina, North Carolina, USA.

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Clean delivery practices in rural northern Ghana: a qualitative study of community and provider knowledge, attitudes, and beliefs

Cheryl A Moyer[1,5*], Raymond Akawire Aborigo[2], Gideon Logonia[2], Gideon Affah[2], Sarah Rominski[1], Philip B Adongo[3], John Williams[2], Abraham Hodgson[2] and Cyril Engmann[4]

Abstract

Background: Knowledge, attitudes and practices of community members and healthcare providers in rural northern Ghana regarding clean delivery are not well understood. This study explores hand washing/use of gloves during delivery, delivering on a clean surface, sterile cord cutting, appropriate cord tying, proper cord care following delivery, and infant bathing and cleanliness.

Methods: In-depth interviews and focus group discussions were audiotaped, transcribed, and analyzed using NVivo 9.0.

Results: 253 respondents participated, including women with newborn infants, grandmothers, household and compound heads, community leaders, traditional birth attendants, and formally trained health care providers. There is widespread understanding of the need for clean delivery to reduce the risk of infection to both mothers and their babies during and shortly after delivery. Despite this understanding, the use of gloves during delivery and hand washing during and after delivery were mentioned infrequently. The need for a clean delivery surface was raised repeatedly, including explicit discussion of avoiding delivering in the dirt. Many activities to do with cord care involved non-sterile materials and practices: 1) Cord cutting was done with a variety of tools, and the most commonly used were razor blades or scissors; 2) Cord tying utilized a variety of materials, including string, rope, thread, twigs, and clamps; and 3) Cord care often involved applying traditional salves to the cord - including shea butter, ground shea nuts, local herbs, local oil, or “red earth sand.” Keeping babies and their surroundings clean was mentioned repeatedly as an important way to keep babies from falling ill.

Conclusions: This study suggests a widespread understanding in rural northern Ghana of the need for clean delivery. Nonetheless, many recommended clean delivery practices are ignored. Overarching themes emerging from this study included the increasing use of facility-based delivery, the disconnect between healthcare providers and the community, and the critical role grandmothers play in ensuring clean delivery practices. Future interventions to address clean delivery and prevention of neonatal infections include educating healthcare providers about harmful traditional practices so they are specifically addressed, strengthening facilities, and incorporating influential community members such as grandmothers to ensure success.

Keywords: Global health, Maternal and child health, Cord care, Developing countries, Umbilicus

* Correspondence: [redacted]
[1]Global REACH, University of Michigan Medical School, 5115 Med Sci 1 1301 Catherine Street, Ann Arbor, MI 48104, USA
[5]Department of Medical Education, University of Michigan Medical School, Towsley Center, Ann Arbor, MI 48109, USA
Full list of author information is available at the end of the article

Background

The vast majority of the world's four million annual neonatal deaths occur in developing countries, and more than one-quarter of those can be attributed to infections [1,2]. Although great strides have been made to reduce under five deaths with immunizations, oral rehydration and control of acute respiratory infections, neonatal mortality in developing countries remains high [3].

In Ghana, West Africa, neonatal death rates are approximately 30/1000 live births [4,5]. In northern Ghana, a vital registration system has been in place for more than 20 years in the rural Upper East region. Current estimates from the Navrongo Demographic Surveillance System (NDSS) suggest that infections are responsible for at least 20% of early neonatal deaths (newborn death within the first seven days) in the district. [6] From 1995–2002 in the same district, 23% of early neonatal deaths and 66% of late neonatal deaths (those occurring between 7 and 28 days of life) were due to infectious causes [7].

Clean delivery – including clean hands, clean delivery surface, clean cord cutting and tying, proper cord care, and bathing – is a key intervention for reducing infections in newborns [8,9]. This is especially critical in the Upper East Region of northern Ghana, where 27% of deliveries were attended by a relative or other untrained assistant, 22% of deliveries were attended by traditional birth attendants (TBAs), and only 35% were attended by nurses, midwives or physicians (the remaining deliveries were unattended or attended by community health officers) [5]. In addition, nearly half of births occur at home. [5] In such a setting, community-based understanding of clean delivery practices are critical in reducing neonatal infections.

Research literature to date suggests wide national and regional variability across many of these practices, especially with regard to cord care following delivery (See Table 1). With two notable exceptions [10,11], very little published data exists from sub-Sarahan Africa pursuant to community attitudes, beliefs, and behaviors surround-ing clean delivery practices. Given the paucity of data and the likelihood of regional differences even within the same country, this research aimed to explore current knowledge, attitudes, and practice with regard to the six pillars of clean delivery seen in Figure 1 in the Kassena-Nankana district of the Upper East region of northern Ghana. The results of this formative study will be used to design an intervention study aimed at reducing neo-natal infection. Given that over 40% of under 5 mortality occurs in the first 28 days of life [1] and the neonate has a 45 times higher likelihood of death in the first 28 days than from day 29 to 5 years, [12] we believe the results of this study can have a significant impact on not only neonatal and infant mortality in northern Ghana, but also under five mortality as well.

Table 1 Cord Care Following Delivery

Substances applied to the cord	Country	Authors
Ash	Bangladesh	Alam et al., 2008 [13]; Mullany et al., 2007 [14]
Boric Powder	Bangladesh	Moran et al., 2009 [15]; Rahman et al., 2011 [16]
Coconut Oil	Bangladesh	Alam et al., 2008 [13]; Moran et al., 2009 [15]
Cow Dung	Pakistan	Mull et al., 1990 [17]
Ghee	Pakistan	Traverso et al., 1989 [18]; Khadduri et al., 2008 [19]
Mud	Nepal	Mullany et al., 2007 [14]
Mustard Oil	Bangladesh	Alam et al., 2008 [13]; Moran et al., 2009 [15]; Rahman et al., 2011 [16]; Mullany et al., 2007 [14]; Sreeramareddy et al., 2006 [20]
Shea Butter	Ghana	Hill et al., 2010 [10]
Sunflower Seed Oil*	Egypt	Darmstadt et al., 2004 [21]
Turmeric	Bangladesh	Alam et al., 2008 [13]; Rahman et al., 2011 [16]

*As part of a randomized controlled trail, demonstrated decreased infection rates.

Methods

Study setting

All data were collected by the Navrongo Health Re-search Centre (NHRC) in the Kassena-Nankana District (KND)[a] of the Upper East region of northern Ghana. Approximately 150,000 people live in the district, 90% in rural settlements. Subsistence agriculture is predomin-ant, and poverty is widespread. The district has one major hospital which acts as a referral hospital to five health centres. Navrongo is the district capital, with a population of approximately 20,000. Throughout the dis-trict there are few health facilities and many transporta-tion challenges.

Data collection

In-depth Interviews (IDIs) and Focus Group Discussions (FGDs) were conducted in the KND among women with newborn infants (including those who delivered at home and those who delivered in a health care facility), grand-mothers, and health care providers (both traditional and formally trained) (See Figure 2).

Identifying participants

For NDSS data collection, the two Kassena-Nankana dis-tricts have been divided into five zones – the East, West,

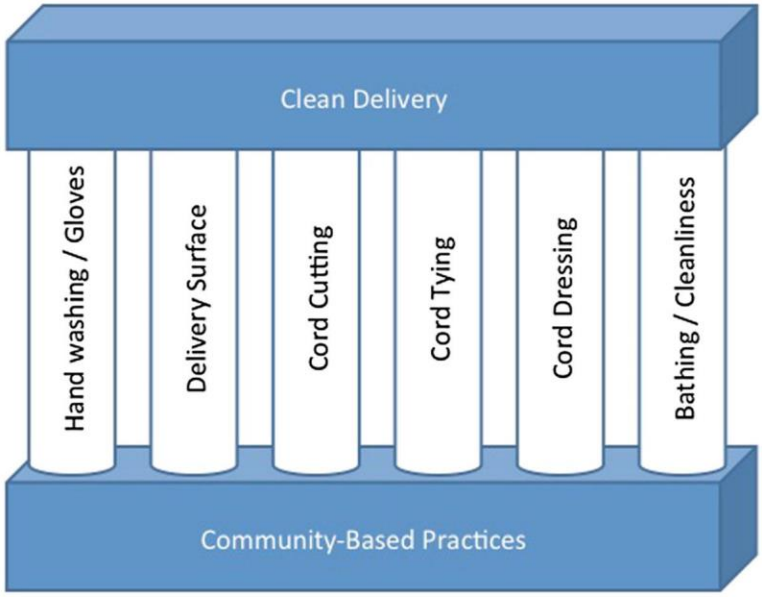

Figure 1 The Pillars of Clean Delivery.

North, South and Central zones. The zones are further divided into clusters. Two zones were randomly selected for inclusion in this research, and within each selected zone, 12 clusters were randomly selected. Community Key Informants (CKIs) living in the communities routinely collect information on vital events including births, deaths, pregnancies and marriages, and they were con-tacted for a list of mothers whose infants had reached 1 month of age. The list of mothers was then categorized based on literacy, place of delivery, and number of previ-ous deliveries. These "stratifiers" were chosen to maximize the variability of our sample, assuming that women who delivered in a facility would be likely to have different atti-tudes and beliefs than women who delivered at home, for example. Similarly, women who have never experienced childbirth before the recent delivery may have different perceptions than women who have had one or more previous deliveries. Within each of those groups, mothers who could be contacted immediately after the child is 29 days old were purposively selected for inter-view. In all, 24 interviews were planned with mothers of newborns.

Traditional Birth Attendants (TBAs), herbalists, and other local healers outside the formal health care system were purposely selected within the selected zones. Their selection was done through the CKIs who identified po-tential respondents based on the individual's knowledge and/or involvement with maternal and child health at the community level.

Health care providers working in the region were also interviewed. Eight IDIs were planned with nurses/mid-wives. Medical assistants (the equivalent of high school graduates with less than 2 years of healthcare training) often deliver babies, thus they were invited to participate

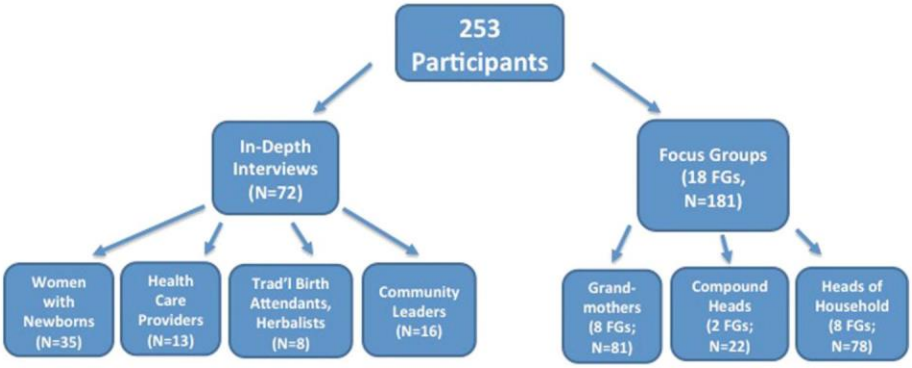

Figure 2 Research Participants & Operational Definitions.

in IDIs. In Navrongo, medical doctors practice in hospitals, and there is only one hospital in the district. Thus selection of doctors for the IDIs was done at the district hospital. The Senior Medical Officer (SMO) in-charge of the district hospital was purposively selected while the second doctor was conveniently sampled on the day that the interview with the SMO was held.

With regard to focus groups, in each selected zone, five clusters were randomly selected for the purpose of focus group recruitment. CKIs who live in those com-munities were consulted in identifying grandmothers with relevant experience in neonatal health residing within the selected clusters. Purposively selected grand-mothers were chosen to participate in an initial four focus group discussions. Each FGD included 8–10 grandmothers. Additional FGDs were added based upon the results of the first four.

Interviews and focus group discussions were con-ducted until thematic saturation was reached.

The interviewers

All interviews were conducted by trained field staff employed by the Navrongo Health Research Center (NHRC). Interviewers went through at least one week-long interviewer training session lead by one of the co-investigators (RA), totaling nearly 25 h of instruction and mock interviews. All interviewers conducted a pre-test interview that was reviewed and discussed to optimize data collection. Half of the interviewers had been through the training repeatedly, given that they had worked on several NHRC studies in the past.

A total of six individuals conducted the interviews and focus groups for this project. Four were Ghanaian (two were undergraduates, two were graduate students at a nearby university; three were male, one was female) and two were from the United States (both were female med-ical students). The American interviewers conducted inter-views with English-speaking health care providers; the Ghanaian interviewers conducted all remaining interviews. Ghanaian interviewers were fluent in both the respon-dent's native language (either Kasem or Nankani) but also in English, the official language in Ghana. Although the interviewers were fluent in the local languages, the inter-viewers did not come from the communities where the interviews were conducted. There were no known rela-tionships between interviewers and participants.

The interview process

In-depth interviews (IDIs) are one-on-one interviews between a field team member and a participant. Inter-viewers used a semi-structured instrument and detailed probes to guide the discussion. The "Saving newborn lives, tools for newborn health, 2004", published by Save the Children [22], was used as a framework for instrument development. The interviews occurred mostly in respondents' homes and in the health care setting (for the health care workers) and typically lasted between 45 and 60 min. Most were conducted in the mornings, but interviews were scheduled in the eve-nings and on weekends as necessary. All interviews were audio recorded, and notes were kept on verbal and non-verbal communication by a second field team member present at each interview. IDIs with women with newborn infants, traditional birth attendants, and herbalists were conducted in the respondent's native language (either Kasem or Nankana). The interviews were transcribed into English, with unique words and phrases or those that were difficult to translate remaining in the local language. Interviews with health care providers were conducted in English and tran-scribed verbatim.

The focus group process

Focus groups were conducted with 8–10 participants each, typically gathered in a semi-circle around the interviewer. Questions were posed to the group, and the interviewer took responses from participants one by one, moving the hand-held microphone closer to the re-spondent who was speaking. The note taker would keep track of respondents who appeared to be interested in speaking and would remind the interviewer to get back to that respondent before moving on to the next ques-tion. Similar to the individual interviews, FGDs typically lasted between 60 and 90 min. All focus groups were audio recorded, conducted in the local language, and transcribed into English as described above.

Permission and invitation to participate

Permission to conduct FGDs in the community was sought from compound or community leaders. Permis-sion to conduct the in-depth interviews at the health fa-cilities was sought from the appropriate authorities, such as the district director of health services, the SMO in-charge of the district hospital and the medical assistants in charge of the health centers.

Information about the objectives of the discussion and the purpose of the overall study were provided to each potential participant. Confidentiality with regard to their participation and anonymity with regard to their stored data were assured, and each participant was asked for his or her verbal consent to participate in the interview or focus group discussion. Permission to audio-record the discussions was also sought and obtained.

In conducting both IDIs and FGDs, each participant was assigned a unique ID number. The numbering sys-tem reflected the type of interaction (IDI vs FGD), the type of respondent (e.g. HCP for health care provider,

WNI for woman with newborn infant), the respondent's ethnicity (Kassena vs. Nankani), and the number of the interview. Thus IDI-WNI-K2 reflected an individual inter-view with a woman with a newborn infant of Kassena ethnicity.

Participants did not receive any monetary incentive for participating in the discussions. However, two cakes of soap were provided as a token of appreciation for participation. This study was approved by the institutional ethics review committees of the Navrongo Health Research Cen-ter, and the Universities of Michigan and North Carolina at Chapel Hill.

Interviewer debriefing sessions

Team debriefing sessions provided an opportunity for members of the qualitative field team to meet as a group to review and discuss their data collection activities. These debriefings were held periodically throughout the study period, and were facilitated by the project director. These sessions were designed to provide the team with an opportunity to reflect on the main themes emerging from the interviews, the degree to which inter-view themes or issues were showing up repeatedly, the emergence of conflicting findings as compared with information collected so far, information gaps for further follow-up, and aspects of the interview process that might need improvement. As a result of these debriefing sessions, the latter half of data collection was limited to an exclusive focus on the first seven days of life, rather than including the prenatal and extended post-natal period. In addition, these debriefing sessions led to the conduct of extra interviews with mothers and grand-mothers to ensure data saturation had been reached.

Data entry

All data were audiotaped using either digital audio-recorders or audiocassette recorders. Audiotaped data was transcribed into Microsoft Word for Windows. If portions of the audio tape were not clear, they were reviewed by all interviewers and the Project Director to determine if consensus could be reached about what was said. In the event that it was not possible to reach con-sensus, data were eliminated from the research record. Similarly, if there were discrepancies in interpretation through translation, all interviewers and the Project Director discussed the translation and came to consensus on the best translation. In select cases, the original word or phrase in Kasem or Nankani was left in the transcript. In addition, field notes taken using pen and paper were transcribed into the research record.

Transcripts were reviewed for obvious errors by both field staff and one of the investigators. Errors were cor-rected in the transcript only after discussing the transcrip-tion with the interviewer/transcriber to ensure appropriate meaning. For example, the term "outdooring" is used to denote a cultural milestone reflecting when a baby can be brought outside in Ghana. Yet when recorded and tran-scribed, the term "adoring" was sometimes substituted. After analysis of the context and discussion with the inter-viewers, such changes were made in the transcript.

Data analysis

All interviews were read by at least three of the investiga-tors (CE, CM, RA) and "in vivo" coding was conducted to assist in the identification of main codes. In vivo coding involves making written notes on hard copies of the tran-scripts and reviewing the notes together. From the in vivo coding, a preliminary coding structure was agreed upon and a codebook was created. At that point, all transcripts were entered into NVivo 9.0, a qualitative software analysis package. Focused coding (using the initial coding structure as a guide) was conducted by four separate coders, includ-ing one of the investigators (CM). The remaining three were master's trained public health researchers.

Coders held regular coding meetings during which time the meanings of any code that came into question were revisited and discussed among the group. The codebook was revised to reflect inclusion and exclusion criteria that may not have arisen previously.

Results

A total of 253 individuals from the Kassena-Nankana district in Ghana participated in either in-depth inter-views or focus group discussions between July 1 and November 1, 2010. In-depth Interviews were conducted with 35 women with newborn infants, 13 health care providers, 8 traditional birth attendants/herbalists, and 16 community leaders. In addition, focus group discus-sions were conducted with 81 grandmothers, 22 com-pound heads, and 78 heads of household. (See Figure 2.) In this community, 'grandmothers' most often referred to mothers-in-law, rather than the mother's mother. The majority of grandmothers interviewed discussed events that occurred with their son's wife and children. All women with newborn infants, traditional birth attendants, midwives, and grandmothers were female, however the majority of community leaders, traditional healers, compound heads, and heads of household were male.

Hand washing/glove usage

Hand washing and glove usage during delivery was rarely mentioned spontaneously by respondents.

"We don't use bare hands, we use gloves. And then we use clean, sterile gauze and cotton to deliver the woman. So the woman cannot get infection." – IDI with Kassena midwife

Health care providers expressed skepticism about the practices of the traditional birth attendants and other untrained providers with regard to hand washing:

"Maybe the local woman was just washed her hands with water and puts the hands inside to deliver the woman. . .. With their dirty hands can introduce infection into the woman's womb, can infect the child, the newborn baby," – IDI with Kassena healthcare provider

"In the local houses they can deliver a woman in

At least one of the traditional birth attendants described hand washing as important: "The one who is also going to assist her to deliver will wash her hand in a small plastic container and put on your gloves. . . . We do this because if your skin is having some dirt you can touch the baby with it and if there is any infection the baby will get it." However, the same traditional birth attendant described using melted shea butter on her hands during pelvic examinations and delivery.

Finally, many women described needing to bring money to pay for soap for nurses to wash their hands if they delivered at a facility. "When she gets to the hospital she has to buy everything like soap so that they can use to wash hands and other things after delivery." (IDI with women's group leader) Table 2 illustrates the variability of responses across the groups of respondents.

the major causes of neonatal mortality here." – IDI with

Delivery surface

Women reported giving birth on a variety of delivery surfaces, including beds with rubber sheets at the hospital, on a mattress or sheet or pile of old rags on the floor at home, in the dirt in the yard, or even on a rock.

But they also have animals in the yard which are being

"I gave birth to the baby on a rock (laughing). I was attending to nature's call (attending to toilet) when I gave birth. We were all sitting outside together when they went inside and let me alone so I decided to go towards the rock to ease myself, it was when I squatted to ease myself that the baby came out." – IDI with Nankam mother with newborn infant

community leaders, and health care providers – indi-

Some women indicated that the baby stays where it was delivered until after delivery is complete: "The baby lies in the blood until the placenta comes out, or when (it) is taking too long the cord is cut and baby is bath while the cord tied," (Women's group leader) Other women and most health care providers report that the baby is immediately placed with its mother. "Immediately the midwife removes the child, she places the child on the mother's tummy before the cord will be cut and then all that." (IDI with healthcare provider (nurse))

Most women appreciated the need for a clean delivery surface as a means of preventing infection in their babies:

> "They have been telling us to deliver in the facilities because they have beds and everything to deliver a woman, but at home you will just deliver on the floor which is very dirty and can make the baby sick," – IDI with Kassena woman with newborn infant

> the sand if it becomes critical, but for the nurses, even if it is an emergency they will clean the place before the woman will deliver to avoid the baby from get any infections. The old women, when it becomes critical, they can deliver you in the middle of the road when they do not have anything to spread on the ground for you to deliver on and they have also said such things will give the baby some infections." – IDI with Nankam woman with newborn infant

Healthcare providers reiterated the importance of a clean delivery surface: "Oh that is very paramount because, uh, if the environment is not clean, clearly there will be infection. Not only to the woman but also to the newborn. Yes. And clearly we have septicemia as one of

healthcare provider (physician)

Healthcare providers also indicated that finding a clean delivery surface during home deliveries can be challenging, given the agrarian nature of much of the region: "I am talking about especially in the rural areas, you see the typical compound is around these, um, animal farms.

bred. The animal dung is being collected as manure during the farming season. . . which is very good. But the problem is, during the dry season or even the rainy season, before you enter the home you have to step on this. And then you get it into the room, more or less infecting the room every now and then. You see. And that is a problem." – IDI with healthcare provider

Most respondents – including mothers, grandmothers,

cated that clinic deliveries were more likely to yield a clean delivery than home deliveries.

Cord cutting and cord tying

Respondents indicated that the umbilical cord was cut within a few minutes of delivery, but exactly who cut the cord varied. (See Table 2) Some respondents reported adhering to traditional practices during cord cutting, including covering the mother's face so she could not see what was happening. "They say it will spoil the eyes of

Table 2 Representative Quotes from Respondents regarding the Pillars of Clean Delivery and Overarching Themes

TOPIC	REPRESENTATIVE QUOTES		
	Health Care Provider	Traditional Birth Attendant	Community Member
Hand Washing/Glove Usage	"(If) we can't get gloves, then you wash your hands very well with soap and water. And then you do what you have to do. And the incidence of cord sepsis, septicemia, other infections, will be much, much lower." – IDI with physician	"When you are called and you get there, you first ask if her water is broken, or better still you wash your hands and wear gloves (to) check her cervix to see if the baby has turned. . ." – IDI with TBA	"In the house delivery, the women who have been trained to assist in delivery do not wear anything on their hands to protect their hands and the baby. If they come they just use their bare hand like that to hold the baby. Assuming there is a cut on her hand she can infect the baby if she has any disease." –IDI with woman with newborn infant
Delivery Surface	"Immediately the midwife removes the child, she places the child on the mother's tummy before the cord will be cut and then all that." – IDI with nurse	"At home birth they deliver on the floor which contains dirt and that can affect the baby with diseases, but in the clinic where you deliver on a bed it doesn't have dirt and the floor is clean also" – IDI with TBA	"If you deliver in the filthy place the baby will get all kids of disease when the baby is still small and you will not know what to do, but when she deliver in a clean place you pick your baby very clean and bath for the baby." FGD with Nankam grandmother
Cord Cutting and Cord Tying	"There's a problem with the home deliveries, they may use all kinds of non-sterile things to cut the cord, or to tie the cord." - IDI with physician	"(The cord was cut) just immediately after I delivered. It didn't take more than 5 min. They tied it with the rag." – IDI with TBA	"Usually they cut the umbilical cord with a blade and tie it well to stop the blood. Bath (the baby) and wrap it with rags and put it by the mother's side on the bed for it to suck the breast milk."- IDI with woman with newborn infant
Who Cuts the Cord?	"The cord is cut by the attending midwife or the assistant." – IDI with physician	"The nurse will cut the umbilical cord and clean it and give it medicine." – IDI with TBA	"It depends on those who are around to support you to deliver. If there is a nurse she will cut the cord with a scissor and if there is a TBA, she will also use a blade to cut the umbilical cord." – IDI with woman with newborn infant
Cord Dressing	"We try to tell them to clean it. They should always clean it, make it dry. . . And it should be dry, it should not be wet. . . they should let air to it so it can dry." – IDI with nurse/midwife	"We normally clean it and use clean Shea-butter to apply on it, is not all batter you can apply on it." – IDI with TBA	"They use shea butter because they said if you do not use the shea butter, water will enter the sore and it will swell up." – IDI with woman with newborn infant
Bathing/Cleanliness	"We tell them to bathe these babies twice a day, to keep the baby, the cord dry, and to wear protective clothings for the child, to sleep under ITN, and to feed this baby on demand. She should always clean her hands well when she does any work and before touching that baby." – IDI with healthcare provider	"It is true no one wants to be dirty, how less to deliver at a dirty environment, that (is) why the hospital delivery is best. The baby is normally delivered with dirty water, and after cleaning and bathing when you place and cover the baby with dirty things, what have you done?" – IDI with TBA	"The first week if the baby is not well catered for, if it is been laid in dirty places, and if mother doesn't bath well and clean the nipples well for the baby to suck, I think this can make the baby sick." - IDI with assembly woman
Increasing Facility-Based Delivery	"We tell them the home, there are so many hazards. Because you can deliver and start (getting) dizzy, and then they don't know how to arrest the hemorrhage. You may deliver the child and the child may not be breathing, or maybe if there is some placenta or cord around the, um, they will not identify it. So when they come here we identify all those things. And these days there are so many conditions, diseases." - IDI with healthcare provider	It is better to give birth in the hospital than giving birth in the house. Because in the hospital they have everything like beds, water, drugs for delivery. . . Most (women) know because we have spoken to them and they understand us that the hospital have benefits for them. For that matter, they don't call me before they go to the hospital and give birth. – IDI with TBA	"For us in the olden days we will stay in the house and will be commanding the woman to push and all of a sudden you will see the woman is lying dead and we will carry her to go and bury. So this is the reason why we have accepted the hospital for women to go and deliver there." – FGD with Nankam grandmother

Table 2 Representative Quotes from Respondents regarding the Pillars of Clean Delivery and Overarching Themes (Continued)

The role of Grandmothers	"Usually they don't even allow the mother to bathe her own baby. . . . Because her own mother, the baby's own mother, is not supposed to be experienced enough." – IDI with healthcare provider	(For women who won't breast feed) "Grandmother should see to it that they will force such women to breastfeed their children." – IDI with TBA"It is the grandmother who is always with the baby so if the baby is not well, the grandmother will tell the mother of the baby to inform the baby's father about it, or today I want you to take the baby to the hospital." – IDI with TBA	"We grandmothers know how to bath the babies because their mothers don't know, especially mothers who have delivered for the first time." –FGD with Kassena grandmother
Disconnect between health care providers and community members	The other issue too also has to do with the perceived attitude of health workers to, to these, to these women. They (the women) feel they don't, they, they, they get treated like equals. They don't want to come into the hospital. Health workers are perceived to be judgmental, so a lot of people stay away from, from these hospitals." - IDI with physician	"The baby could have 'weni-niila' (fit) the way the baby's neck is turning backwards. . . for the 'weni-niila' one can go to hospital many times but western medicine cannot cure it unless the fellow uses traditional medicine. . ." –IDI with TBA	"Within one week you have to give a name to the baby in case the VAST worker comes around. Secondly, there are also people who come to register the babies for the birth certificates so the moment you give birth these people are around to take the name of the baby."* – IDI with woman with newborn infant

* Traditionally, babies are not named immediately. It may take anywhere from a few days to more than a month before some families will name their infants.

the mother that is why they use the broken calabash to cover their faces before they will cut the umbilical cord." – IDI with Nankam mother with newborn infant

According to respondents, the cord is typically cut with scissors or a razor blade. Among the 35 recently-delivered women in our sample, 16 women reported the use of scissors, 6 reported the use of a razor, and 13 admitted they didn't know what was used.

Unprompted, some women described the importance of sterility when cutting the cord: "People are saying that they use contaminated instruments to cut the cord thus infecting it with tetanus, but in the clinic it is not like that so that is why everyone want to deliver in the clinic." – IDI with Kassena mother with a newborn infant

Respondents indicated a variety of non-sterile tools with which the cords were tied, including rags, twigs, a piece of linen, a piece of string, a small rope, or a plastic clamp. Respondents described the importance of tying the cord to stop bleeding as well as to prevent infection, but local health care providers expressed concerns about traditional practices. "There's a problem with the home deliveries, they may use all kinds of nonsterile things to cut the cord, or to tie the cord." – IDI with healthcare provider (physician)

Cord dressing

When asked about how the cord was cared for following delivery, community members reported unanimous awareness of the need to treat the cord appropriately. As one grandmother reported,

"When you are also treating the cord, you have to take good care of it so that dirt will not enter it for it to get rotten and breed maggots because this is where you will not feel comfortable taking care of it." – FGD with Nankam grandmother

"Since there is a sore, if . . . the one bathing the baby does not blow out the water from the navel after bathing the baby, it will rot. That is why we use shea butter on it to cover the red part." – FGD with Nankam grandmother

To prevent excessive moisture and dirt from getting on the cord, mothers and grandmothers report covering the cord with shea butter, ground shea nuts, local herbs, local oil, or "red earth sand." (See Table 3) Another community member described using the juice of a local plant to assist in cord healing.

Health care providers reported that women are advised to put nothing on the cord. One midwife said that she advises women that "if there's no infection it necroses and then dry off." Another midwife reiterated:

Table 3 Summary of Cord Treatment in our Sample (N = 35)

Was anything put on the umbilical cord?	
Don't know =	6 (17.1%)
No =	4 (11.4%)
Yes =	25 (71.4%)
What was put on the umbilical cord?	(27 out of 35 provided a response)
12/27 (44.4%)	Shea Butter Alone
6/27 (22.2%)	Combination (oil and spirits, spirits and plaster, earth and juice from pou plant, shea butter and ground shea nuts)
4/27 (14.8%)	Nothing
3/27 (11.1%)	Oil Alone
1/27 (3.7%)	Ground Shea Nuts Alone
1/27 (3.7%)	Spirits (alcohol)

"They shouldn't use anything. Like this local things like cow dungs. That eh, that is the, the olden days. They used the cow dungs to cover the cords. And some use shea butter to cover the cord up. So that can bring, especially cow dung, it can bring infection. Especially tetanus. Neonatal tetanus. And now they don't do it." – IDI with healthcare provider (midwife)

Bathing/cleanliness

Cleanliness (known as "yeera Kweem" or personal hygiene in Kassem), and maintaining clean surroundings were mentioned in a variety of contexts, including breastfeeding, sleeping quarters, and bathing babies frequently.

Women, grandmothers, and community leaders spoke about the need to keep a woman's breasts clean prior to breastfeeding an infant:

"The nurses have taught us that immediately the baby is born and you cut the umbilical cord and the baby cries you have to teach the mother wash her nipples very well. Then you hold the breast into the baby's mouth." – FGD with Nankam grandmother

They also spoke about the need for general cleanliness: "When the woman returns from nature's call she has to wash her hands before she can pick/carry the baby. If the woman does not wash her hands and picks the baby, the baby can get some infection and become sick." – FGD with household head

Health care providers also reported that new mothers needed to pay more vigilant attention to cleanliness than other community members:

"They (young mothers) should be sure every morning they should clean their surroundings, wash their cooking utensils, fetch good drinking water, and then the food they eat, especially the mother if they eat it, clean, cooked food so that she doesn't get any sickness. And then where the baby is lying should be clean. All the baby's clothes should be clean. Then they should bathe, the mother and the baby should bathe morning and evening." – IDI with healthcare provider (nurse)

Respondents reported that clean sleeping quarters were an important part of preventing infections.

"After delivery you have to make sure that where the baby is sleeping is clean of dirt so that the baby will not be infected because we know that most of the infections are through dirty places." FGD with Nankam household head

"If the sleeping place is not clean or if you don't wash it clothes or if you don't cover it well. It can get cold and fall sick." – IDI with Kassena woman with newborn infant

Bathing was mentioned frequently across all types of respondents, the majority of which cited the relationship between frequent baths and reducing the risk of infection.

"If you cannot keep good hygiene the infections will be there like that. If you do not wash the clothes of the baby and do not dry them if the baby wets them when you wake up in the morning but keep them like that it will give the baby some infections." – FGD with Nankam grandmother

Bathing appears to be most often left to the purview of grandmothers. To the question, "Who typically baths the babies?" the response in a focus group of grand-mothers was resounding: "We, the 'kazina'" (Kasem for grandmother) This response was reiterated among women with newborn infants. Out of the 35 women with newborn infants who were interviewed, 24 of them indicated it was their mothers or their husband's mothers who bathed their babies.

There was general agreement that warm water was used to bathe the babies, but no consensus as to why warm water was used rather than cold water. One Nan-kam mother's response was that they "use warm water because the baby's body is not yet strong."

Data also suggested inconsistencies with regard to when the babies were bathed. Some mentioned bathing infants shortly after delivery, while others mentioned waiting until later in the day to bathe. None described waiting more than a few hours before bathing.

Overarching themes

Data suggested several overarching themes that supersede the six prevention practices. First, the proportion of women in the community who deliver their infants in facilities appears to be increasing. Second, grandmothers have an extremely powerful social position that influences young mother's behavior. Finally, there appears to be a disconnect between health care providers and the community members in terms of their understanding of ideal and actual maternal and child health behaviors.

Increasing facility based delivery

As one new mother said, "Delivery at clinic and home delivery are not the same because you can deliver safely in the clinic since they have everything there." (IDI with Nankam mother with newborn) Data indicate that attitudes toward delivering at a facility are changing throughout the community, with grandmothers, community leaders, and compound heads all suggesting that facilities are the safest places for women to deliver. (See Table 2.)

Grandmother's role

Another key finding in these data relates to the role of the grandmother in this rural region in Ghana. As was described, grandmothers are frequently in charge of bathing infants. They are also frequently cited as sources of information, decision-makers, and elders who command respect and are in a position of authority.

"It is the old ladies (that) advice them about where and how to sit to make their delivery easy and how it lies when the pregnancy is about some months."
–FGD with Nankam household head

In several interviews with women with newborn infants, grandmothers nearby repeatedly engaged in con-versation and provided answers for the new mothers, even after being asked to let the women answer them-selves. The women interviewed also repeatedly said they would do what their mothers and mother-in-laws told them, because that is how it is done. It was even sug-gested that the grandmother may have more influence than the baby's father: "Even though the father can also (give) advice. . . but that is what we the women do here."
– FGD with Kassena grandmother

Disconnect between providers and the community

Finally, the data collected in this study suggest that health care providers and community members are not always in agreement about what is happening in the community or what is happening in the health care facil-ities. One example of the disconnect between providers and new mothers in the community relates to what is being put on the umbilical cord. Health care providers unilaterally say that they tell women to put nothing on the cord. Yet more than 70% of the women in our sam-ple said they dressed the cord of their newborn with one of a variety of substances. (See Table 3) This example speaks to a broader issue of the relationship between patients and providers in this community. While many patients and providers expressed mutual respect for one another, Table 3 illustrates an example of the language that was repeatedly used to describe the tension between uneducated rural women and the nurses and midwives in the health centers. "Health workers are perceived to be judgmental, so a lot of people stay away. . ." – IDI with healthcare provider (physician)

Discussion

The data presented here suggest that there is widespread understanding of the need for clean delivery practices to reduce the risk of infection to both mothers and their babies. This understanding expands beyond the health care setting, where it might be expected, and into the rural community. Despite this understanding, when looking at six key clean delivery practices that can be targeted for intervention – hand washing/use of gloves during delivery, delivering on a clean surface, sterile cord cutting, appropriate cord tying, proper cord care following delivery, and infant bathing and cleanliness – each appears to have room for improvement in this rural area in Northern Ghana. Notably, behaviors appeared to differ based upon delivery location – with facility-based deliver-ies and deliveries attended by skilled birth attendants much more likely to comply with clean delivery recom-mendations than home deliveries and those attended by traditional or untrained attendants.

In our study, the use of gloves during delivery and hand washing during and after delivery were mentioned infrequently, despite repeated discussion of the need for cleanliness to avoid infant infections. This may be due in part to the open-ended nature of the interview tool – respondents were not directly asked, "What about hand washing?" However, it is noteworthy that discussions prompted by "What needs to be clean during delivery?" rarely included discussion of hand washing. Respondents frequently mentioned the need for a clean delivery surface, including explicit discussion of avoiding delivering in the dirt. However, at least 3 of the 35 recently-delivered mothers in our sample delivered their infants on the way to the facility, including deliveries alongside the road. Cord cutting was done with a variety of tools, the most common of which were razor blades or scis-sors. Cord tying also utilized a variety of non-sterile materials, including string, rope, thread, twigs, and clamps. These data suggest that applying traditional sal-ves to the cord – including shea butter, ground shea nuts, local herbs, local oil, or "red earth sand" – is still a common practice in this region of Ghana. The motivation behind doing so appears to be to prevent infection – "so that dirt will not enter it for it to get rotten." Finally, these data suggest an appreciation for the need to bathe infants frequently and keep their surroundings clean in order to prevent infection.

Our findings also suggest that this community is undergoing a shift toward a greater percentage of facility-based deliveries. These findings mirror results published elsewhere: in the northern region where our study was conducted, 2003 data suggests that 29% of women delivered in a health facility [23], whereas 2009-2010 data suggest that number has risen to nearly 70% (data not shown). This mirrors trends seen on the national level [5]. While this is good news from the per-spective of the World Health Organization's recommen-dation that all deliveries be attended by a skilled provider [24], it also suggests that facilities in this region need to be equipped to handle the increasing volume and complexity of patients. This may require additional staffing, re-training of existing staff, addition or renovation of physical infrastructure and close attention to quality improvement techniques. Perhaps most importantly, the technical skills of the providers need to be supplemented with an understanding of long-held traditional practices and beliefs. Community members and providers need to work together to ensure that birth traditions can be up-held in as clean a manner as possible in order to reduce cultural barriers to facility-based delivery.

These data also suggest that grandmothers are critical social gatekeepers, providing advice, guidance, and advo-cacy regarding how mothers and their babies ought to behave and be treated. While such a finding has been demonstrated in the context of breastfeeding [25-28], and while research in Ghana has supported the involve-ment of husbands as financial decision-makers [29], to date the literature has yet to demonstrate the import-ance of grandmothers in preventing neonatal infection. The data presented here suggest that future interven-tions and health promotion efforts are likely to be more successful if grandmothers are incorporated into the program planning and implementation phases.

Finally, these data suggest that health care providers and community members are not always in agreement with re-gard to maternal and child health practices. This suggests that not only do healthcare providers need to be educated

about broad community perceptions, but they need to proactively ask about them with individual patients. Per-haps most importantly, providers need to be willing to dis-cuss these issues openly and respectfully and work with patients and family members to find acceptable alternatives to traditional (or standard medical) practices. Providers also need to appreciate that unless acceptable solutions are devised, agreed-upon, and implemented collectively with a woman and her extended family, traditional prac-tices may be resumed once she leaves the hospital. The results presented here suggest that researchers and policy makers need to engage health care providers and commu-nity members in working together to help plan interven-tions that maximize community participation.

Our findings complement those by Hill et al., who reported on clean delivery practices in Central Ghana. [10] They interviewed women who had recently delivered (30 IDI and 2 FGD), traditional birth attendants and grandmothers (20 IDI and 6 FGD), and husbands (12 IDI and 2 FGD), and analyzed the prevalence of clean deliv-ery behaviors collected through a demographic surveil-lance system. In their study, they report that most women delivered on a covered surface, and had birth attendants who washed their hands, cut the cord with a new blade and tied it with a new thread. They also described as near universal the frequent application of products to the cord. Husbands were singled out as key in financial decision-making, thus the authors suggested incorporating them in home visits [29]. There are also important contrasts to the work by Hill et al. Our find-ings suggest that in Northern Ghana there may be a greater use of non-sterile materials to tie the cord such as twigs, string, rope and thread, as well as the use of contaminating materials on the umbilical cord, such as red earth soil, as well as local herbs and oils. While hus-bands were singled out as prime drivers of newborn healthcare decision in central Ghana, we noted the prominent role grandmothers play in the north.

Our findings also supplement four other studies in Africa that have addressed prevention of neonatal in-fection through community-based practices [11,30-32]. All four were intervention studies, yet Meegan et al. used their knowledge of community practices to in-form and shape their intervention. The authors con-ducted an evaluation of the effect of a health-promotion program on neonatal tetanus among the Maasai in Kenya and Tanzania. While traditional cord care among the Maasai includes packing the umbilical stump with cow dung, the authors were able to work with local leaders to encourage substituting washing the stump with water or milk instead. This resulted in a dramatic drop in neonatal tetanus rates (0.75 per 1000 births in the intervention areas vs 82 per 1000 births in the control areas). This is an example of working with the community to provide an acceptable substitute for long-held traditional infant care beliefs, something that our data suggest will be critical if we are to address neonatal infection rates in rural areas of developing countries.

Our results also complement research conducted out-side Africa. For example, Sreeramareddy et al. (2006) [20] found that in Nepal, only 16.2% of mothers who delivered at home used a clean home delivery kit, only 38.3% of the birth attendants had washed their hands prior to delivery, and nearly 94% of infants were given a bath shortly after birth [20]. As seen in Table 1, our find-ing regarding non-sterile substances being applied to the cord is not uncommon in the developing world. Mustard oil was applied to the cord in 22.1% of deliveries in Nepal.

We believe the research reported here has several key strengths. First, this study represents 253 individual respondents who completed in-depth interviews or parti-cipated in focus group discussions in 2010. The study includes a diversity of perspectives, including women with newborn infants, grandmothers, compound heads, com-munity leaders, formally-trained healthcare providers, and traditional healers. It also includes diversity within each of those groups. For example, among mothers, our sample includes women who delivered unassisted, assisted by a traditional birth attendant, or assisted by a skilled birth at-tendant. It includes women who delivered at home and in a variety of types of facilities, from the health center to the district hospital. It includes literate and illiterate women, women experiencing their first birth or one of many. And it includes women of both Nankani and Kasem ethnicity. This comprehensive approach helps ensure that our find-ings reflect a rich and variable portrait of newborn care in this region – including the influences of grandmothers, compound heads, community leaders, and health care providers.

Despite its strengths, there are limitations to this study. First, interviews were conducted by undergraduate- and graduate-student interviewers. It is possible that results might have been different if the community members per-ceived the interviewers to be more similar to themselves. It is also possible, on the other hand, that community members were less guarded among students than they might have been with local peers. Given the volume of in-formation readily volunteered and the 20-year history of conducting interviews in the community we believe respondents were not inhibited by the student status of interviewers. Finally, the design of this study did not in-clude an assessment of actual infections resulting from post-natal practices. Future experimental research is needed to assess the relationship between traditional and contemporary practices in rural northern Ghana in order to document actual neonatal infection rates. However,

given the formative, hypothesis-generating nature of this research, we believe our findings provide useful information to researchers, clinicians, and program planners in Ghana and beyond.

The results presented here provide an important backdrop against which future interventions can be planned. Newborn-care interventions are not new – the New-Hints Trial in central Ghana [10], Nepal's Safe Delivery Incentive Programme (SDIP) [33], and the Pregnancy and Village Outreach Tibet (PAVOT) program [34] are just a few examples of programmatic attempts to im-prove the way infants are handled upon delivery. How-ever, our results suggest that future interventions would benefit from thoughtful inclusion of grandmothers and other key community figures in addition to training traditional birth attendants and others who might attend home deliveries. Our results suggest that grandmothers play a very important role in infant care and must not be overlooked as important stakeholders with regard to infant care. In addition, our results uncover a notable disconnect between providers and community members – one that must be breached if future interventions are going to be successful.

Conclusions

In summary, our research suggests that in this region in northern Ghana, clean delivery is afforded a high priority among health care providers and community members. However, despite a widespread understanding of the importance of cleanliness as a means to preventing neo-natal infections, practices do not always reflect adequate implementation of clean delivery practices, especially in community settings. Grandmothers play a key role in all areas of post-delivery care, as do traditional community beliefs about what is appropriate. Health care providers appear to differ from community members in their views of ideal post-delivery care. This research raises critical questions about the disconnect between health care providers and community members and suggests that future maternal and child health interventions would be well-served to include grandmothers and other community figures.

Endnotes

[a]In 2008, the Kassena-Nankana District was split into two districts – Kassena-Nankana East and Kassena-Nankana West Districts. In this study, we use the original name – Kassena-Nankana District to refer to the two districts.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

CAM, MPH: Ms. M was involved in the conceptualization of the research, the development of the survey instrument, the development of the protocol, the coding and analysis of data, and the preparation of the manuscript. RAA, MPH: Mr. A was involved in the conceptualization of the research, the development of the survey instrument, the development of the protocol, the coding and analysis of data, and the preparation of the manuscript. GL, BA: Mr. L was involved in primary data collection as well as the coding and analysis of data and the preparation of the manuscript. GA, BA: Mr. A was involved in primary data collection as well as the coding and analysis of data and the preparation of the manuscript. SR, MPH: Ms. R was involved in the coding and analysis of data and the preparation of the manuscript. PB A, PhD: Dr. A was involved in the conceptualization of the research, the development of the survey instrument, the development of the protocol, the coding and analysis of data, and the preparation of the manuscript. JW, MD: Dr W was involved in the conceptualization of the research, analysis of data, preparation of the manuscript, and providing leadership and supervision to team members at the Navrongo Health Research Centre. AH, MD, PhD: Dr. H was involved in the conceptualization of the research, analysis of data, and preparation of the manuscript, and providing leadership and supervision to team members at the Navrongo Health Research Centre. CE, MD: Prof. E was involved in the conceptualization of the research, the development of the survey instrument, the development of the protocol, the coding and analysis of data, and the preparation of the manuscript. All authors read and approved the final manuscript.

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Author details

[1]Global REACH, University of Michigan Medical School, 5115 Med Sci 1 1301 Catherine Street, Ann Arbor, MI 48104, USA. [2]Navrongo Health Research Centre, PO Box 114, Navrongo, UE/R, Ghana. [3]Department of Social and Behavioral Science, School of Public Health, University of Ghana, Legon, Ghana. [4]University of North Carolina, CB# 7596, 4th Floor, UNC Hospitals, Chapel Hill, NC 27599-7596, USA. [5]Department of Medical Education, University of Michigan Medical School, Towsley Center, Ann Arbor MI 48109, USA.

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Maxwell Ayindenaba Dalaba [redacted]
Patricia Akweongo [redacted]
Raymond Akawire Aborigo [redacted]
Happiness Pius Saronga [redacted]
John Williams ([redacted]
Gifty Apiung Aninanya [redacted]
Rainer Sauerborn [redacted]
Svetla Loukanova [redacted]

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Cost to households in treating maternal complications in northern Ghana: a cross sectional study

Maxwell Ayindenaba Dalaba[1,2,* *]
Corresponding author
Email: [redacted]

Patricia Akweongo[3]
Email: [redacted]

Raymond Akawire Aborigo[2,4]
Email: [redacted]

Happiness Pius Saronga[1,5]
Email: [redacted]

John Williams[2]
Email: [redacted]

Gifty Apiung Aninanya[2]
Email: [redacted]

Rainer Sauerborn[1]
Email: [redacted]

Svetla Loukanova[1]
Email: [redacted]

[1] University of Heidelberg, Institute of Public Health, Heidelberg, Germany

[2] Navrongo Health Research Centre, Navrongo, Ghana

[3] University of Ghana, School of Public Health, Accra, Ghana

[4] Global Public Health, Monash University, Monash, Malaysia

[5] Behavioural Sciences Department, School of Public Health and Social Sciences, Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania

Abstract

Background

The cost of treating maternal complications has serious economic consequences to households and can hinder the utilization of maternal health care services at the health

facilities. This study estimated the cost of maternal complications to women and their households in the Kassena-Nankana district of northern Ghana.

Methods

We carried out a cross-sectional study between February and April 2014 in the Kassena-Nankana district. Out of a total of 296 women who were referred to the hospital for maternal complications from the health centre level, sixty of them were involved in the study. Socio-demographic data of respondents as well as direct and indirect costs involved in the management of the complications at the hospital were collected from the patient's perspective. Analysis was performed using STATA 11.

Results

Out of the 60 respondents, 60% (36) of them suffered complications due to prolonged labour, 17% (10) due to severe abdominal pain, 10%(6) due to anaemia/malaria and 7%(4) due to pre-eclampsia . Most of the women who had complications were primiparous and were between 21–25 years old. Transportation cost accounted for the largest cost, representing 32% of total cost of treatment. The median direct medical cost was US$8.68 per treatment, representing 44% of the total cost of treatment. Indirect costs accounted for the largest proportion of total cost (79%). Overall, the median expenditure by households on both direct and indirect costs per complication was US$32.03. Disaggregating costs by type of complication, costs ranged from a median of US$58.33 for pre-eclampsia to US$6.84 for haemorrrhage. The median number of days spent in the hospital was 2 days - five days for pre-eclampsia. About 33%(6) of households spent more than 5% of annual household expenditure and therefore faced catastrophic payments.

Conclusion

Although maternal health services are free in Ghana, women still incur substantial costs when complications occur and face the risk of incurring catastrophic health expenditure.

Keywords

Maternal complication, Pregnancy, Economic burden, Household cost, Kassena-Nankana district, Ghana

Background

Despite recent evidence of reduction in maternal mortality worldwide, most developing countries still lack behind in achieving MDG 5, which seeks to reduce the maternal mortality ratio by 75% (i.e. 5.5% annual decline) between 1990 and 2015 [1-3]. Globally, every day, about 800 women die from pregnancy-related complications and almost all these deaths occur in developing countries [3]. Women living in developing countries are 300 times more likely to die as a result of childbirth or pregnancy-related complications than women living in developed countries [4]. About 80% of these deaths are due to severe bleeding (hemorrhage), infections, high blood pressure (pre-eclampsia and eclampsia) and unsafe abortion [3].

Women who survive life-threatening maternal complications are known as near misses. Near misses are more common than maternal deaths [5,6]. Globally, about 15% of pregnant women suffer from maternal complications [7,8]. Accumulated evidence shows that most of these complications occur during childbirth and the postpartum period [9]. Global efforts towards improving maternal health during this period have focused on increasing access to skilled care during child birth and providing emergency obstetric care where complications occur [3]. However, most deliveries in the developing world occur at home, which poses challenges when complications occur [10]. Utilization of health facilities for maternal services in these settings is hindered by several factors including cost. Anecdotal evidence suggests that even where maternal services are free, there may be unofficial or under-the-table payments and buying drugs outside the health facility when health facilities are out of stock. Also, indirect costs such as transportation, food and lodging can hinder the utilisation of maternal health care services at health facilities [11].

Although Ghana has instituted free maternal health care, Safe Motherhood programmes among others, an estimated 41% of deliveries are not attended by skilled health care providers [12]. Maternal health services covered under the free maternal health care initiative include antenatal care, delivery, caesarean section, obstetric complications and postnatal care [13,14].

Despite these interventions, the maternal mortality ratio is substantially high at 350 /100,000 live births [15]. The incidence of maternal near misses has also been estimated within health facilities in urban Ghana to be 28.6 cases per 1,000 live births [12]. Cost of treating these complications have serious social and economic consequences for families [16-18]. However, beyond estimating the health burden, very few studies have estimated costs to patients or households in managing these complications [19,20]. Our study estimated the costs to households in the management of maternal complications based on referrals from peripheral health facilities to the next level of care (hospital).

Methods

Study site

The study was conducted in the Kassena-Nankana Districts (East and West) located in northern Ghana. For the purposes of this study, the two districts shall be referred to by their former name - the Kassena-Nankana District (KND). The KND has an area of about 1,675 square kilometres with a population of about 152,000 people [21]. Subsistence agriculture is the mainstay of the people. The district is characterized by a high poverty and mortality burden. The district is in one of the poorest regions in Ghana with poverty incidence of 88% [22,23]. Maternal mortality ratio for the period 1995–1996 was estimated at 637 / 100,000 live births but it declined to 373 maternal deaths per 100,000 live births based on an estimate for the period 2002–2004, representing a 40% reduction in the ratio [24].

With regards to health care, the KND has a district hospital located in the capital town (Navrongo) that serves as a referral point for all health facilities in the district. The hospital is the only health facility equipped to offer comprehensive emergency obstetric care in the district [11]. There are six health centres, one private clinic and twenty seven Community-based Health Planning and Services (CHPS) compounds. The CHPS initiative started in 1999 by the government of Ghana with the aim of increasing access to primary health care in the

entire country. In this initiative, midwives and community health nurses are trained and sent to rural communities to provide basic preventive and curative services as well as doorstep services. These include antenatal care, delivery and postnatal services [25].

Study design and data collection

A cross sectional quantitative survey design was employed in data collection. Data was collected between February and April 2014 from the patient's perspective. Two graduate research officers conducted all the interviews after two weeks of training on the study tools. Women with pregnancy-related complications were defined as women who were diagnosed by health staff during pregnancy or delivery to have a maternal complication and were referred from the health centre to the hospital for treatment. Data on all women who had pregnancy-related complications at the six main health centres in the district between April 2012 and March 2013 (12 month period) were obtained from the six health centres.

A total of 296 women with maternal complications were referred from the health centres to the hospital within the period. However, contact information for 145 cases were never recorded by the health centre and therefore could not be traced in the community. In addition, 91 women had migrated from the district when their homes were visited. Thus only 60 women who were met during our visits were interviewed. Information on socio-demographic characteristics, direct and indirect costs of treating the complications were obtained. The reasons for referral reported by the women were also obtained. Since the aim was to capture official and unofficial payments made by women, all expenditures incurred within the hospital and outside the hospital were included.

This study was part of a larger project (QUALMAT project) which aimed to improve quality of maternal and prenatal care in Ghana, Tanzania and Burkina Faso by testing two interventions: a computer-assisted clinical decision support system and performance-based incentives for improvement of the quality of maternal health services provided [26,27].

Ethics statement

Ethical approval was obtained from the ethics committee of the University of Heidelberg (S-173/2008) and the Institutional Review Board of the Navrongo Health Research Centre in Ghana (NHRCIRB 085) before the study was conducted. In addition, individual oral informed consent was obtained from respondents before being interviewed.

Data processing and analysis

Data were entered into Epidata 3.1 and exported into STATA 11.0© for analysis. Descriptive analysis on background characteristics of respondents was done. The direct out-of-pocket costs for each pregnancy-related complication were estimated. Direct and non-direct medical costs were estimated by summing the costs and means calculated. The direct medical costs covered out-of-pocket payments for drugs, laboratory tests and medical supplies. Direct non-medical costs included all expenditure made on food during the health seeking process and transportation to the hospital and back home. The transportation cost included both the woman and the person who accompanied her to the hospital. Indirect costs associated with productivity lost were estimated by multiplying the number of days spent at the hospital by the daily minimum wage for the year 2013 (GH¢5.24/US$2.8).This was calculated for both the patient and the caretaker. Pre-referral costs were not collected and for that matter are not

part of the analysis. Given that health centres are generally closer to the people, indirect cost such as transportation will be negligible. Also health centres do not have in-patient services hence costs related to in-patient care will be marginal.

To determine the financial impact of maternal complications for households, actual cost incurred by the household was measured in relation to average annual household expenditure obtained from the Ghana Living Standards Survey Report of the fifth round (GLSS 5)_ Gh¢1,918 (US$1009) [28]. Catastrophic Health Expenditure (CHE) was also assessed. CHE is when a household's out-of-pocket (OOP) payments are so high relative to its available resources which would require the household to forego the consumption of other essential goods and services [29]. Thus total OOP health care payments in excess of a certain threshold of household resources (household income, expenditure or consumption) are catastrophic. There is no consensus regarding the threshold for defining catastrophic health expenditures. Most authors have used threshold levels of 2.5%, 5%, 10% 15% and 20% of total household income.

All costs were collected in Ghana Cedis (GH¢) and results presented in US$. The US$ conversion was based on the average exchange rate for 2013 (1US$ = 1.9GH¢). Given that the numbers interviewed were small, results on expenditures are presented in median.

Results

Socio-demographic characteristic of respondents

Of the 60 women, majority were married 88% (53). The mean age was 26 years (median = 25; range = 16–39 years) with standard deviation of 6. Most of the women 34% (20) were between 21–25 years, 23% (14) were above 30 years and 23% (14) were less than 20 years old. Majority 57% (34) of the respondents were farmers/traders, 25% (15) were unemployed, 10% (6) were employed in the formal sector, 5% (3) were artisans and 3% (2) were students. In terms of education, 56% (34) of the respondents had basic level education (primary and junior secondary level), 22% (14) had post-basic education (secondary education or higher), and 22% (13) had no formal education. Majority of the women who had complications were primiparous 47% (28) (Table 1).

Table 1 Socio-demographic characteristic of respondents

Category	Sub-category	Frequency	Percentage (%)
Age	20 and below years	14	23
	21-25 years	20	34
	26-30 years	12	20
	Above 30 years	14	23
Marital status	Married	53	87
	Not married	8	13
Ethnicity	Kassena	28	47
	Nankana	32	53
Occupation	Unemployed	15	25
	Trader/farmer	34	57
	Artisan	3	5
	Formal sector employee	6	10
	Student	2	3
Education	No formal education	13	22
	Primary school	20	33
	Junior high school	14	23
	Senior high school	8	14
	Tertiary school	5	8
Parity	1	28	47
	2	16	27
	3	13	22
	4	2	3
	5	1	2

Type of complication and source of treatment

As shown in Table 2, more than half (60%) of the pregnancy-related complications reported by respondents resulted from prolonged labour (labour lasting more than 12 hours). About 17% (10) was due to severe abdominal pain, 10% (6) due to anaemia/malaria, and about 7% (4) due to pre-eclempsia. About 80% (49) of respondents sought care at a hospital and the remainder at a regional hospital.

Table 2 Distribution of pregnancy complications

Type of complication	Frequency	Percent (%)
Pre-eclampsia	4	6.7
Anaemia/malaria	6	10
Haemorrhage	2	3.3
Infection	2	3.3
Abdominal pains	10	16.7
Prolong labour	36	60
Total	60	100

Cost of treating pregnancy complications

Table 3 presents the main cost components for each of the five maternal complications. Of the 60 women who had complications, only 30% (18) incurred direct medical costs and 70% (42) reported zero direct medical cost. Out of the 18 women, the total direct medical cost emanating from drugs, laboratory services and scanning was US$543.68 and the median cost was US$8.68(IQR = 43.68) per treatment. Thus, 21% of the total cost of treatment was spent on direct medical costs (Figure 1). Most of these direct medical costs were incurred outside the hospital because of shortage/non-availability of prescribed drugs or non-availability of equipment. For instance, 2 years preceding the survey, the Navrongo hospital operated without an ultrasound scan. Accordingly, women had to obtain their scans from private sources which made them incur additional costs.

Table 3 Cost of treating pregnancy complications by type of complication (US$)

Type of complication	Variables	Food (US$)	Transportation (US$)	Drugs & medical supplies(US$)	Productivity lost (US$)	Total cost (US$)
Pre-eclampsia	Observation	4	4	3	4	4
	mean	24.87	10.13	39.82	14.48	79.35
	median	26.05	10.00	7.89	15.17	58.33
	IQR	16.58	13.42	98.95	9.65	64.65
	Total	99.47	40.53	119.47	57.92	317.39
Aneamia/Malaria	Observation	6	6	4	6	6
	mean	22.89	13.12	27.11	13.33	67.42
	median	14.21	14.63	28.95	8.27	56.76
	IQR	9.47	9.47	35.26	5.52	39.87
	Total	137.37	78.74	108.42	79.98	404.51
Haemorrhage	Observation	0	2	0	0	2
	mean	0	6.84	0	0	6.84
	median	0	6.84	0	0	6.84
	IQR	0	6.32	0	0	6.32
	Total	0	13.68	0	0	13.68
Infection	Observation	1	2	0	1	2
	mean	18.95	15.89	0	11.03	30.88
	median	18.95	15.89	0	11.03	30.88
	IQR	0.00	0.21	0	0	30.19
	Total	18.95	31.79	0	11.03	61.77
Abdominal pains	Observation	8	10	4	8	10
	mean	11.25	19.37	20.13	6.55	41.66
	median	11.84	20.53	7.37	6.89	38.67
	IQR	11.84	27.37	32.37	6.89	50.25
	Total	90.00	193.68	80.53	52.40	416.61
Prolong labour	Observation	32	36	7	32	36
	mean	13.62	13.40	33.61	7.93	39.09
	median	9.47	12.89	6.32	5.52	28.41
	IQR	11.84	15.26	60.53	6.89	37.09
	Total	435.79	482.32	235.26	253.73	1407.09
Total	Observation	51	60	18	51	60
	mean	15.33	14.01	30.20	8.92	43.68
	median	9.47	13.58	8.68	5.52	32.03
	IQR	14.21	16.05	43.68	8.27	42.55
	Total	781.58	840.74	543.68	455.05	2621.05

Figure 1 Cost components as a proportion of total cost.

The median transportation cost was US$13.48 (IQR = 16.05) per person (patient and person accompanying the patient) representing 32% of the total cost (Figure 1). Majority of the respondents were transported to the hospital with the official vehicle of the health centre (37%). Respondents reported paying between US$11 and US$13 to fuel the vehicle to the referral point. The median expenditure made on food for both patient and caretaker was estimated at US$9.47(IQR = 14.21) per person. In addition, median indirect cost attributed to productivity losses was estimated at US$5.2 (IQR = 8.27) per person.

Overall, the median expenditure made by households on both direct and indirect costs per complication was US$ 32.03(IQR = 42.55) per person. Indirect costs accounted for the largest proportion of total cost (79%). Disaggregating costs by type of complication, women who had pre-eclampsia spent more (median = US$58.33; IQR = US$64.65) than those who had other types of complications. Women with haemorrhage incurred the least cost (median = US$6.84; IQR = 6.32).

As shown in Table 4, the median number of days spent in the hospital was two days (mean = 3 days, IQR = 3). The median days varied from zero for haemorrhage to six days for pre-eclampsia.

Table 4 Mean number of days admitted at the hospital

Type of complication	Frequency	Mean (days)	Median (days)	Interquartile range(IQR)
Pre-eclampsia	4	5	6	3.5
Aneamia/malaria	6	5	3	2
Haemorrhage	2	0	0	0
Infection	2	2	2	4
Abdominal pains	10	2	2	2
Prolong labour	36	3	2	2
Total	60	3	2	3

Catastrophic health expenditure

Table 5 presents costs of maternal complication as a proportion of annual household expenditure for 2008 (US$1009). Payments for maternal complications amounted to about 3% of annual household expenditure. Pre-eclampsia and anemia/malaria accounted for the greatest burden on households (6% of annual household expenditure). Haemorrhage accounted for the least burden on households (1% of annual household expenditure). About 33%(6) of households spent more than 5% of annual household expenditure and therefore faced catastrophic payments (threshold at 5%).

Table 5 Median cost as a percentage of annual household expenditure

Type of complication	Median cost (US$)	Percentage of annual household expenditure (%)
Pre-eclampsia	58.33	6
Aneamia/Malaria	56.76	6
Haemorrhage	6.84	1
Infection	30.88	3
Abdominal pains	38.67	4
Prolong labour	28.41	3
Total	32.03	3

Limitation of the study

One limitation was the possibility of recall bias. Some expenditure could either have been overestimated or underestimated. We however recognize that health expenditure and hospitalization are critical events for low income families and therefore can easily be recollected. Field staff training also put emphasis on probing strategies to help mitigate the effect of recall bias.

Also, the study could not contact about 49% (145) of all cases due to the absence of contact details. It is worth noting that, as in many developing countries, home addresses in Ghana is a major challenge. However, the health centres are located within a demographic surveillance system which has developed a unique home address system with identity cards for all individuals in the district. This should have facilitated the recording of contact information which is part of the standard of care within the health care system. The nurses at the health centres however complained that most patients do not come with their identity cards and recalls often led to wrong addresses.

We did not include intangible costs in our analysis which therefore underestimated our cost results. Intangible costs relates to the reduced quality of life due to illness. It includes pain,

psychological pressure, reduced joy of life and social prestige due to the illness [30]. However, this cost component, though important, is difficult to measure and is therefore not usually included in cost studies.

Discussion

The results of this cross-sectional study showed that the economic burden of pregnancy complications to households (median = US$32.03) was high. This constitutes a large expenditure for households. Given a minimum monthly wage of about US$60 in Ghana, it implies that the amount spent on complications represented more than halve the monthly minimum wage earned by Ghanaians. In other words, expenditure for maternal complications amounted to about 3% of annual household expenditure. In fact, about 33% (at 5% threshold level) of the study participants faced catastrophic health expenditures. Given that the study district is in one of the poorest regions in Ghana with poverty incidence of 88% [22,23] suggests that majority of participants were already vulnerable to even the smallest expenditure on health care .As it has been reported elsewhere, household expenditure on pregnancy-related complications will not only deplete household resources, especially poor households, but also the household's ability to meet subsistence needs and therefore lead to poverty or deeper poverty [16-18]. Cost of seeking maternal care may prevent or delay women in seeking care [31], leading to deteriorating health, increased expenses and possible death. Although our study could not establish the magnitude of long term effects of complications, previous studies have revealed that women who experience maternal complications can suffer from other long term severe consequences and increase their risk of death [4,18,32].

The cost obtained in this study is lower than the cost of US$92 estimated in a similar study conducted in southern Ghana between 1999 and 2000 in hospitals [20]. The main reason for this difference could be due to the free maternal health care initiative introduced in Ghana in 2004 [33].With the free maternal health policy, all direct medical costs incurred in all public and accredited private health facilities are borne by the government.

Indirect costs constituted a major cost component (79%). This is worrying given that indirect costs are not covered by the free maternal health policy. Indirect costs such as transportation cost has been identified in many studies as a major obstacle to utilization of maternal health services [14,34-36]. In most poor rural settings such as the KND, free ambulance services are non-existent and social support schemes for the vulnerable are rare and yet provide the only viable option in the face of persistent government failures to respond to the needs of the population.

Our findings raise serious concerns about the context in which the free maternal health policy is being implemented. Maternal health services are not free if cost of medicines and services are still directly borne by patients. The policy can be deemed to have failed to ensure that cost of health services is not a barrier to access to emergency obstetric services. Women in the KND and others in similar settings still suffer huge financial risks in accessing maternal health services and the health system needs to respond appropriately. Our results are supported by Borghi et al. [20] who found similar expenditures in the southern part of the country.

The findings expose a critical limitation in the health system especially in preparing for maternal emergencies in referral facilities. A functional health system should maintain adequate and regular supply of essential medical supplies and equipment at referral hospitals. Current conditions at referral facilities however suggest otherwise, thus endangering the lives of women. Interventions such as the provision of essential maternal health care services, free maternal health care, maternity referral system have the propensity to reduce significantly, costs and consequences of pregnancy-related complications. However, implementation has been a major challenge [33,37], thus limiting their potential impact. This may be one of the critical challenges within health systems in the developing world that have slowed down progress towards achieving MDG5. More pragmatic efforts are urgently needed to improve implementation of these interventions including non-medical interventions such as ambulance services so as to reduce the financial burdens to women seeking emergency obstetric care.

Conclusions

Although, officially, maternal health services are free in Ghana, women in need of emergency obstetric care in formal health care facilities incur substantial costs and face the risk of incurring catastrophic health expenditure. The current health system within which the free maternal health service policy is being implemented is necessary but not sufficient to reduce the economic burden of treating maternal complications and to provide adequate financial protection to households. Enacting a policy without necessarily providing the enabling environment to maximize the outcomes puts a dent on the health system. In view of this we recommend the following:

1. That health facilities should be adequately equipped with both diagnostics and essential medicines to make the free maternal health care policy a reality.
2. That the provision of ambulance services and the inclusion of transportation costs in the free maternal health service policy may yield some dividends.
3. That a system for replenishing expenses related to ambulance services be instituted within the maternal health care policy to make it sustainable.
4. That poverty alleviation programmes that focus on women have the potential to make poor households resistant to health financial shocks and thus reduce the economic burden of treating illness and the risk of incurring catastrophic health expenditures due to maternal complications.
5. That more public education is required to encourage patients to carry their personal identity cards or house addresses when visiting health facilities in order to facilitate follow up visits.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

MAD, contributed in the conception and design, acquisition of data, analysis, interpretation and drafting of the manuscript. PA, SL contributed to the conception and design, interpretation and drafting of the manuscript. RAA, HPS, JW, GAA and RS contributed to

the interpretation of data and drafting the manuscript. All authors have given final approval of the version to be published.

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CLINICAL ARTICLE

Female autonomy and reported abortion-seeking in Ghana, West Africa

Sarah D. Rominski [a], Mira Gupta [a], Raymond Aborigo [b,c], Phillip Adongo [d], Cyril Engman [e], Abraham Hodgson [b,f], Cheryl Moyer [a,g]

[a] Global REACH, University of Michigan Medical School, Ann Arbor, USA
[b] Navrongo Health Research Centre, Ghana Health Service, Navrongo, Ghana
[c] Jeffrey Cheah School of Medicine and Health Sciences, MONASH University, Sunway Campus, Subang Jaya, Malaysia
[d] Department of Social and Behavioural Sciences, School of Public Health, University of Ghana, Accra, Ghana
[e] Department of Pediatrics and Maternal Child Health, Schools of Medicine and Public Health, University of North Carolina, Chapel Hill, USA
[f] Ghana Health Service, Accra, Ghana
[g] Department of Medical Education, University of Michigan Medical School, Ann Arbor, USA

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Objective: To investigate factors associated with self-reported pregnancy termination in Ghana and thereby ap-preciate the correlates of abortion-seeking in order to understand safe abortion care provision.

Methods: In a retrospective study, data from the Ghana 2008 Demographic and Health Survey were used to inves-tigate factors associated with self-reported pregnancy termination. Variables on an individual and household level were examined by both bivariate analyses and multivariate logistic regression. A five-point autonomy scale was created to explore the role of female autonomy in reported abortion-seeking behavior.

Results: Among 4916 women included in the survey, 791 (16.1%) reported having an abortion. Factors associated with abortion-seeking included being older, having attended school, and living in an urban versus a rural area. When entered into a logistic regression model with demographic control variables, every step up the autonomy scale (i.e. increasing autonomy) was associated with a 14.0% increased likelihood of reporting the termination of a pregnancy (P b 0.05).

Conclusion: Although health system barriers might play a role in preventing women from seeking safe abortion services, autonomy on an individual level is also important and needs to be addressed if women are to be empowered to seek safe abortion services.

1. Introduction

Complications from abortions are a major cause of maternal mortal-ity, especially in low- and middle-income countries. WHO estimates that 47 000 women die annually from unsafe abortion [1], which is defined as a procedure for terminating a pregnancy that is carried out either by individuals lacking the necessary skills or in an environment that does not conform to minimum medical standards, or both [2]. An estimated 21.2 million unsafe abortions occur each year [1], and a dis-proportionate number of these procedures occur in Africa [3].

To reduce the burden of disease and disability attributable to unsafe abortion, it has been suggested that legal barriers should be removed and healthcare providers should be trained in safe abortion proce-dures [4]. The West African nation of Ghana has taken both of these steps. Ghana liberalized the law governing abortion in 1985 and now has one of the most liberal abortion laws on the continent [5], permit-ting an abortion in the case of rape or incest, to save the life of the mother, to protect her mental or physical health, or in the case of malformation of the fetus. It also enables midwives—the healthcare pro-viders most common in rural parts of the country where complications from unsafe abortions are prevalent—to be accredited to provide safe abortion services.

In 2003, the objective "to provide abortion services as permitted by law" was also added to the National Reproductive Health Policy and Standards Document [6]. In addition, the Ghana Health Service pub-lished the document "Prevention and Management of Unsafe Abortion: Comprehensive Abortion Care Services; Standards and Protocols" in 2006 to guide the implementation of safe abortion services at govern-ment hospitals across the country as part of the country's Reproductive Health Strategy [7,8].

Despite these actions, complications from unsafe abortions continue to be a large contributor to maternal death and disability. According to the Ghana Medical Association, unsafe abortion is the leading cause of maternal mortality, accounting for 15%–30% of maternal deaths

Corresponding author at: University of Michigan Medical School, 240 Victor Vaughn Building, 3111 Catherine St, Ann Arbor, MI 48109, USA. [redacted]

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countrywide [9,10] and contributing a higher proportion of maternal deaths in rural as compared with urban areas [11]. Abortion com-plications are consistently a leading cause of admission to hospital, accounting for approximately 40% of all admissions to gynecologic wards [6,12,13].

Given that previous research has linked female autonomy in Sub-Saharan Africa to utilization of maternal health services [14], the aim of the present study was specifically to explore the role of female autonomy in reported abortion-seeking by using a nationally represen-tative sample to investigate not only the prevalence of abortion in Ghana at a countrywide level, but also the factors associated with abortion-seeking in Ghana.

2. Materials and methods

In this retrospective analysis, data on abortion were analyzed from the 2008 Ghana Demographic and Health Survey (DHS) [15], the fifth nationwide demographic health survey of its kind. These data were col-lected between January 1 and December 31, 2008, in Ghana as part of the global Demographic and Health Surveys Program. Because the study used publically available and anonymized secondary data, it was exempt from ethical review by the University of Michigan Institutional Review Board.

The study data were obtained from the global DHS Program website (http://dhsprogram.com/), and were already formatted for use in Stata (StataCorp, College Station, TX, USA). The 2008 sample included 12 323 households from all 10 geographic regions within Ghana. In half of the households selected, 5096 women aged 15 − 49 years were identified for a supplemental women's questionnaire. Interviews were completed with 4916 women, yielding a 97% response rate [15]. Data were weight-ed to ensure representation.
The women's questionnaire collected information about the women themselves and any children born to them within the previous 5 years. Topics included education, residential history, reproductive history, family planning, prenatal and delivery care, infant nutrition, vaccina-tions, childhood illnesses, childhood mortality, and marriage and sexual activity.

For the present study, the dependent variable of interest was abortion-seeking, which was based on the respondent's answer to the question of whether she had ever had a pregnancy that was terminated. Independent variables included factors previously found to be associated with abortion-seeking, including age, education (having ever attended school), marital status, urban residence, and wealth. Other factors in-cluded as control variables were number of children ever born, living in one of the three northern regions of the country (upper east, upper west, and northern), ever having used modern contraception, and iden-tifying as Muslim or Christian. The northern region variable was created on the basis of previous studies in these regions showing that abortion is seen not only as immoral but against nature [16], suggesting that women from these areas may be differentially able to seek abortion services owing to both a lack of healthcare services and sociocultural barriers.
Additional dichotomous variables were included to determine the impact of familiarity with the formal healthcare system ("have you sought care from a health clinic in the past 12 months," yes/no) and the impact of distance to a healthcare facility ("distance to a health facil-ity is a big barrier," yes/no).

To measure autonomy, a crude composite score was created by using the following generally accepted components of autonomy: women's freedom of movement (as measured by the respondent answering yes to the question of her ability to visit friends and family without permission from her partner); discretion over earned income (as measured by the respondent answering that she decides how to spend the money that she earns); decision-making related to economic matters (as measured by the respondent answering yes to the question of whether she makes decisions about purchases for daily needs); women's ability to control her sexual relationships (as measured by the respondent answering yes to the question "are you able to refuse to have sex with your partner?"); and decision-making related to health care (as assessed by the respondent answering no to a question about needing permission to seek personal healthcare) [14].
These components were framed into five questions to create the au-tonomy scale. First, can you visit families and friends without seeking permission? Second, who decides how money you earn is spent (answered as the respondent)? Third, who makes decisions about pur-chases for daily needs (answered as the respondent)? Fourth, can you refuse sex with your partner? Fifth, do you need permission to seek care at a health facility? For the purpose of the study, the overall women's autonomy variable used all five questions (Table 1). The au-tonomy variable was created by recoding variables into an additive scale, ranging from 0 to 5, where 5 was the most autonomous.

All analyses were conducted via Stata version 9 (Stata Corp). Inde-pendent variables were examined via bivariate χ^2 analysis and multi-variate logistic regression with abortion-seeking as the outcome of interest.

Multivariate logistic regression was conducted in stages, which first included only those variables found to be significant in a previous anal-ysis, and then included the additional variables described above. The final, full model was compared against the initial simpler model to de-termine goodness of fit via the Akaike information criterion (AIC) and Bayes information criterion (BIC). The AIC value for the simpler model was 4037.26, and the corresponding BIC was 4076.258, whereas the AIC for the full model was 2237.695 and the BIC was 2312.095, suggest-ing that the full model was an overall better fit of the data than the shorter model. For all analyses, P b 0.05 was considered statistically significant.

3. Results

Of the 4916 women included in the 2008 Ghana DHS, 791 (16.1%) re-ported having terminated a pregnancy. Demographic and health statistics from the women's questionnaire are given in Table 2. Table 3 provides de-scriptive statistics of the respondents for those variables that were signif-icant in bivariate analysis. Living in an urban versus rural area was significantly associated with reported abortion-seeking (P = 0.003), as was being married (P b 0.001), having ever attended school (P b 0.001), having more children (P = 0.003), ever used contraception (P b 0.001), having visited a health facility in the past 12 months (P = 0.001), living in the three northern regions of the country (P b 0.001), scoring higher on the autonomy scale (P = 0.027), and identifying as Christian (P b 0.000) or Muslim (P = 0.05).

Table 4 shows the results of the logistic regression using demograph-ic variables found to be associated with abortion-seeking in previous work. The factors significantly associated with having terminated a pregnancy included age (being older; marginal effect of each year of age, 0.009), and having ever attended school. The marginal effect of 0.082 on the ever attended school variable suggested that women who had been educated were approximately 8.2% more likely to report hav-ing terminated a pregnancy than those who had not attended school. Being married and living in an urban versus rural area were not signifi-cantly associated with reporting having terminated a pregnancy.
Table 5 presents the results of the full logistic regression model, indi-cating further variables associated with reporting having terminated a pregnancy. Notably, being older and educated remained significantly associated with reported abortion-seeking. For every 1-year increase in age, the likelihood of seeking an abortion was almost 1% greater (marginal effect, 0.008). Living in the three northern regions of the country was negatively associated with reporting having an abortion (marginal effect, −0.082), and ever use of modern contraception was positively associated (marginal effect, 0.059). Being wealthier was also associated with reported abortion-seeking. The marginal effect of 0.030 on wealth quintile suggested that each step up in wealth quintile

Table 1
Demographic and Health Survey items used to create autonomy scale.

Item in the 2008 Ghana DHS	Response option indicating "high" autonomy
Can you visit families and friends without seeking permission?	Yes
Who decides how the money you earn is spent (answered as the respondent)?	Respondent herself
Who makes decisions about purchases for daily needs (answered as the respondent)?	Respondent herself
Can you refuse sex with your partner?	Yes
Do you need permission to seek care at a health facility?	No

Abbreviation: DHS, Demographic and Health Survey.

was associated with a 3% increase in the likelihood of reporting seeking an abortion.

Notably, the autonomy scale (Table 1) was significantly associated with reporting having had an abortion. The marginal effect of 0.1399 on the autonomy scale suggests that for each positive answer on the au-tonomy scale (i.e. from answering one to two questions in the affirma-tive), women were approximately 14% more likely to report having had an abortion.

4. Discussion

The present results suggest that reported abortion-seeking behavior is complicated by not only access to health workers and facilities where women can access these services, as previously suggested [17], but also by individual factors such as autonomy. Individual autonomy, as mea-sured by a novel five-point scale created from existing DHS items, seemed to be associated with increased reporting of abortion-seeking, even when the analysis controlled for other factors.

The present findings identified education, wealth, and urban resi-dence as primary correlates of reported abortion-seeking, combined with higher individual autonomy scores. What is not clear from the present analysis is whether such factors are actually proxies for the re-spondent's willingness to admit potentially stigmatizing information. It is plausible that women with greater education, higher wealth, stron-ger levels of individual autonomy, and residence in an urban location might feel empowered to admit that they have had an abortion, where-as less educated, poor, rural women may be just as likely to seek an abortion but much less likely to report it. In a cross-sectional analysis of an existing data source such as the DHS, such differences cannot be distilled.

In previously unpublished data from a qualitative study conducted in the upper east region of Ghana [16], respondents spoke of a wide-spread belief that abortions are common. In fact, older members of the community mentioned preventing young women who were newly pregnant from attending health facilities out of fear that they would abort their pregnancies. Although the women living in this area would be expected—on the basis of the results of the present analysis—to be the least likely to seek an abortion, it may well be that these women are simply less likely to report this behavior.

The finding that 16.1% of the women reported having had an abortion is slightly lower than that found in previous work. Specifically, Geelhoed et al. [18] found that 22.6% of respondents in their community-based sur-vey of women in the Brong Ahafo region of Ghana reported having had an abortion. The nationwide proportion of 16.1% from the DHS is also lower than the 21.3% of survey respondents in the Volta region of Ghana who reported having an induced abortion [19], but similar to the 10%–17.6% of women who reported during prenatal visits that their previous pregnancy ended with an abortion [20]. A larger community-based survey of 1689 women conducted in four of Ghana's 10 regions found an induced abortion rate of 27 per 100 live births [21]. The value of 16.1% in the DHS is considerably lower than the 36.7% of teenage girls who reported having at least one abortion in the Ejisu-Juabeng dis-trict in the Ashanti region of Ghana [22], and the 49.9% of women who reported having an abortion in Berekrum in the Brong-Ahafo region [19]. Krakowiak-Redd et al. [23] found that 20.0% of survey women in the Kumasi area reported having had an abortion.

It is feasible that the reasonably low rate of 16.1% found in the 2008 DHS is due to underreporting of pregnancy termination by participants. Sundaram et al. [24] estimated that approximately 60% of abortions were unreported in the 2007 Maternal Health Survey—a nationally

Table 2
Selected demographic and health statistics in the women's questionnaire.

Statistic	Total number of respondents	No. (%) of respondents
Ever terminated a pregnancy	4913	
No		4122(83.9)
Yes		791(16.1)
Missing		3(0.06)
Type of place of residence	4916	
Urban		2162(44.0)
Rural		2754(56.0)
Wealth index	4916	
Poorest		1089(22.2)
Poorer		921(18.7)
Middle		897(18.3)
Richer		1024(20.8)
Richest		985(20.0)
Married	4916	
No		2555(52.0)
Yes		2361(48.0)
Ever attended school	4916	
No		1243(25.3)
Yes		3673(74.7)
Total children ever born	4916	
0		1617(32.9)
1		651(13.2)
2		644(13.1)
3		546(11.1)
4		467(9.5)
≥5		991(20.2)
Ever used modern contraception	4916	
No		2878(58.5)
Yes		2038(41.5)
Visited a health facility in the past 12 months	4916	
No		2537(51.6)
Yes		2376(48.3)
Missing		3(0.06)
Autonomy scale	2275[a]	
0		141(6.2)
1		548(24.1)
2		643(28.3)
3		507(13.0)
4		296(13.0)
5		140(6.2)
Distance to a health facility is a problem	4907	
Yes		1445(29.4)
No		3462(70.4)
Missing		9(0.18)
Live in northern part of country	4916	
Yes		1322(26.9)
No		3594(73.1)
Christian	4906	
Yes		3630(74.0)
No		1276(26.0)
Muslim	4916	
Yes		832(16.9)
No		4074(83.0)

[a] The number of participants included in the autonomy scale is a subsample of the whole study population as only those who answered the five questions that make up the scale are included.

Table 3
Bivariate analysis of demographic variables and experience with pregnancy termination.

Variable	Terminated a pregnancy		P value
	Yes	No	
Place of residence		0.003	
Urban	386	1775	
Rural	405	2347	
Wealth index			b0.001
Poorest	114	973	
Poorer	144	777	
Middle	144	753	
Richer	188	836	
Richest	201	783	
Married			b0.001
No	335	2220	
Yes	456	1902	
Ever attended school		0.003	
No	166	1075	
Yes	625	3047	
Total children ever born			b0.001
0	132	1486	
1	130	521	
2	142	500	
3	103	443	
4	80	386	
≥5	204	787	
Ever used modern contraception			b0.001
No	310	2566	
Yes	481	1556	
Visited a health facility in the past 12 months			
No			
Yes			
Autonomy scale		0.027	
0	21	120	
1	116	432	
2	128	512	
3	108	399	
4	74	222	
5	42	98	
Distance to a health facility is a problem		0.05	
Yes	210	1234	
No	581	2879	
Live in northern part of country			b0.001
Yes	144	1176	
No	647	2946	
Christian			b0.001
Yes	613	3017	
No	176	1097	
Muslim		0.05	
Yes	115	717	
No	674	3397	

representative questionnaire administered to 10 370 women. The Maternal Health Survey included questions pertaining to demographic characteristics, pregnancy and birth history, and, unlike the DHS, specif-ically about women's abortion experiences. In the Maternal Health Survey, 19.9% of the ever pregnant women reported having experience with an abortion, which is similar to the level of 16.1% found in the 2008 DHS. Given the potentially differential manners in which these studies assessed abortion-seeking, the variations might reflect a difference in semantics rather than in actual rates.

Table 4
Multivariate logistic regression.

	Coefficient (SE)	Marginal effect
Constant	−3.94 (0.482)	
Current age	0.068 [a] (0.005)	0.009
Place of residence—Urban	−0.150 (0.083)	−0.019
Married	0.050 (0.090)	0.006
Ever attended school	0.654 [a] (0.104)	0.082

Abbreviation: SE, standard error.
[a] Denotes significance at the 0.001 level.

Previous studies have reported demographic factors associated with having an induced versus a spontaneous abortion. All else being equal, younger, better educated, and unmarried women are more likely to re-port an induced abortion [24]. Wealth and urban status have also been associated with an increased likelihood of seeking an abortion [24]. Women living in urban areas with more disposable income and with higher levels of education may have greater ability to access a necessary induced abortion. The present analysis suggests that some of these pre-viously identified demographic differences in abortion-seeking might be explained by sociocultural factors. For example, the influence of wealth was slightly mitigated, whereas the urban dwelling variable lost significance, when the autonomy scale was added to the analysis.

The study has a few important limitations. Most significantly, the outcome measure used was "reported terminated pregnancy," which may or may not be an accurate reflection of actual abortion-seeking. The analysis showed significant correlates with termination reporting; however, women with lower autonomy may simply be less likely to re-port this behavior. Thus, the present type of cross-sectional analysis, which would predict older, wealthier, more educated, and more auton-omous women to have a higher need for abortion services, should not underpin national policy. Furthermore, the question asked in the DHS

Table 5
Logistic regression with pregnancy termination as the outcome variable.

Variables	Full model[a]		
	Coefficient (SE)	Marginal effect	P value
Demographic variables			
Current age	0.052 (0.009)	0.008	b0.001
Rural place of residence	0.195 (0.144)		
Married	−0.149 (0.140)		
Christian	−1.68 (0.203)		
Muslim	0.257 (0.239)		
Socio-economic variables			
Ever attended school	0.349 (0.152)	0.055	b0.01
Wealth quintile	0.189 (0.057)	0.030	b0.001
Northern region residence	−0.522 (0.172)	−0.082	b0.001
Access measures			
Ever used modern contraception	0.377 (0.111)	0.059	b0.001
Distance to a health facility is a problem	−0.026 (0.129)		
Main variable of interest			
Autonomy scale	0.088 (0.041)	0.1399	b0.05

Abbreviation: SE, standard error.
[a] The constant for the model was −3.94 (0.482).

was whether the respondent had ever had a pregnancy that was terminated, and this variable might have included spontaneous abortions and stillbirths in addition to induced abortions. Such broad wording in a nationally representative survey is extremely problematic, given the associated likelihood of measurement error. Nevertheless, the DHS and this particular question is the best assessment of abortion-seeking behavior on a national level in Ghana that is available for public analysis.

A second limitation is that there may be other factors associated with accessing safe abortion services beyond what was measured in the DHS. There are no questions in the DHS about the participant's knowledge of the law governing abortion in Ghana, nor whether she is knowledgeable about where to access these services. Both such fac-tors are likely to be associated with accessing a safe abortion.
Another potential limitation to the study relates to the age of the data. The DHS data are now more than 5 years old, and it is possible that contextual factors have changed since the implementation of the survey in 2008. Nevertheless, we believe that abortion stigma and gaps in safe abortion access remain, and that women's attitudes, beliefs, and practices are unlikely to have undergone changes sufficient to nul-lify the value of the present findings.

A key strength is that—in addition to the conventional measures that have been employed in previous research on abortion-seeking in Ghana such as education, marital status, and age—the present study also in-cludes a measure of women's autonomy. Besides its theoretic contribu-tion to the knowledge of women's ability to seek a safe abortion, the present work has potential policy implications. Ghana's 1992 constitu-tion guarantees human rights, of which reproductive rights are an inte-gral part. However, a woman's autonomy and ability to exercise her rights are often closely linked to the customary laws and traditional practices of her community, which may limit the exercise of this right [15].

Improving knowledge and access to modern contraception has the potential to reduce the need for abortion services, although currently there are very low rates of usage of modern contraception in Ghana [25]. However, even if modern contraception usage were to increase markedly, a need will remain for safe abortion services. Ensuring that these services are available and accessible to all Ghanaian women is im-perative if the proportion of maternal death and disability attributable to unsafe abortion is expected to fall. The regional differences in report-ed abortion-seeking discovered in the present analysis points to a po-tential need for policies and interventions that specifically target women in the more deprived rural areas to increase their ability to seek safe abortion services.

Conflict of interest

The authors have no conflicts of interest.

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Grandmothers as gatekeepers? The role of grandmothers in influencing health-seeking for mothers and newborns in rural northern Ghana

Mira L. Gupta[a], Raymond Akawire Aborigo[bc], Philip Baba Adongo[d], Sarah Rominski[a], Abraham Hodgson[b], Cyril M. Engmann[e] & Cheryl A. Moyer[af]

[a] Global REACH, University of Michigan Medical School, Ann Arbor, MI, USA

[b] Navrongo Health Research Centre, Navrongo UE/R, Ghana

[c] Department of Public Health, Monash University School of Medical and Health Sciences, Selangor Darul Ehasan, Malaysia

[d] Department of Social and Behavioral Science, University of Ghana School of Public Health, Legon, Ghana

[e] Department of Maternal and Child Health, University of North Carolina School of Public Health, Chapel Hill, NC, USA

[f] Department of Medical Education, University of Michigan Medical School, Ann Arbor, MI, USA

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Grandmothers as gatekeepers? The role of grandmothers in influencing health-seeking for mothers and newborns in rural northern Ghana

Mira L. Gupta[a*], Raymond Akawire Aborigo[b,c], Philip Baba Adongo[d], Sarah Rominski[a], Abraham Hodgson[b], Cyril M. Engmann[e] and Cheryl A. Moyer[a,f]

[a]Global REACH, University of Michigan Medical School, Ann Arbor, MI, USA; [b]Navrongo Health Research Centre, Navrongo UE/R, Ghana; [c]Department of Public Health, Monash University School of Medical and Health Sciences, Selangor Darul Ehasan, Malaysia; [d]Department of Social and Behavioral Science, University of Ghana School of Public Health, Legon, Ghana; [e]Department of Maternal and Child Health, University of North Carolina School of Public Health, Chapel Hill, NC, USA; [f]Department of Medical Education, University of Michigan Medical School, Ann Arbor, MI, USA

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Previous research suggests that care-seeking in rural northern Ghana is often governed by a woman's husband or compound head. This study was designed to explore the role grandmothers (typically a woman's mother-in-law) play in influencing maternal and newborn healthcare decisions. In-depth interviews were conducted with 35 mothers of newborns, 8 traditional birth attendants and local healers, 16 community leaders and 13 healthcare practitioners. An additional 18 focus groups were conducted with stakeholders such as household heads, compound leaders and grandmothers. In this region, grandmothers play many roles. They may act as primary support providers to pregnant mothers, care for newborns following delivery, preserve cultural traditions and serve as repositories of knowledge on local medicine. Grandmothers may also serve as gatekeepers for health-seeking behaviour, especially with regard to their daughters and daughters-in-law. This research also sheds light on the potential gap between health education campaigns that target mothers as autonomous decision-makers, and the reality of a more collectivist community structure in which mothers rarely make such decisions without the support of other community members.

Keywords: grandmothers; health-seeking behaviour; Ghana; maternal and child health; power dynamics

Introduction

Here in this environment, the grandmothers, they have a lot of clout. When I say grandmothers, I'm talking about the mothers-in-laws … the grandmother of the baby. … They have a lot of power. Usually the married woman lives in the husband's compound. So it's not her own mother who matters. Her mother is living elsewhere. It's the husband's mother who calls the shots. (In-depth Interview, Doctor, Navrongo; Aborigo et al., 2012)

Each year, approximately 275,000 women die during or shortly after pregnancy, and more than 3 million infants do not survive past the first month of life (Lozano et al., 2011).

*Corresponding author. [redacted]

The vast majority of these deaths occur in low-resource settings, such as sub-Saharan Africa. In Ghana, for every 1000 live births, 25 infants do not survive past their first month of life. That compares to only 4 infants for every 1000 in the USA who do not survive 28 days after birth (Lozano et al., 2011). Maternal and neonatal mortality have many causes, such as sepsis and haemorrhage among mothers, and complications of preterm birth, severe infections and asphyxia among infants (Bhutta, Lassi, Blanc & Donnay, 2010). However, such conditions do not have to result in death if treated promptly by trained healthcare providers.

One of the most important ways to address some of the factors associated with both maternal and neonatal mortality is ensuring skilled obstetric care at the time of delivery (Harvey et al., 2007; WHO, 2004). In the event of unexpected birth complications, which occur in approximately 1 out of every 10 deliveries (Bacak, Callaghan, Dietz, & Crouse, 2005), every moment of delay in receiving skilled care significantly increases the risks of stillbirth, neonatal death and maternal death (Lee et al., 2009).

Delays in receiving skilled care can be caused by a number of different factors. One seminal theory of delay in care-seeking is Thaddeus and Maine's Three Delays Model (Thaddeus & Maine, 1994). This model identifies three phases from the onset of obstetric complications that can influence maternal mortality outcomes: (1) a delay in the decision to seek care, (2) a delay in reaching a healthcare facility and (3) a delay in receiving adequate care at the facility. The authors emphasise the variety of factors that can lead to such delays, and that more obvious factors such as distance or cost, are weighed alongside less apparent aspects such as perceived severity, socio-economic status, opportunity costs and decision-making authority. Among their findings, the authors note that women's status and their lack of autonomy can constrain their access to health services. Studies in Ethiopia, Gambia, Ghana, India, Nigeria, Swaziland, Tanzania and Tunisia all indicate that women of childbearing age often do not decide whether or not to seek healthcare. Instead, these decisions are made on their behalf by their spouse or a senior member of their family such as their mother-in-law, father-in-law or compound head (Bazzano, Kirkwood, Tawiah-Agyemang, Owusu-Agyei, & Adongo, 2008; Jansen, 2006; Magoma et al., 2010; Mills & Bertrand, 2005; Moyer et al., 2013; Thaddeus & Maine, 1994).

In settings where multiple levels of permission are required to seek care, such delays can pose significant threats to the health of women and/or their newborns. Previous researchers have used the term 'gatekeepers ' to describe those community members whose authorisation is required for women and children to seek healthcare (Ngom, Debpuur, Akweongo, Adongo, & Binka, 2003). This study aimed to increase our understanding of the role that grandmothers[1] may play in pregnancy, delivery and care-seeking in northern Ghana. While our previous research has highlighted the prominent role the grandmothers play in newborn care (Aborigo et al., 2012; Engmann et al., 2013; Moyer et al., 2012), this manuscript explores other facets of the grandmother's role in maternal and child health.

Setting

The study was conducted in communities of the Kassena-Nankana Districts (KNDs) of Kassena-Nankana East and Kassena-Nankana West, in Ghana's Upper East region. The districts span an area of 1674 square kilometres along Ghana's border with Burkina Faso. The two main ethnic groups in the districts are the Kassena and the Nankana, which comprise 43% and 52% of the population, respectively.

The current population of the districts is approximately 152,000 (Oduro et al., 2012), with about 10% residing in Navrongo, the district capital, and the large majority living outside the city in predominantly rural settlements. The community follows a patrilocal residence structure, whereby once married, a couple will reside with or near the husband's parents. Communities are often arranged in compounds, which consist of several homes clustered together to reflect extended family structures. There are approximately 18,000 compounds within the area of the two districts (Oduro et al., 2012). The primary source of economic activity in the region is subsistence agriculture, with limited rainfall occurring between June and October (Ngom et al., 2003). Poverty within the KNDs is widespread, and a lack of income and infrastructure makes transportation throughout the area difficult (Engmann et al., 2013).

The community is served by a district hospital in Navrongo as well as seven health centres, several primary healthcare clinics, and more than 30 community health compounds that are staffed with local health officers that provide health services within their communities (Oduro et al., 2012; Welaga et al., 2013). This number of health facilities for such a rural area is somewhat unusual. Compared to nearby districts and regions, the population of the KNDs is fairly well served in terms of facility access. In addition, the indicators for maternal and neonatal health are generally better in the KNDs than in surrounding districts, suggesting that of Thaddeus and Maine's three delays, obtaining adequate treatment upon arrival at a facility is not likely to be as problematic as the first two delays (recognising a problem and deciding to seek care). The health centres are typically larger in size than the clinics, cover a wider population and offer a wider range services. They are often run by doctors or medical assistants and include specialised staff such as laboratory technicians, pharmacists, disease control officers, nutritionists and statisticians. Clinics are smaller in scale and are often run by nurses or nurse-midwives. The community health compounds, known as Community-based Health Planning and Services compounds, are run by community health nurses with varying levels of training in managing labour and delivery. They also often assist with deliveries that take place in the local homes. For the local population, life expectancy rates are 56 for men and 67 for women, with women having an average of 3.8 children (Oduro et al., 2012).

Methods

This research was conducted as part of the Stillbirth and Neonatal Death Study (SANDS), a joint project of the Navrongo Health Research Centre (NHRC) and the Universities of Michigan, North Carolina and Ghana. The SANDS project examined associations and contributing factors to stillbirth and neonatal deaths and investigated community attitudes, knowledge and practices surrounding pregnancy, delivery and the neonatal period in the KNDs of Ghana. Field research for the study was conducted between July and October, 2010.

In-depth interviews (IDIs) and focus group discussions (FGDs) were conducted with a variety of respondents (Figure 1) using a study-specific semi-structured interview tool based on published guidelines for assessing newborn care practices (Parlato, Darmstadt, & Tinker, 2004). Although the tool was initially conceptualised to focus on factors surrounding newborn care practices, it was expanded to include prenatal, perinatal and post-natal factors, as well as sociological and cultural factors that may influence pregnancy and birth outcomes. The tool was also tailored by respondent category and as well as by

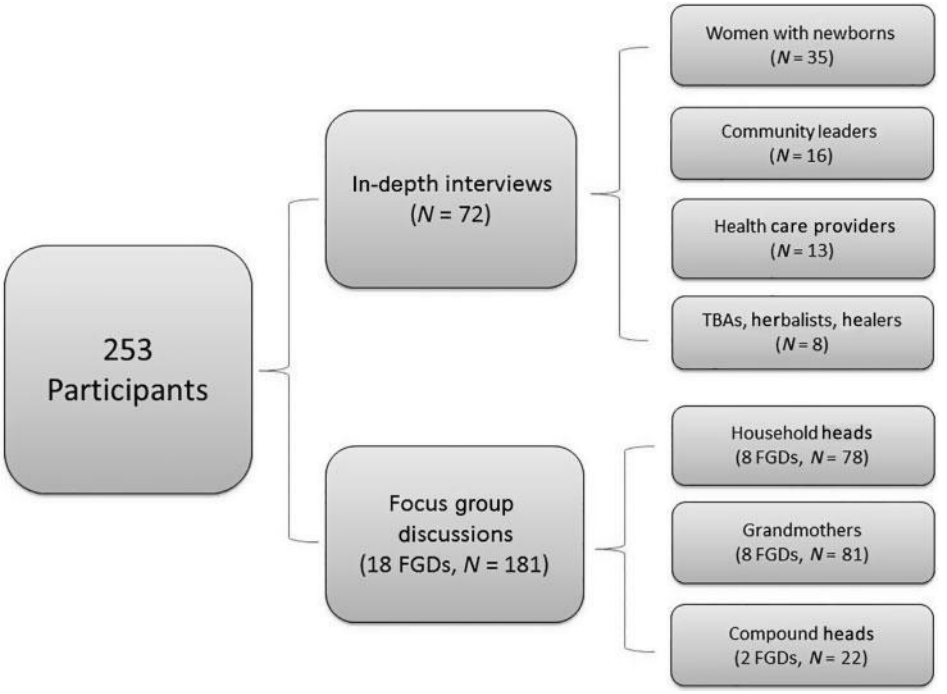

Figure 1. Study participants.

interview type (IDI vs FGD). Appendix 1 illustrates sample questions from the interview tool.

Community Key Informants (CKIs), community members designated by the NHRC to routinely collect information on local births, deaths, pregnancies and marriages, assisted in identifying individuals for IDIs and FGDs. A list of women who gave birth within the past 29 days (4 weeks) was obtained through the CKIs. This window of time was chosen to maximise accurate recall while minimising undue stress on new mothers by approaching them too soon after delivery. The list of mothers was reconfigured based on literacy, place of delivery and number of deliveries to maximise the variability of the sample. CKI guidance was also utilised to identify traditional birth attendants, herbalists and other local healers. Members of these groups were selected based on their involvement with maternal and child health at the community level. All healthcare providers involved in this study participated in IDIs, including nurses, midwives, medical assistants and doctors.

IDIs took place one-on-one between a field team member and a participant. Interviewers used a semi-structured instrument and detailed probes to guide the discussion. The interviews occurred mostly in respondents' homes except for those with healthcare practitioners, which were held in local clinics and the district hospital. Sessions typically lasted between 45 and 60 minutes. Ten community clusters were randomly selected to participate in FGDs. Clusters consisted of small geographic regions that contained several housing compounds in relatively close proximity or the equivalent geographic makeup of a small village. Permission was sought to conduct FGDs in the

community from compound heads or community leaders from the appropriate authorities at the health facilities, such as the District Director of Health Services, the Senior Medical Officer in charge of Navrongo Hospital and the medical assistants in charge of the health centres.

CKIs were consulted to identify grandmothers residing within the selected clusters who had relevant experience with newborn infants. A random list of 20 household heads and 20 compound heads from the same community was generated from the Navrongo Demographic Surveillance System. Selected individuals were then invited to participate in the study, and the first 12 to give their consent were invited to the FGDs. Focus groups were conducted with 8–12 participants. Questions were posed to the group, and the interviewer took responses from participants one by one. FGDs were longer than IDIs and typically lasted between 60 and 90 minutes. All FGDs were conducted in the local languages of Kasem or Nankani, and transcribed into English.

The research team was comprised of six individuals; four were Ghanaian and two were American. The American members conducted IDIs with English-speaking healthcare practitioners. The Ghanaian members included interviewers that were fluent in the native languages of the respondents as well as English. They conducted the remaining IDIs as well as the FGDs. Efforts were made to ensure that none of the interviewers resided in the communities where the interviews were conducted, and as a result, there were no known relationships between interviewers and participants. All interviews were audio recorded, and notes were kept on verbal and non-verbal communication by a second field team member present at each interview.

Figure 1 illustrates the total number of IDIs and FGDs conducted, as well as the categories of the 253 respondents.

Data analysis

At least three of the authors read each interview and performed ‘in vivo’ coding to identify main codes. From the in vivo coding, a preliminary coding structure was developed and a codebook was created. All transcripts were then entered into the qualitative software analysis package NVivo 9.0. Four separate team members then conducted focused coding using the codebook as a guide. All codes pursuant to grandmothers, decision-making authority and factors influencing care-seeking were retrieved and reviewed as part of the analysis process. The coders and one of the project investigators met regularly to discuss additional themes emerging from the data beyond the initial coding structure, and the codebook was updated and revised accordingly. The consolidated criteria for reporting qualitative research (COREQ) was used to guide the analysis and reporting of this study (Tong, Sainsbury, & Craig, 2007).

Results

Roles of grandmothers in maternal and child health

Interviews with community members indicated that grandmothers have a multifaceted role in maternal and child health in the KNDs. Grandmothers are often considered to be the primary support providers for their daughters-in-law during pregnancy. Grandmothers tend to be the main source of information, guidance and emotional support for young

women, especially those going through their first pregnancy. As one grandmother explained:

If there is an old woman in the house you have to talk to the pregnant woman. She should do this, she should do that, you the old woman have to tell her so that she will be healthy. (FGD, Grandmother, Kologo)
Moderator (M): Who do those pregnant women in this community seek advice from on matters of pregnancy and its care?
Respondent (R)1: If you have a mother-in-law she has to advise the woman about the do's and don'ts of pregnancy and the complications it can cause during delivery.
Respondent (R)2: It is the old ladies to advise them about where and how to sit and make their delivery easy. (FGD, Household Heads, Kurugu-Kandiga)

Grandmothers in the KNDs also play a leading role in preserving the cultural traditions of their ancestors. Even in communities where belief systems have shifted to deemphasise traditional practices, many grandmothers still expressed the importance of upholding traditions in their households and passing that knowledge onto their children and grandchildren. One example of this is the burial of the baby's placenta, which is customary for the grandmother to oversee. Many grandmothers reported placing the placenta in a small pot or broken calabash and burying it in the 'tampugre' (rubbish dam) in front of the home.

It is not all the ladies that will carry the placenta to the rubbish dump for them to bury, most of the ladies will not do it. So it is the old women who will carry the placenta out for them to bury. (FGD, Grandmother, Bundunia)
Our forefathers buried it in a garbage dump because one day the baby will be able to trace its lineage to where its placenta was buried. (FGD, Grandmother, Pungu-Yitonia)
We usually put (the placenta) in a hole, but first we put it into a pot and close it to ensure that sand does not enter it, because if sand enters it, it can affect the child's eyes. (FGD, Grandmother, Manyoro)

Interviews also revealed that grandmothers may serve as repositories of knowledge on local medicine, even when they are not considered local traditional healers. Many of the grandmothers interviewed were able to identify which herbs, roots or barks could be used for which ailments, where they could be found, how the treatment should be prepared and where on the body it should be applied. They mentioned a variety of local treatments including herbal remedies to stimulate the production of breast milk, grain pastes to relieve a mother's abdominal pain and special grasses that promote urination in babies. In some communities, grandmothers were able to list a local treatment option for every maternal and newborn health problem for which they were asked. Since most communities in this region have herbalists and other traditional healthcare providers, the detailed knowledge that grandmothers have about home remedies is particularly striking.

M: What do you usually do if a woman has trouble breastfeeding the baby?
R1: We let her grind millet into powder form or as millet flour and mixed it with shea-butter and plenty water and drink. The breast milk will come more.
R2: If the breast milk is not enough she can fetch the bark of a thorn tree and cook it with vegetables and eat (it). The breast milk will come for the baby to suck.
(FGD, Grandmothers, Paga-Navio)

Grandmothers' extensive knowledge of locally available treatments can foster newborn care behaviours that may run counter to public health recommendations. For example, some grandmothers reported that goat droppings had been used on the infant's body following delivery for spiritual reasons. Others reported treating the infant's umbilical cord with a variety of substances, including shea butter, spirits, dirt or plant extracts. This conflict between traditional treatments and medically endorsed best practices can be especially challenging due to the grandmother's role within the household, which at times allows them to enforce whichever practices they think are best. It is also worth noting that despite their extensive knowledge of local remedies, many of the grandmothers interviewed expressed support for healthcare clinics. Their knowledge of local treatments did not necessarily indicate a preference for traditional treatments over facility-based care.

Data suggest that grandmothers often influence decisions about or ultimately decide whether: a mother should deliver her baby at home or at the clinic, how urgent maternal and infant health problems are, and whether a sick mother or infant should be treated with local remedies or by the nurses at the clinic. In doing so, their role is not dissimilar to that of a gatekeeper. As one mother of a newborn infant explained:

M: How would you know if your baby is sick?
R: I wouldn't know unless I ask my mother-in-law.
M: How about if it is a convulsion?
R: We will go to clinic but with my mother in-law's permission. (IDI, Mother, Nania)

Grandmothers wield considerable power to permit the movement of mothers to seek or not seek care in facilities. This is especially clear in cases of emergencies, or when care is urgently needed.

Now Ghana Red Cross has taught us (the grandmothers) that we should always send the babies to hospital if they are sick. And like I said earlier if a baby is attacked you don't have to sit and wait for the husband to come before you must send him, and when you come back, whatever it is you sit and iron out the difference.
If the baby is sick and the father is not around, you must send him to hospital. So we take such decisions when it comes to baby's health.
(FGD, Grandmothers, Paga-Navio)

Data also suggest that while grandmothers are important, they are not the only ones to serve as gatekeepers to care seeking in this setting. Compound heads and fathers/ husbands were also mentioned as important individuals to 'respect' in terms of their preferences for infant care and maternal and newborn care seeking.

It is those who bathe the baby, and the old ladies, as well as the compound head, who advise on the baby's care. (FGD, Compound Heads, Akurugu-Daboo)
M: Who decides when an infant should be taken to or seen by a health professional?
R: If the mother informs the husband that the baby is not well, he will then decide that she should take it to the clinic. (FGD, Household Heads, Nakolo)
If (a woman) comes to complain about abdominal or pelvic pains, I will go and talk to the compound head that this is what the woman complained about and I think you should send her to the clinic. (IDI, Community Key Informant, Manyoro)
M: What prevents women from using the clinic?
R1: I think it is the individual perceptions. Some have various reasons why they don't go there, such as cost preventions by husbands or compound heads and some just do not see the benefit of the clinic.

Table 1. Decision matrix for location of delivery given varying preferences by mothers and grandmothers.

		Grandmother	
		Pro-clinic	Anti-clinic
Mother	Pro-clinic	Scenario A Outcome: clinic delivery	Scenario B Outcome: home delivery
	Anti-clinic	Scenario C Outcome: home delivery	Scenario D. Outcome: home delivery

R2: Some (husbands) prevent their wives from visiting the clinic because they have the perception that women were delivering when there were no clinics.
(FGD, Compound Heads, Akurugu-Daboo)

Gatekeeping in practice: effects on delivery outcomes

While the SANDS data demonstrate that grandmothers may serve as gatekeepers for care-seeking, this status does not always go unchallenged. One example is when mothers disagree with grandmothers' opinions about visiting a facility during labour and delivery. Table 1 presents a decision matrix that illustrates different outcomes, depending upon the concordance or discordance of preferences between mothers and grandmothers for or against a facility delivery.

When there is concordance between the desires of mother and grandmother (i.e. Scenario A, where both prefer a facility delivery, and Scenario D, where both prefer a home delivery), the outcomes typically fall in line with the preferences of both women. However, when there are differences between what the mother desires and what the grandmother desires (i.e. Scenario B and Scenario C, where one desires a facility delivery and the other prefers a home delivery), a variety of factors come into play to determine the outcome. In both cases, the data indicated that such discordance typically resulted in home deliveries.

In Scenario B, whereby a mother would like to deliver in a facility but the grandmother prefers a home delivery, it is difficult both socially and logistically for the mother to proceed without the grandmother's support. Most women in the KNDs who deliver in a facility are escorted by their mother-in-law, sometimes with the additional help of a traditional birth attendant. Whether it be the long walk to the clinic, arranging for transport or carrying supplies such as a rubber sheet or soap, a mother in labour is unlikely to be able to navigate that process without the support of her mother-in-law. For these reasons, when a mother wants to deliver at the clinic but the grandmother only supports home delivery, it often results in a home delivery.

Respondents described a Scenario C that occurred when the grandmother prefers a clinic delivery, but the pregnant woman would rather deliver at home. In some cases, women are taken to the clinic by their families, even if they would rather not go. However, an alternative for women to taking on such a passively obedient role is to take a position of passive resistance to prompt the outcome she desires. According to many of the stakeholders interviewed, mothers often do not tell others when they are going into labour or how far along they are in labour, until it is so late in the process that they are forced to deliver at home. As explained by a grandmother from Kologo:

> Some of them do not go to the hospital because when the pregnancy is paining her, she will not let you know, so by the time she will tell you she is almost due and the baby will be coming and she will deliver in the house without going to the hospital. … There are types of them, those who will hesitate to tell you and will be walking around and later tell you when it is too late for you to take her to the hospital. That is why some of them do not go to the hospital to deliver. (FGD, Grandmother, Kologo)

Mothers' reasons for preferring home delivery varied. Some mentioned a preference for wanting to deliver in familiar surroundings, while others avoided clinics for fear of being criticised and treated poorly by nurses (Moyer et al., 2013). These scenarios illustrate that while grandmothers have a great deal of influence, in some cases mothers can bypass their authority in favour of their own preferences.

Discussion

The results of this study suggest that grandmothers play an integral and multi-faceted role in maternal and infant health in rural northern Ghana. Grandmothers support mothers during pregnancy, care for infants following delivery, maintain cultural traditions surrounding pregnancy and childbirth and serve as repositories of knowledge on local treatment options. Grandmothers also have the potential to play a significant role when it comes to influencing health-seeking behaviour, though study results revealed that their authority can be challenged either by other actors in the community (such as compound heads) or by mothers desiring a different course of action.

This finding, that grandmothers may play a gatekeeping role in their communities, provides a different viewpoint than the results of Ngom et al. (2003) based on data taken from the same region in 1995, which found that husbands and compound leaders were the primary decisions-makers that influenced women's health-seeking behaviour. Ngom et al. (2003) concluded that husbands' consent was necessary for economic reasons (to incur medical or transportation-related costs), while compound leaders were important for spiritual reasons (as mediators between community members and their ancestors; Ngom et al., 2003). The SANDS data gathered 15 years later, demonstrate that while there are areas where it is still important to ask for a husband's or compound head's permission, the grandmother's role cannot be overlooked. Note, however, that the Ngom et al. (2003) data focused more on general healthcare needs, whereas data presented here focused specifically on maternal and neonatal health services. It is possible that the differences between the Ngom et al. (2003) findings and those presented here are related to the different approach to data collection taken across the two studies.

While the research presented here was not structured as a study on gatekeeping, the role of grandmothers was repeatedly and spontaneously mentioned as important to maternal and neonatal health in both individual interviews and focus groups across diverse categories of respondents. This is important for several reasons. Ngom et al. (2003) found that mothers who require authorisation from a gatekeeper to seek care are more likely to have children who died during infancy than those who did not require authorisation (Ngom et al., 2003). Data gathered indicate the proportion of deceased children was higher for mothers who required authorisation from a gatekeeper; and, it was higher for mothers who required authorisation from a compound leader or husband than for those who needed permission from grandmothers (Ngom et al., 2003). This study suggests that further research on the role of grandmothers could be beneficial in better understanding the social and cultural precursors to infant mortality in the KNDs.

That grandmothers were revealed as potential gatekeepers does not necessarily suggest that they are more powerful than husbands or compound heads in their communities. It may be a function of the limited role that men typically play in labour and delivery in this region of Ghana, or perhaps the latitude that grandmothers are granted in urgent circumstances. It could also be a function of a parallel decision-making structure that is emerging, whereby men are increasingly ceding decisions to women when those decisions relate directly to domains considered outside the purview of men. Although, given the cross-sectional nature of this research, it is difficult to document trends emerging over time versus increased recognition of existing patterns. The role of grandmothers illustrated in this study might also be tied to the sense of ownership that grandmothers feel over maternal and child health outcomes, resulting in an exaggeration of their roles in decision-making reported in interviews. Finally, it is also possible that rather than grandmothers becoming more powerful, there have been changes to the spiritual and economic landscape that have altered the gatekeeping roles of compound heads and husbands. There were significant changes in healthcare financing between 1995 and 2010 with the introduction of the National Health Insurance Scheme. This programme provides free maternal and child healthcare to all Ghanaians, and may have affected the economic gatekeeping role that husbands once held.

While there are many possible explanations for the emergence of grandmothers as influential actors in maternal and child health-seeking behaviour in the KNDs, these observations are consistent with trends occurring elsewhere in Ghana. The importance of grandmothers has been recognised by Ghana's Ministry of Health and the Ghana Health Service, both of which partnered with Johns Hopkins University to create a series of educational television spots as part of its Good Life campaign. This programme features a cast of nutritional superheroes led by Super Nana, a knowledgeable older woman who explains to viewers the importance of good nutrition for pregnant women and their newborn babies (Johns Hopkins University, 2012). While the spots feature a range of other young and physically fit characters, each one is narrated and led by the grandmother who explains the importance of each theme to the viewer. Other media used as part of the campaign include billboards, posters and musical events. This depiction of the grandmother as the advisor and wisdom carrier on issues of maternal and child health is similar to our findings from northern Ghana.

Research conducted in other West African countries has also emphasised the importance of grandmothers and older women in influencing maternal and child health decisions at the household level. For example, in western Senegal, grandmothers play a leading role at the family level in both health promotion and illness management. In addition, grandmothers often serve as the primary advisors to mothers and their husbands on all maternal and child health matters (Aubel et al., 2001). In Sierra Leone, grandmothers 'are the guides and supervisors of daughters-in-law on all issues related to the health and well-being of themselves and their children' (Grandmothers Project and World Vision Sierra Leone, 2013). There is an expectation that young wives will adhere to the roles and practices of their new communities, often under the watch of their mother-in-law. The men are not actively engaged in day-to-day household activities and noted that their mothers and aunties advise them and ensure that their wives and children are well (Grandmothers Project and World Vision Sierra Leone, 2013). While these cases do not explicitly define grandmothers as gatekeepers, they do underscore the influence and authority that grandmothers have over maternal and child health in their communities.

It should be noted that while grandmothers' ability to authorise health-seeking in certain circumstances can decrease delays associated from gaining permission from higher authorities such as husbands or compound heads who may be outside the home, this time gained is only beneficial if community members make wise treatment decisions. One of the key challenges is therefore the preference for local treatment over facility-based care. The results of this study revealed that grandmothers were divided between supporting clinic-based care and traditional medicine, with a substantial number of grandmothers interviewed opting for a combination of both treatments. Responding promptly but opting for local treatments for health challenges that would be better addressed in the hospital can be ineffective or even harmful to the mother or infant. There needs to be a continued focus on promoting clinic-based care to limit the delays associated with trying multiple treatment approaches before coming to the clinic. In recognition of their authority on such matters, any such efforts should include the active engagement of grandmothers if they are to be successful.

In addition to incorporating grandmothers into programming efforts, this study suggests the need to include multiple stakeholder groups to ensure that challenges to care-seeking are addressed through multiple venues. Similarly, demand creation is an important aspect to consider – including the need to simultaneously address quality of care issues alongside community mobilisation.

Study limitations

This study has several limitations worth noting. It was designed to explore community attitudes and knowledge regarding pregnancy and childbirth, not explicitly to explore the decision-making role of grandmothers. While such an unexpected discovery is part of the benefit of qualitative inquiry, it is possible that we may have had different insights had we explicitly sought to explore the role of grandmothers a priori. It is also possible that, given the study's association with the NHRC, respondents felt compelled to respond more favourably to issues associated with western healthcare, if they felt that such answers would be considered 'right' by the data collection team. Given the variety of responses recorded, we do not believe this to be a significant cause of bias in the data. All interviews were conducted in the local languages of Kasem or Nankani, and later transcribed into English for analysis. Subtleties may have been lost in that process. Future research that conducts analysis in the local languages is warranted.

Conclusions and implications

These study results suggest that to effectively improve maternal and child health outcomes in the KNDs, programmatic efforts should consider incorporating grandmothers and acknowledging the leadership role that they may play. Engaging grandmothers in health promotion efforts may be an effective approach to facilitating change, as they may be a key point of entry in the decision-making dynamics behind health-seeking behaviour. Such an approach should acknowledge and reinforce the status that grandmothers have within the community and to leverage their existing role as educators and carriers of wisdom. Embracing the roles that grandmothers already hold in their households and engaging them in health education may serve to minimise delays in the decision to seek care, which in turn can improve maternal and newborn health outcomes.

Disclosure statement

No potential conflict of interest was reported by the authors.

Note

1. In the context of this study the term 'grandmother' is used to refer to the infant's paternal grandmother, or the mother-in-law of the infant's mother. More broadly throughout the region, the term also refers to elder women or 'old ladies' who serve as advisors to younger women on various household issues, even when there is no biological relation.

ORCID

Mira L. Gupta http://orcid.org/0000-0002-3800-5232

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Appendix 1. Sample interview questions

(Antenatal care)

Can you tell me a little bit about how women take care of themselves during pregnancy? Probes:

a. Are there things that pregnant women are not supposed to do?
b. Are there things that pregnant women are supposed to do?
c. What happens if they do/don't do them?
d. Have you ever known anyone who did/didn't do X? What happened?
e. What about traditional herbs? What do women use them for?
f. What about other treatments women use? For what?
g. What about medicines (e.g. anti-malarials)?
h. What about vitamins (e.g. folic acid, iron)
i. Who do women see for health care when they are pregnant?
j. Where is that person / provider located?
k. Do women go to a clinic? For what?
l. What health services are available (at your clinic/hospital)?
m. Do women use those services? Why / why not?
n. What would make it easier for women to access the services that are available?
o. How do you feel pregnant women are treated when they attend a hospital or clinic or when they see a skilled birth attendant such as a nurse-midwife or physician for antenatal care?

(Intrapartum care)

Do most women have a skilled attendant at their deliveries? Probe:

a. Why do you think that is?
b. Does it matter if they have a skilled birth attendant?
c. What are the biggest barriers to using a skilled birth attendant?
d. What would make it easier to use a skilled birth attendant?

(Immedate newborn care)
Now I'd like to ask you about how babies are handled once they are born. What usually happens to the baby right after it is born?
Probes:

a. Why does it happen that way?
b. Does it always happen that way?
c. Where is the baby placed?
d. Is the baby dried?
e. Is the baby wrapped?
f. Who first holds the baby?
g. What happens if the baby isn't doing well?
h. Does the mother try to breast feed? How soon after delivery? How often?
i. How long does it take after a baby is born before she/he is first fed?
j. When does the mother's family get to meet the baby?

What usually happens if the baby has trouble breathing?
Probes:

a. Why does it happen that way?
b. Does it always happen that way?
c. Why or why not?

(Neonatal care)
Think about what happens during the first week of a baby's life. Typically what type of food is the baby given? Probes:

a. What about water?
b. What about gripe water?
c. What about colostrums?
d. What about herbal preparations?
e. What about rituals?

In the first week, where does the baby usually sleep?
Who usually makes decisions about the baby's care?
Probes:

a. Who typically bathes the baby?
b. Who decides on the clothing?
c. Who decides what to feed the baby?
d. Who decides on spiritual activities?
e. Who decides when an infant should be taken to, or seen by a health professional?

(Other questions)
What do you think could be done to make pregnant women in the community have healthier babies?

ORIGINAL RESEARCH ARTICLE

"I don't know anything about their Culture": The Disconnect between Allopathic and Traditional Maternity Care Providers in Rural Northern Ghana

Elizabeth Hill[1], Rebecca Hess[1], Raymond Aborigo[2,3], Philip Adongo[4], Abraham Hodgson[2] and Cyril Engmann[5] and Cheryl A. Moyer[1,6]*

[1]Global REACH, University of Michigan Medical School, Ann Arbor, MI, USA; [2]Navrongo Health Research Centre, Ghana Health Service, Navrongo, Ghana; [3]Jeffrey Cheah School of Medicine and Health Sciences, MONASH University, Sunway Campus, Malaysia; [4]School of Public Health, University of Ghana, Legon; [5]Department of Pediatrics and Maternal Child Health, Schools of Medicine and Public Health, University of North Carolina, Chapel Hill, NC, USA; [6]Department of Medical Education, University of Michigan Medical School, Ann Arbor, MI USA

* **For** [redacted]

Abstract

The provision of maternal and neonatal health care in rural northern Ghana is pluralistic, consisting of traditional and allopathic providers. Although women often use these providers interchangeably, important differences exist. This study explored the differences in approaches to maternal and neonatal care provision by these two different types of providers. This research was part of the Stillbirth and Neonatal Death Study (SANDS), conducted in northern Ghana in 2010. Trained field staff of the Navrongo Health Research Centre conducted in-depth interviews with 13 allopathic and 8 traditional providers. Interviews were audio-recorded, transcribed, and analyzed using in vivo coding and discussion amongst the research team. Three overarching themes resulted: 1) many allopathic providers were isolated from the culture of the communities in which they practiced, while traditional providers were much more aware of the local cultural beliefs and practices. 2) Allopathic and traditional healthcare providers have different frameworks for understanding health and disease, with allopathic providers relying heavily on their biomedical knowledge, and traditional providers drawing on their knowledge of natural remedies. 3) All providers agreed that education directed at pregnant women, providers (both allopathic and traditional), and the community at large is needed to improve maternal and neonatal outcomes. Our findings suggest that, among other things, programmatic efforts need to be placed on the cultural education of allopathic providers. *(Afr J Reprod Health 2014; 18[2]: 36-45).*

Keywords: Allopathic medicine, traditional medicine, maternal health, delivery care, culture

Résumé

La prestation de soins de santé maternelle et néonatale dans les régions rurales du nord du Ghana est pluraliste, composé de fournisseurs traditionnels et allopathiques. Bien que les femmes utilisent souvent ces fournisseurs interchangeables, il existe des différences importantes. Cette étude a exploré les différences dans les approches à la prestation de soins de santé maternelle et néonatale par ces deux types de fournisseurs différents. Cette recherche fait partie des études sur la mortinatalité et les d écès néonatales (EMDN), menées dans le nord du Ghana en 2010. Le personnel de terrain formé du Centre de Recherche en santé de Navrongo a mené des entrevues en profondeur avec 13 allopathique et 8 fournisseurs traditionnels. Les entrevues ont été enregistrées sur bande audio, transcrites, et analysées à l'aide du codage in vivo et la discussion entre l'équipe de reche rche. Trois grands thèmes ont été constatés : 1) De nombreux fournisseurs allopathiques ont été isolés à partir de la culture des communautés dans lesquelles ils pratiquaient, tandis que les fournisseurs traditionnels étaient beaucoup plus conscients des croyances et des pratiques culturelles locales. 2) les fournisseurs allopathiques et traditionnels de soins de santé ont des cadres différent s pour la compréhension de la santé et de la maladie, alors que les fournisseurs allopathiques s'appuient fortement sur leur connaissance biomédicale, les fournisseurs traditionnels s'appuient sur leur connaissance des remèdes naturels. 3) Tous les fournisseurs sont d'accord que l'éducation qui vise les femmes enceintes, les fournisseurs (allopathiques et traditionn els), et la communauté au sens large, est nécessaire pour améliorer la santé maternelle et néonatale. Nos résultats suggèrent que, entre autres, les efforts programmatiques doivent être appliqués à l'éducation culturelle des fournisseurs allopathiques. *Afr J Reprod Health 2014; 18[2]: 36-45).*

Mots-clés: médecine allopathique, médecine traditionnelle, santé maternelle, soins de l'accouchement, culture

Introduction

Maternal and neonatal mortality rates in much of sub-Saharan Africa are unacceptably high and the rates in Ghana are no exception. Recent data from studies conducted in Ghana show a lifetime risk of maternal mortality of 1 in 66, and a neonatal mortality rate of 24 per 1,000 live births[1,2]. Almost half of maternal deaths in Ghana occur in the first 24 hours after birth, often resulting from delays in seeking and receiving adequate medical care[2,3]. Thus, one focal area for intervention to improve maternal and neonatal outcomes surrounds the pregnant woman's decision of whether or not to seek medical care during pregnancy and delivery.

Currently, Ghana has a pluralistic health care system consisting of both traditional and allopathic medicine (See Table 1). When seeking antenatal care, Ghanaian women use traditional medicine, allopathic medicine, or some combination of the two[4]. The system of traditional healers has been widely used for centuries, and these healers typically live within the communities they serve[5]. Medical care through traditional healers has advantages. Since traditional healers share history and culture with their patients, they provide care that complements their patients' belief systems and fits within their worldview of the causes of illness[4,6-9]. In addition, traditional healers are often readily accessible and affordable. Most communities have at least one traditional provider present[4,10,11].

Disadvantages abound as well. Many aspects of traditional medicine are not scientifically proven or necessarily reproducible. Healers often rely on spiritual guidance for their treatments, and herbal medicines typically have limited or nonexistent dosing guidelines, leading to potentially serious risks for patients[6,11,12]. While some traditional healers undergo training through an apprenticeship, many are without any formal or recognized training[10]. They are frequently characterized by a spiritual calling rather than completion of a formalized training program[6, 13].

Table 1: Operational definitions of provider cadres

Provider Cadre	Operational Definition	Type of Providers
Allopathic providers	Providers with formal medical training that is recognized by some formal accrediting body and who provide care that reflects a western medical model of illness	Doctors, nurses, midwives, medical assistants, nursing assistants
Traditional providers	Providers without formal training who provide care that reflects a cultural understanding of health and illness.	Traditional birth attendants, herbalists, traditional healers

Challenges exist in providing conventional allopathic maternal and child care in Ghana. Among other challenges, these include: 1) Providers knowing what to do, but having insufficient resources; 2) The cost of allopathic care – particularly when factors such as travel, lost work hours, and the cost of medication and supplies are taken into account[4,11,14]; 3) Allopathic medicine's inherent separation of the physical from the spiritual, which is contrary to many local beliefs and can make it difficult for patients to understand their illnesses and the need for allopathic treatment[6,9]; and 4) Lack of skilled health providers. According to one report, the physician-to-population ratio in Ghana is 1:20,000[15]. This discrepancy is magnified in rural areas. For example in the capital city of Accra, the physician-to-population ratio is 1:6,000 while in the northern rural regions it is 1:100,000[16]. By contrast, the traditional healer: population ratio is 1:200. Possibly as a result of these statistics, much of the population – as much as 80% - relies upon traditional healers[17].

In practice, patients often combine traditional and allopathic medicine[11,16]. Tabi et al. found that Ghanaian citizens frequently use both types of health care, noting the interplay between family, friends, employers, education, religion, and culture as factors dictating which health care system to rely upon. Additionally, the authors reported that people often sought *diagnosis* from allopathic medical providers, while seeking both *treatment and spiritual meaning* from traditional medicine[4]. As Green and Makhubu note, the "shortcomings of traditional healing should be balanced against its beneficial or useful functions. The same can be

said for [allopathic] medicine"[6]. Most literature to date on the interplay between traditional and allopathic medicine focuses on topics such as how traditional providers need to improve, why patients choose one over the other, the limited resources available, and how to educate women and communities to emphasize utilization of allopathic health care providers. In contrast, the aim of this research was to compare and contrast the approaches to maternal and neonatal care taken by traditional and allopathic providers in rural northern Ghana.

Methods

Setting

This research was part of the Stillbirth and Neonatal Death Study (SANDS), conducted between July and October 2010. The setting was the Kassena-Nankana District (KND) of the Upper East region of northern Ghana. The region is largely rural and contains one district hospital, located in Navrongo, and five community health centers. A comprehensive description of the region and methods is detailed elsewhere[14,18-20].

Identifying Participants

The Navrongo Health Demographic Surveillance System (NHDSS) operates within the Navrongo Health Research Centre (NHRC) with the purpose of monitoring population dynamics, including births and deaths. The NHDSS has divided the Kassena-Nankana District into five zones. For this research, we randomly selected two zones for inclusion in the study (North, South).

We conducted in-depth interviews (IDIs) with 13 allopathic health care providers (3 nurses, 3 midwives, 2 medical assistants, and 5 doctors) and 8 traditional providers (4 herbalists and 4 traditional birth attendants). Providers were selected based upon their availability for interview during the study period.

The nurses, midwives, and medical assistants were interviewed in the selected zones. As medical doctors are generally only stationed in hospitals in this area, the selection of doctors for the interviews was done at the district hospital. The Senior Medical Officer (SMO) in charge of the district hospital was intentionally selected, and the remaining doctors interviewed were conveniently selected based on scheduling availability.

The Interviewers

Six trained field staff members conducted all of the interviews. The interviewers were employees of the NHRC, and each received a minimum of one week of instruction from one of the co-investigators prior to beginning interviews. This instruction included mock interviews and a pretest interview. Of the field members, 4 were Ghanaian (3 male, 1 female), and 2 were American medical students (both female). The American students conducted the interviews with the 13 health care providers in English. The Ghanaian field staff members were fluent in English, Kasem, and Nankani, and conducted all interviews in the respondent's native language. There were no known relationships between interviewers and study participants.

Data Collection

In-depth interviews (IDIs) were one-on-one interviews based on a semi-structured interview guide. Interviews typically lasted 45-60 minutes each and followed a semi-structured interview guide. We conducted interviews with allopathic health care providers in the health care setting, and typically in respondents' homes for the traditional providers. We audio recorded and then transcribed all interviews into Microsoft Word. For the interviews conducted in English, transcription was verbatim; however, for the interviews conducted in either Kasem or Nankani, the conversation was translated into English for transcription. At least three of the co-investigators read all transcribed data, including field notes, and reviewed them for completeness and clarity. Unclear portions of the recordings were reviewed by all interviewers and the project director, and, if a consensus was unable to be reached on the content, the data were eliminated from the research record.

Data Analysis

We began our analysis using "in vivo" coding to assist in the development of the main codes. This involved making written notes on hard copies of

the transcripts and creating a list of potential codes. Members of the research team discussed the potential codes and created a preliminary codebook. Two of the authors (RH, EH) then conducted focused coding, reviewing each transcript line-by-line and assigning codes reflected in the codebook. When coding was complete, we compiled quotes reflecting each identified coding "node." Field notes, coding nodes, and transcripts were then reviewed together amongst the investigators.

Ethical Issues

We sought permission from local community leaders, the District Health Officer, and the Senior Medical Officer in charge of the hospital to conduct this study. All participants were taken through an informed consent process, during which the aims, objectives, risks and benefits of the study were described. Only those who consented to participate were enrolled in the study. We also asked permission to audio record all interviews. All interviews were conducted in private or semi-private locations with attention to maintaining confidentiality. No identifying information was recorded, and all audio files and transcripts were stored on password-protected computers.

This research was approved by the Institutional Review Boards of the Navrongo Health Research Centre (NHRC), University of Michigan, and University of North Carolina- Chapel Hill.

Results

We conducted a total of 21 in-depth interviews (IDIs) with traditional and allopathic health care providers in rural Northern Ghana about issues surrounding childbirth. Three main themes emerged from the data: a disconnect between allopathic provider knowledge and community practices, differing frameworks of understanding pregnancy and childbirth, and the need for increased education of all people involved in pregnancy and childbirth.

"In Touch" with the Community

Traditional providers interviewed were more aware of the practices of the local community than were the allopathic health care providers in the same communities. In response to questions about pregnancy-related behaviors, rituals, spiritual protection, herbal preparations, and decision making in the community, allopathic health care providers used the phrase "I don't know" a combined total of 35 times throughout the interviews and used numerous other phrases such as "I'm not sure," "I wouldn't know," and "I can't be certain." While several of the allopathic health care providers were able to provide answers to some of these questions, gaps in their knowledge still remained. In contrast, the phrase "I don't know" was used only once by a traditional provider. These differences are highlighted in the examples below.

I (Interviewer): Who decides on spiritual activities?
R (Respondent): Hmm… This one, ma, that is why I say I can't be, I can't talk much about this place.
I: Okay.
R: So if you are talking, maybe it's the male. The man they are in charge that. But I didn't, I don't know anything about their culture here much.

(IDI, Allopathic health care provider- Midwife)

R: At times when a baby is born, the father goes to consult a smooth-sawyer and he is told the baby wants something to be done for him.
I: Give me an example.
R: The baby can say he wants a bangle; so after the baby is born, the bangle is put on his wrist to protect the baby.

(IDI, Traditional provider- Healer)

Furthermore, allopathic health care providers frequently answered questions in ways that later seemed incorrect when viewed against traditional providers' perspectives. For example, allopathic health care providers regularly stated that there were no rituals or spiritual protections used in the first days or months of a baby's life, herbal preparations were not used, and colostrum was always given, despite the fact that several of the traditional providers reported the opposite

occurring. The following excerpts illustrate this point:

I: What food is the baby given during that first week?
R: Breast milk.
I: What about water? R:
No.
I: What about gripe water? R:
No.
I: What about colostrums? R:
Yes.
I: And what about herbal preparations? R:
No, please.
I: Are there any rituals in that first week? R:
No.

(IDI, Allopathic health care provider- Nurse)

R: We give the breast milk and those millet water and the herbs or grasses for a full week before we stop them.
I: How about the colostrums?
R: No if it is bitter the baby can't suck… another Nursing Mother whose breast milk is not bitter will breastfeed it for some time.
I: How about the gripe water?
R: We don't give because we don't have those things here.
I: How about ritual water and foods?
R: In some homes, they will put the baby alone in a certain room and allow it to cry for some time and the mother wouldn't even attend to it.
Then after that she can go and pick it and breastfeed it .

(IDI, Traditional provider- Healer)

Different Frameworks of Understanding Pregnancy

When discussing pregnancy and childbirth practices in northern Ghana, allopathic and traditional providers often appeared to have quite different methods of approaching the same issues. For example, when asked, "Can you tell me a little about how women take care of themselves during pregnancy?" the allopathic health care providers were likely to discuss clinic visits, vital signs, physical exams, various medications, laboratory studies, and other medical issues. Traditional providers, on the other hand, were largely focused on what women should be eating. Of the eight traditional providers interviewed, only two mentioned clinic visits. None mentioned any of the other medical issues raised by the allopathic health care providers. These differences are highlighted in the excerpts below.

"So they come for weighing monthly and then we give them routine drugs, immunizations like tetanus, then de-wormers, mmm, and then we do PMTC test…. Take their HB. Then… we give them the malaria drugs."

(IDI, Allopathic health care provider- Nurse)

"First, when a woman is pregnant, she needs to eat well and now with this wet season she needs to stay away from cold and not do a lot of work."

(IDI, Traditional provider- Herbalist)

Similarly, when asked, "What can a woman do if she's having trouble breastfeeding?" all of the allopathic health care providers spoke of seeking medical advice or the specifics of what such medical advice would entail, such as repositioning, frequent feeding, and examining the breasts for abnormalities, as illustrated here:

"Basically they need to be shown the proper positioning which puts the baby, to breastfeed the baby. And they need to be encouraged to continue doing it. Particularly in the early days, when for some of them there's not much breast milk coming out. They need to be encouraged to keep putting the baby to the breast because it's the only way that the reflex will be activated to allow more milk to be made."

(IDI, Allopathic health care provider- Doctor)

In contrast, only three local healers spoke of seeking medical advice, while the rest spoke of different things that women can ingest to stimulate milk production.

"*If the breast milk doesn't come. We have certain things they called "kaligongo" (local medicine) mixed with "yara mum" (flour from guinea corn) and drink that water the breast milk will come"*

(IDI, Traditional provider - TBA)

Different approaches were also evident in management decisions regarding the newborn. While all 13 allopathic health care providers recommended sending a child with a seizure to a clinic or hospital, three of the eight traditional healers stated that traditional medicines were preferred over allopathic medicine for such an event. Similarly, in response to breathing troubles in newborns, allopathic health care providers recommended interventions such as oxygen, suction, and better delivery care. Traditional healers did recommend seeking medical attention, but also recommended actions like whistling in the baby's ear or putting water on the baby's chest.

The Need for Education of the Entire Community

Both allopathic and traditional healers agreed that one of the most important things that can be done to improve maternal and neonatal health outcomes is to implement more education, both directly to the mother and community-wide, on issues related to pregnancy and childbirth. There was an overall sense that many women in the community are not very knowledgeable when it comes to pregnancy and neonatal care, and, despite the current efforts, many are still not receiving the information and the education they need. This is illustrated by the following provider account:

"What I have to say, that we still educate them so that they know the importance of delivery at the health center, and also the attendance at the antenatal clinics. Some don't know the importance, so we taught them when they come they get early detection of any case and they detect it. ... We try to educate the woman on the importance of it. And to know to understand and to come, so that they get skilled delivery."

(IDI, Allopathic health care provider- Nurse)

"If you could organize the women together and educate them about those signs and advise them to go to the hospital if they should see any, this would prevent complications."

(IDI, Traditional provider- TBA)

Respondents were asked for specific suggestions about how pregnancy outcomes and neonatal care could be improved, and how they proposed that knowledge could best be spread through the community. Some of the suggestions from the allopathic health care providers included more education at antenatal clinics and incorporating education about pregnancy and neonatal care into the educational curriculum of the schools. Many respondents stressed that it would not be effective to only educate the pregnant women, because many of the other members of their families and communities are involved in the decisions of when they should seek medical care. Thus, it was suggested to use the
"natural flow" of information in the community, by meeting with community leaders (chiefs, elders, and opinion leaders), as well as community gate keepers (mothers in law, fathers in law), and to then let the information trickle down to the rest of the community. For instance:

" ... A whole lot of community sensitization. Um, focus group discussions ... And these should be channeled through the chiefs, the people, the natural flow. How generally information flows in the community. That's from the chiefs to the elders to opinion leaders. Yeah, these are people to rope in, in, in order to get information like this to seep down ... to women in the community. ... And you'll be surprised if you get opinion leaders to, to buy into this, information spreads like wildfire in a community."

(IDI, Allopathic health care provider- Doctor)

Some of these education initiatives have already begun, as described below:

"We are meeting with the community leaders, the chiefs, the mother-in-laws, and the father-

in-laws of course. They are the sole decision makers behind them. But when the woman is pregnant, unless they give the option that the woman should come to the hospital, the woman cannot come."

(IDI, Allopathic health care provider- Medical assistant)

Traditional providers also emphasized the importance of community gatherings to spread information. Given that much of the region is rural, several of the respondents stated that it would be much more practical to conduct the education in a group setting. For example:

"If we have a community gathering we can ask the nurses to come and talk to them about those things and give them advice."

(IDI, Traditional provider- Herbalist)

"We have to call them together because we cannot go [to] them house by house."

(IDI, Traditional Provider - TBA)

Discussion

In summary, we found that allopathic and traditional health care providers in northern Ghana have very different levels of understanding of the cultural practices surrounding maternal and newborn health in their communities. They also appear to approach health care based on different frameworks for understanding health and disease. While allopathic health care providers were well informed on evidence-based medical care, they lacked knowledge and understanding about the cultural beliefs and practices of their patients when compared to traditional providers. Despite these differences, both allopathic and traditional providers agreed on the need for education to help women achieve healthier pregnancies.

We have previously reported on how local understanding of illness influences treatment practices in rural northern Ghana. Community members reported bitter or bad breast milk as a cause for poor feeding or diarrhea, seizures being caused by an illness that needs to be "smoked out" of the newborn's fontanelle, and decreased arousal as a cause of breathing troubles[20]. These understandings are in line with what we report here as treatment strategies suggested by traditional providers, notably herbal concoctions for breast feeding difficulties, traditional remedies for seizures, and whistling into the ears of a newborn with breathing troubles. Because they are part of the communities they serve, traditional health care providers are able to relate to these concepts of disease and help patients understand their illnesses and devise treatment strategies within these frameworks. In contrast, allopathic providers approach pregnancy from a biomedical framework and favor pathophysiologic explanations over supernatural, which may not resonate with community members.

The fact that allopathic and traditional providers conceptualize disease differently also has implications for collaboration between the two groups. Green and Makhubu found that 98% of traditional providers desired more cooperation with allopathic providers; however, many did have concerns that their own lack of formal education might make communication with allopathic providers difficult[6]. If the two sectors of health care have different starting points in their understanding of disease, it could make communication and future efforts at collaboration difficult as well. There are also significant concerns on the part of allopathic providers regarding the efficacy of traditional treatments, as well as their potential to do harm. Specific examples from the literature include exacerbations of diarrhea caused by the provision of medicinal enemas[6], traditional vaccinations being delivered via unclean razors and introducing various infectious diseases[6], and liver damage caused by pyrrolizidine alkaloid poisoning, which is found in various plants that are used by traditional providers to treat a "wide range of diseases and conditions"[12].

Culture and traditions play an important role in management of health in rural northern Ghana. Our findings suggest that allopathic health care providers in this area have limited knowledge about the cultural beliefs and practices of the communities they serve. Other researchers have

found that this gap in knowledge can have negative consequences. Hardy reported that the doctors serving her study area in Cameroon were not originally from that region, did not speak the local language, and did not fully understand the culture. As a result, doctors were perceived as foreigners and patients were hesitant to seek their care[11].

In addition to the above noted beliefs and practices, we have previously reported on other beliefs held by community members of which allopathic providers did not seem to be aware of in this study. Despite the fact that all allopathic providers reported that they counsel women not to put anything on the umbilical cord, we previously found that 70% of women in our study area report dressing the cord with at least one substance[19]. In addition, we have reported that women commonly delay breastfeeding for up to 4 days while undergoing cleansing rituals[18], that they fear repercussions as severe as death if they disobey a soothsayer, and often require permission, or at least assistance, from community members before seeking allopathic health care[14]. Allopathic providers did not commonly report on such practices when asked about rituals surrounding childbirth, while traditional providers did. Although it is clear that allopathic providers need to ask about such practices, our findings show that they first need to understand that such beliefs even exist. A previous report from our study area noted that women were able to forgo the standard permission seeking required for allopathic care when being treated by a nurse living within the community[10]. This may indicate that if allopathic health care providers were better able to assimilate into the communities they serve, the population may become more willing to utilize their services.

Throughout our study, we resoundingly heard that more education is needed on maternal and neonatal care to help women have healthier pregnancies. Pregnant women have previously reported a desire for more information regarding pregnancy and early child care[21], and a correlation has been found between higher education levels and increased use of allopathic medical facilities[13,22].

Our prior research has noted that, when compared to literate women, illiterate women were equally knowledgeable about pregnancy and childbirth related issues, and were equally likely to seek out a facility based delivery; however, illiterate women often had more logistical barriers such as the need to seek permission to use allopathic health care[14]. As long as this cultural hierarchy exists, educating the community as a whole is the most likely way to help more women get the care they need, a point that was echoed by several of our respondents.

While most respondents agreed that more education for everyone in the community is needed, Tabi et al found that those who are more educated in Ghanaian society often look down upon traditional medicine for various reasons, including hygiene and a hesitation to accept information from someone with less formal education than themselves[4]. Given the current provider to population ratios in Ghana, traditional providers are an important proportion of the manpower needed to provide care. In addition, other authors have noted that traditional medicine is a "respectable profession, and perhaps the best one that women and those lacking formal education can aspire to"[6]. Education that trivializes the social and cultural value of traditional medicine is likely to be counterproductive. A better option might be to educate communities about when to seek which type of care and to help allopathic and traditional health care providers work together to improve the health of Ghanaian women. This approach would be particularly helpful given the different approaches and knowledge bases noted by this study and the fact that many Ghanaian women utilize both traditional and allopathic sources of health care. Encouragingly, Hardy found that patients with higher levels of education desired more integration between the two types of health care providers[11].

While not directly noted by any of our respondents, it is clear from our data that education of allopathic providers is needed as well. Their lack of understanding of cultural beliefs and practices places significant gaps in the knowledge needed to adequately relate to and treat their patients. In addition to implementing programs designed to educate communities about antenatal health, programs should also be implemented to train allopathic providers on local

customs and disease conceptualization. We recommend an orientation and continuous traditional learning program throughout the stint of allopathic providers' attachments in a new health district or area, determined and delivered in conjunction with mothers, community leaders, traditional birth attendants, and traditional healers.

We believe that this research has several important strengths. We gathered information from a diverse population of health care providers in an effort to create a sampling that is as complete as possible. Our study's focus on the different approaches of traditional and allopathic providers to antenatal care provides important insight into the functional advantages and disadvantages of each sector of health care in Ghana. Perhaps most importantly, it places significant emphasis on the lack of cultural understanding by allopathic providers. Very little research to date has been done on this topic and our findings provide a framework with which to implement future interventions and outcomes research.

Despite these strengths, there are several limitations to our study. First, data were self-reported; we did not directly observe what occurs in health care settings in this region. Future research would benefit from comparisons of behaviors and practices in traditional versus allopathic settings. Second, allopathic providers were interviewed in English by American graduate students, while traditional providers spoke their native languages with Ghanaian graduate student interviewers, and their conversations were translated into English. It is possible that unconscious biases, language issues, and other subtleties of communication might have been affected by these differences. However, all interviewers underwent rigorous training – including pretest interviews with debriefings afterward – and adhered to neutral, open-ended interviewing techniques. In addition, the interview guide was designed to explore a variety of issues surrounding maternal and child health – not to question existing practices or provider expertise. Thus we do not believe that the differences in types of interviewers is likely to significantly bias the results, as providers were not likely to feel challenged by any of the questions asked. It is also possible that interviews being conducted by graduate students – whether American or Ghanaian – may have biased reporting by respondents. It is equally possible, however, that respondents may have been less guarded than they might have been reporting to their peers. The 20-year history of research in the area combined with the volume of information volunteered suggests that respondents were comfortable enough with the interviewers that any bias present was likely minimal. This study focused on the disconnect between allopathic and traditional providers, but did not investigate whether this translates to a disconnect between providers and the community. As noted throughout our discussion, our previous research indicates that the disconnect does exist at the community level as well; however, more research is needed in regard to significance of this disconnect and what it means for health care seeking behavior and health outcomes.

In conclusion, we believe this study provides unique insight into the disconnect between traditional and allopathic providers in rural northern Ghana. We found that traditional and allopathic providers approach antenatal healthcare very differently, and each approach has unique advantages and disadvantages. Notably, we emphasize traditional providers' important role in disease conceptualization based on community understanding and allopathic providers' role of biomedical management. Allopathic providers were found to be far less knowledgeable about community practices than traditional providers. Similarities did exist between allopathic and traditional providers in their advocacy for antenatal health education for women and community members. Additionally, our findings suggest that programmatic and research focus needs to be placed on the cultural education of allopathic providers.

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Conflict of Interest

All authors mentioned in the study approved this manuscript.

Contribution of Authors

Elizabeth Hill, MD[-] collected data, analyzed data, prepared manuscript

Rebecca Hess, MD[-] collected data, analyzed data, prepared manuscript

Raymond Aborigo, MPH[-] collected data, analyzed data, prepared manuscript

Philip Adongo, PhD[-] conceived and designed study, assisted with manuscript editing

Abraham Hodgson, MBChB, PhD[-] conceived and designed study, assisted with manuscript editing

Cyril Engmann, MD[-] conceived and designed study, assisted with manuscript editing

Cheryl A. Moyer, PhD, MPH[-] conceived and designed study, analyzed data, prepared manuscript

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‘They treat you like you are not a human being’: Maltreatment during labour and delivery in rural northern Ghana

Cheryl A. Moyer, PhD, MPH (Managing Director)[a,n], Philip B. Adongo, PhD (Senior Lecturer and Head)[b], Raymond A. Aborigo, MPH (Health Research Officer, PhD Candidate)[c,d], Abraham Hodgson, MD, PhD (Director)[c], Cyril M. Engmann, MD (Associate Professor)[e]

[a] Global REACH, Department of Medical Education, University of Michigan Medical School, 5115 Med Sci 1; 1301 Catherine St. Ann Arbor, MI 48109, USA

[b] Department of Social and Behavioral Science, School of Public Health, University of Ghana, Legon, Ghana

[c] Navrongo Health Research Centre, PO Box 114, Navrongo UE/R, Ghana

[d] Department of Public Health, School of Medical and Health Sciences, MONASH University, Jalan Lagoon Selatan, 46150 Bandar Sunway, Selangor Darul Ehasan, Malaysia

[e] Departments of Pediatrics and Maternal and Child Health, Schools of Medicine and Public Health, University of North Carolina at Chapel Hill, CB# 7596, 4th Floor, UNC Hospitals, Chapel Hill, NC 27599-7596, USA

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Objective: to explore community and health-care provider attitudes towards maltreatment during delivery in rural northern Ghana, and compare findings against The White Ribbon Alliance's seven fundamental rights of childbearing women.

Design: a cross-sectional qualitative study using in-depth interviews and focus groups. Setting: the Kassena-Nankana District of rural northern Ghana between July and October 2010.
Participants: 128 community members, including mothers with newborn infants, grandmothers, house-hold heads, compound heads, traditional healers, traditional birth attendants, and community leaders, as well as 13 formally trained health-care providers.
Measurements and findings: 7 focus groups and 43 individual interviews were conducted with commu-nity members, and 13 individual interviews were conducted with health-care providers. All interviews were transcribed verbatim and entered into NVivo 9.0 for analysis. Despite the majority of respondents reporting positive experiences, unprompted, maltreatment was brought up in 6 of 7 community focus groups, 14 of 43 community interviews, and 8 of 13 interviews with health-care providers. Respondents reported physical abuse, verbal abuse, neglect, and discrimination. One additional category of maltreat-ment identified was denial of traditional practices.

Key conclusions: maltreatment was spontaneously described by all types of interview respondents in this community, suggesting that the problem is not uncommon and may dissuade some women from seeking facility delivery.

Implications for practice: provider outreach in rural northern Ghana is necessary to address and correct the problem, ensuring that all women who arrive at a facility receive timely, professional, non-judgmental, high-quality delivery care.

Introduction

Every year in low- and middle-income countries, 275,000 women die due to pregnancy-related causes, and 3 million babies die in first 4 weeks of life (The Lancet, 2005; Oestergaard et al., 2011; WHO, 2012). Facility-based delivery – or births that occur outside the home in any health-care setting – has been identified by the World Health Organization as a critical strategy for reducing these deaths (WHO, 2004). Nonetheless, many things prevent women from giving birth in a health facility, including logistical factors such as cost (Spangler and Bloom, 2010), distance to facilities (De Allegri et al., 2011; Gabrysch et al., 2011), and unexpected, rapid, or ill-timed onset of labour (Galaa and Daare, 2008). Social factors, such as the need to seek permission from others before going to a health facility (Mills and Bertrand, 2005; Bazzano et al., 2008; Moyer et al., 2013), can also prevent women from giving birth anywhere but at home.

One important factor that is not well-documented but can have profound effects on women's choices regarding where to give birth is maltreatment at the hands of providers at a health facility. Maltreat-ment has been described or alluded to as part of larger studies in

[n] Corresponding author.
E-mail [redacted]
(C.M. Engmann).

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Ghana (D'Ambruoso et al., 2005; Mills and Bertrand, 2005; Bazzano et al., 2008), Nigeria (Asuquo et al., 2000; Ejembi et al., 2004; Onah et al., 2006), Swaziland (Uyirwoth et al., 1996; Thwala et al., 2011), Tanzania (Kruk et al., 2009; Spangler and Bloom, 2010), and Uganda (Kyomuhendo, 2003). There is no uniform definition of maltreatment, and there is no standardised instrument to measure its prevalence. Maltreatment has been conceptualised as general abusive treatment towards women (Asuquo et al., 2000), negative or unfriendly staff attitudes (Asuquo et al., 2000; D'Ambruoso et al., 2005; Mills and Bertrand, 2005), verbal abuse (Mills and Bertrand, 2005), or sexual abuse (d'Oliveira et al., 2002). Maltreatment has also been described as encompassing neglect, detention at facilities if women are unable to pay for services, non-consented care, discrimination based on patient attributes, and health-care workers delivering services in exchange for bribes (FIDA-Kenya, 2007; Bowser, 2010; Human Rights Watch, 2011).

The drivers of maltreatment, which is most often discussed in the context of midwife or nurse interactions with pregnant or labouring women, are not well understood. In many developing countries, nurses in the public sector are working long hours in harsh conditions, and there are extreme power differentials between them and their predominantly poor, illiterate patients (Jewkes et al., 1998). 'In these situations nurses have been reported to employ humiliation, verbal coercion, and even physical violence to assert their authority and control patient behavior' (Jewkes et al., 1998, p. 1781). Anecdotal reports from midwives in rural Ghana suggest that they will do whatever it takes to help a woman give birth to a healthy baby—even if that means hitting her to help her focus on pushing during delivery.

In 2011, the advocacy organisation The White Ribbon Alliance for Safe Motherhood published a charter to formally recognise seven fundamental rights of childbearing women, which map to seven categories of disrespect originally put forth by Bowser and Hill (Bowser, 2010). These include: physical abuse, non-consented care, non-confidential care, non-dignified care (including verbal abuse), discrimination based on specific patient attributes, abandonment of care, and detention in facilities (Respectful Care Advisory Council, 2011). Notably, these categories are not meant to be mutually exclusive as many types of maltreatment encompass multiple categories.

This study sought to explore the issue of maltreatment in rural northern Ghana using a broad cross-section of community respon-dents. The study included the following aims: (1) to determine whether maltreatment was mentioned by community members without prompting when discussing issues surrounding childbirth,
(2) to determine the types of maltreatment reported to be occurring in facilities in rural northern Ghana, and (3) to compare the categories of maltreatment described in the existing literature against those identified in this region of Ghana.

Methods

This study grew out of the Stillbirth And Neonatal Death Study (SANDS) in northern Ghana from July through October 2010 (Aborigo et al., 2012; Engmann et al., 2012; Moyer et al., 2012; Moyer et al., 2013). This study focuses on cross-sectional interview and focus group data spanning the antenatal and perinatal period and excludes interactions solely focused on an infant's first seven days of life. The cross-sectional nature of the study design allowed for a broad exploration of the issue of maltreatment across a variety of respondents, as well as the opportunity to let respon-dents spontaneously discuss elements of childbirth in this setting.

Study setting

We conducted all data collection in the Kassena-Nankana District of the Upper East region of northern Ghana, a region known for subsistence agriculture and widespread poverty. Approximately 90% of the district's 150,000 inhabitants live in rural settlements. The district has six health centres that refer to one major hospital in the district capital of Navrongo.

Data collection

We conducted in-depth interviews and focus group discussions among a wide cross-section of individuals, illustrated in Table 1. We used several variants of a semi-structured interview tool that we developed based on previous published guidelines (Parlato et al., 2004). The tool varied based upon the type of interaction (interview versus focus group) and the type of respondent.

Selection of participants

The Kassena-Nankani District is divided into four zones for enumeration purposes: two were randomly selected for data collection in this study.

Community Key Informants (CKIs) provided a list of women who delivered infants within the previous 29 days in each selected zone. CKIs live within the community and work with the Navrongo Health Research Center (NHRC) to routinely collect information on such events as births, deaths, pregnancies, and marriages. The list of mothers was categorised by literacy, place of delivery, and number of previous deliveries to maximise the variability of the sample. On the basis of recommendations from the CKIs, we purposely selected traditional birth attendants (TBAs), herbalists, and other local healers. Researchers conducted in-depth inter-views with all of these types of respondents.

Focus group participants were recruited from 10 randomly selected community clusters across the two selected zones. CKIs identified grandmothers with relevant experience in neonatal health, and the NHRC database generated a random list of 20 household heads and 20 compound heads from the same com-munities. We contacted individuals in the order that they appeared on the list and invited the first 12 to grant consent to participate in the discussions.

The research team also selected a purposive sample of health-care providers working in the region, including nurses, midwives, nurse/midwives, medical assistants, and clinicians. Medical doc-tors practice in the only hospital in the district, thus interviewers selected and recruited doctors at the district hospital. All health-care providers were interviewed individually.

The interviewers

Four trained field staff employed by the NHRC conducted all community-based interviews in one of the two local languages. (Two were undergraduates and two were graduate students at a nearby university; three were male, one was female; all were Ghanaian.) Two graduate students from the United States con-ducted health-care provider interviews in English, the official language of Ghana. (Both were female medical students.) All participated in nearly 25 hours of instruction and mock interviews. The Ghanaian interviewers did not come from the communities where the interviews were conducted, and there were no known relationships between interviewers and participants.

In-depth interviews (IDIs)

Interviewers conducted hour-long in-depth interviews with community members, relying upon a semi-structured instrument and detailed probes to guide the discussion. All interviews were audio-recorded, and a second field team member took field notes. Interviews conducted in one of the local languages were transcribed into English, with unique words and phrases – or those that were

Table 1
Participants and operational definitions.

Type of respondent	How identified	Operational definition	Number of interactions (interviews or focus groups)	Number mentioning maltreatment
In-depth interviews				
Women with newborn infant	Community key informant	Women who delivered an infant 4–12 weeks prior; timeframe chosen to minimise stress on respondents but maximise accuracy of recall	23	5
Traditional birth attendants	Community key informant	Women in the local community who attend to births outside the health facility and are not considered to be formally trained	4	1
Herbalists	Community key informant	Traditional healers in the community who provide herbal and traditional remedies for health problems	3	1
Community leaders	Community key informant	Women's group leaders, assembly men and assembly women, local tribal chiefs	13	8
Health-care providers	Employment roster at health facility	Medical assistants, midwives, nurse/midwives, nurses, clinicians who were employed by one of the local health facilities	13	7
Focus group participants				
Grandmothers (N¼30)	Community key informant	Any woman who had at least one grandchild within the past year	3	2
Compound heads (N¼22)	Navrongo Demographic Surveillance System	Leaders of the 'compounds' where clusters of families live, usually an elder male who oversees multiple related households of extended family	2	2
Household heads (N¼20)	Navrongo Demographic Surveillance System	Leaders of a single household, usually the father or elder male in charge of one house within a compound	2	2

difficult to translate – remaining in the local language. Interviewers conducted in-depth interviews with health-care providers in English and transcribed the audiotape of the interview verbatim.

Focus group discussions (FGDs)

Eight to ten community members participated in each 60- to 90-minute focus group. The interviewer posed questions and then took responses individually, moving the hand-held microphone closer to the respondent who was speaking. An assistant took notes and kept track of respondents who were not fully participating to ensure all voices were heard. All focus groups were audio-recorded, conducted in the local language, and transcribed into English.

Ethical review and consent

Investigators obtained permission to conduct focus groups in the community from compound heads and/or community leaders. Investigators also obtained permission to conduct interviews at the health facilities from the appropriate authorities at each facility. Interviewers took each participant through a verbal informed con-sent process. This study was approved by the institutional ethics review committees of the Navrongo Health Research Center and the Universities of Michigan and North Carolina.

Data analysis

Three of the investigators (CM, RA, CE) read each transcript and worked together to create a preliminary coding structure and codebook. Transcripts were entered into NVivo 9.0 qualitative software. Four separate coders used the codebook to conduct focused coding. Coders included one of the investigators (CM) and three master's level public health researchers. The coding team met regularly to discuss the meaning and application of codes. New themes that had arisen and themes in need of revision were discussed and the codebook was updated accordingly.

All codes pursuant to providers' treatment of women in facility settings as well as perceived barriers to facility delivery were examined. All such 'nodes' in NVivo were examined with an eye towards categorising provider treatment into one of the following seven categories as described by The White Ribbon Alliance (Respectful Maternity Care Advisory Council, 2011): physical abuse, verbal abuse (non-dignified care), neglect (abandonment of care), discrimination, non-consented care, non-confidential care, and detention of women for failure to pay. One additional code was identified during this process: denial of traditional customs.

Data for this study were analysed in two stages. First, data were analysed from all respondents together, and then the data from health-care providers was disaggregated and examined separately. Themes found in overall analysis were compared against provider-specific themes.

Findings

Table 1 illustrates the number and type of respondents included in this study, including 128 community members (mothers with newborn infants, grandmothers, household heads, compound heads, traditional healers, traditional birth attendants, and community leaders) and 13 formally trained health-care providers. Seven focus groups and 43 individual interviews were conducted with commu-nity members, and 13 individual interviews were conducted with health-care providers.

Pursuant to Aim 1 (identifying whether maltreatment was mentioned without prompting), all types of community respon-dents mentioned maltreatment spontaneously when asked to describe potential barriers to facility delivery. Six out of seven focus groups with community members included discussion of maltreatment, and 14 out of 43 individual interviews with com-munity members included mention of maltreatment. These num-bers are not indicative of the prevalence of maltreatment, yet they speak to the common understanding within this community that maltreatment is sufficiently problematic to include in discussions about why women may opt against facility delivery.

Pursuant to Aim 2 (determine the types of maltreatment reported), respondents described maltreatment as encompassing

physical abuse, verbal abuse, neglect, discrimination, and denial of traditional customs.

Physical abuse

Women, grandmothers, household heads, and compound heads all described women in labour being hit, slapped, kicked, or beaten, most often in an attempt to get women to push:

Interviewer: 'Do you think most women here like to deliver at home?'

Respondent: 'Yes.'

Interviewer: 'Why?'

Respondent: 'They said the nurses beat them.' (laughter)

Interviewer: 'Why do you think they beat them?'

Respondent: 'If the nurses asked the women to push for the baby to come out and they feel lazy to push … they beat and shout at them.' (IDI, Woman with Newborn Infant)

One respondent, a male head of household, described how fear of physical abuse delayed his wife's arrival at the clinic:

What they have said is true … my wife was in labour for two days, the first day I told her to go to hospital and she refused. The following day she said … she will not go to the hospital for the nurses to be insulting her and kicking her… (IDI, Household Head)

None of the respondents interviewed described abuse by a traditional birth attendant or midwife outside a facility setting.

Verbal abuse

Respondents reported that midwives and nurses shouted at women, insulted them, and spoke harshly. Respondents also reported that providers spoke to women about inappropriately intimate things, such as about how women sounded or behaved during sexual intercourse, something women called 'talking to them by heart':

When she is going to deliver … (the nurse) insults her and talks to her by-heart, which should not have been so because as she is delivering she is suffering. (IDI, Traditional Healer)

… Let me add that some of our nurses have to handle the women with care…. One day a woman slapped a nurse after delivery because of the treatment she had from her. (IDI, Assemblyman)

Respondents indicated that such treatment is likely to have a negative effect on desire to deliver at a facility in the future:

Like if a woman goes there to deliver and she is not due you will see them shouting at her telling her that she is making noise. If she is lucky and delivers, next time when she is in labor and you ask her to go to the hospital she will not go. The nurses shout on them that is why some of them do not go to the hospital. (FGD, Grandmother)

This belief was reiterated by women with newborns, traditional birth attendants, household heads, and compound heads:

In the house the old women will pamper you, but in the hospital they will be shouting on you treating you as if you are not a human being. (IDI, Woman with Newborn Infant)

Neglect

Respondents described labouring or recently delivered women being left alone or ignored. One traditional birth attendant described begging a nurse to attend to a labouring mother who was very close to delivery, only to be told to take the woman out for a walk. The woman began to deliver as soon as they went outside:

Some nurses do not handle the women well because when you go there, they do not have time for the pregnant women, they only dump you on the bed for you to be having your pains there while she is sitting somewhere. (FGD, Grandmothers)

Some of the nurses will not even pay any attention to you and your daughter and you will be sitting there crying. This is why some of them also refuse to go to hospital and will deliver in the house. (FGD, Grandmothers)

Discrimination

All types of community respondents suggested that the poorest women and the women with the least education were the most likely to experience discrimination and neglect when they visited health facilities. 'Here, it's poverty' that's the biggest problem for women, said one health-care provider. One compound head reported nurses ignoring his family while they attended to the families with money.

Several respondents indicated that nurses expected women to bring various things to the facility for delivery, such as clean clothes for the baby, a clean receiving blanket, and soap for the nurses to wash their hands. If women didn't have those things, the nurses were more likely to treat women poorly:

In the hospital if a woman goes there to deliver and she did not buy the baby's clothes and things, the nurses will be insulting her. (FGD, Household Head)

Denial of traditional customs

The maintenance of traditional customs surrounding childbirth appeared to be controversial, with many respondents saying that nothing like that happens anymore, 'We had that in the old days.' (IDI, Chief) Women and providers disagreed over whether women were allowed to keep the placenta for burial after delivery, how they were allowed to labour once they arrived at the facility, and what women were allowed to do at the facility. As one new mother described, 'Some people demand for (the placenta) to take home but these days, the nurses don't agree to give them. They ask, 'Why you want the placenta?' The nurses keep it but I don't know what exactly they do to it.' (IDI, Woman with Newborn Infant)

Several respondents indicated this can be a problem, given the cultural significance of the placenta:

Respondent #2: If it is buried in the house it is a sign of identification that the baby is really a true member of the house.

Respondent #3: It is good to bury it in the house because it keeps the baby's spirit and soul healthy. (FGD, Household Heads)

Provider perspectives on maltreatment

Health-care providers also spontaneously mentioned maltreat-ment during labour and delivery. Although providers did not describe explicit physical and verbal abuse or neglect, many described midwives' negative attitudes towards labouring women, discrimination, and denial of traditional customs.

According to one physician, '(Women) fear to come to the hospital or the health facility because they feel the attitudes there are not friendly.' (IDI, Health-care Provider (physician)) Another suggested that nurses needed to 'tone down the judgment, so to speak.' (IDI, Health-care Provider (physician))

Providers also described discrimination in facility settings:

…The other issue too also has to do with the perceived attitude of health workers to, to these, to these women. They feel they don't, get treated like equals…. Health workers are perceived to be judgmental, so a lot of people stay away from, from these hospitals. (IDI, Healthcare Provider (physician))

Health-care providers suggested that denial of traditional practices may be an important deterrent for some women to delivering in a facility.

In fact, probably that's one of the reasons people don't come to deliver. That's a point because some might have some rituals to perform and they know when they come here to deliver, they won't get the placenta. You see, so these are all, eh, reasons. (IDI, Healthcare Provider (physician))

Counter perspectives

Despite the number of respondents who brought up maltreat-ment, many had only positive things to say about midwives, nurses, and giving birth at a facility. 'It is just fine, when you go there and see the way the nurses treat (the women), it is fine and you will like to ask your child to go there if she is pregnant.' (FGD, Grandmother) A woman who recently gave birth at a facility also described a very positive experience at her most recent birth:

The nurses that received me were caring enough …. They were telling me to be patient, relax or telling me to do this or that, so in fact, they were caring enough and I think everything was done successfully. (IDI, Woman with Newborn Infant)

One traditional birth attendant also suggested that facilities treated women well. 'They are always treated well because the(y) get better drugs and look healthy. Women are always happy the way they always handle them.' (IDI, Traditional Birth Attendant)

One woman's responses reflected the variability seen across providers within the region:

The nurses differ from one another, some of them, those who have patience, they will have time and sit you down and talk to you very calmly. Some too, the moment you get to the clinic, the way the nurse will make her face will not let you discuss freely with her, you will not say some of the things you came with. So the nurses are in differences. (IDI, Woman with Newborn Infant)

As with community-based respondents, not all health-care providers agreed that maltreatment was a problem. According to one midwife, when asked if she thought there was anything that would prevent a woman from delivering at a facility:

No. Because we are lovely. We don't discriminate. So I don't think there's something that can prevent anyone, any pregnant woman who is in labor not to come here. (IDI, Healthcare Provider (midwife))

Types of maltreatment: a comparison to the literature

Pursuant to Aim 3 (compare the categories of maltreatment described in the existing literature against those identified in this region), our data corroborate the categories of physical abuse, verbal abuse, neglect, and discrimination based on specific patient attributes. Our data do not include instances of non-consented care, non-confidential care, or detention at facilities for inability to pay. Note, however, that specific questions about such occurrences were not asked. One additional category of maltreatment we identified that has not been previously described in the literature was denial of traditional customs.

Meta themes

We identified two overarching 'meta themes' in these data. The first is the potential impact of socio-economic status on women's delivery experiences. The second is that power differentials within the health-care setting appear to have a profound effect on women's delivery experiences.

The role of socio-economic status

Socio-economic status (SES) in this community refers to the differences seen by levels of literacy and the degree of engagement in the formal economy (e.g. subsistence farming, selling vegetables in the market, owning a small business, employment in the formal sector). This sample consisted of a fairly homogenous group of rural mothers and grandmothers who rely largely on subsistence farming. However, data come from both literate and illiterate women. Data also come from unemployed women, women's group leaders, and assembly women. Thus the sample was quite diverse, even within a relatively homogenous population. While women of varying levels of education and SES reported being ignored by health-care providers, made to feel ashamed of their poverty, and spoken to in disrespectful tones, these findings appeared to be more common among illiterate women. As one illiterate woman with a newborn infant described, 'At times (the nurses) demand for soaps knowing very well that we are poor and we don't (have) anything.'

The maltreatment category of 'discrimination' in this setting in northern Ghana is also almost entirely hinged on socio-economic differences. Community members repeatedly reported being ignored in favour of patrons with money or being 'disturbed' by the nurses if they are not clean or not dressed well:

Some of the women will say when they go there, the people at the hospital disturb them because she has not got good clothes… when you tell her to go she will tell you that she will not go because of those things. (FGD, Household Head)

Power differentials

A second theme that permeated the data related to the power differentials within the health-care setting. Clinicians reside at the top of the hierarchy, but they only practice in the largest hospital in the region. In the smaller regional health-care centres, nurses and midwives are often in charge. Below the nurses and midwives are the assistants and the clerks. All of these people are employed, and all of these people earn a consistent paycheck – which is quite different than the subsistence farming that predominates among community members. Women entering a facility are often made aware of their position in the hierarchy immediately: They are at the bottom. 'When we go to the hospital, the doctors do not even (take) time to ask us why we are there. It is the lucky ones that can see the doctor, they do not even look at us.' (IDI, Traditional Birth Attendant) And women feel limited recourse when they are ignored or mistreated: 'Some of the nurses will not even pay any attention to you …. This is why some of them also refuse to go to hospital….' (FGD, Grandmothers)

It is unclear whether the source of these behaviours is best attributed to socio-economic differences and the chasm of 'social distance' between providers and women in labour, or whether the

power hierarchy that separates labouring women from the nurses, midwives and clinicians in charge is a stronger determinant.

Discussion

We found that women delivering in facilities in rural northern Ghana experienced physical abuse, verbal abuse, neglect, discri-mination, and denial of traditional customs. Such occurrences are not ubiquitous, and many women report receiving excellent care in facilities. Nonetheless, we found a consistent undercurrent of fear of maltreatment.

These results are consistent with the limited published research literature on maltreatment. Verbal abuse, 'abusive treat-ment', and negative and unfriendly staff attitudes as a barrier to seeking facility delivery have been reported throughout sub-Saharan Africa (D'Ambruoso et al., 2005; Mills and Bertrand, 2005; Onah et al., 2006; Kruk et al., 2009). In addition, fear of being shamed (Spangler and Bloom, 2010) or of being 'treated like a child or a fool' (Kyomuhendo, 2003) have been reported as barriers to facility delivery. Finally, Thwala et al. (2011) conducted a study in Swaziland that reported on taboos associated with not keeping traditional practices, which are often not allowed in facilities. Taken together, such findings support the categories of maltreatment presented in Tables 1 and 2. Maltreatment at the hands of providers in health facilities is a multifaceted problem that will likely require multifaceted solutions.

Numerous studies have documented the relationship between lower socio-economic status and lower rates of facility-based delivery. The causal pathway is typically described as wealth being related to health insurance coverage, ability to pay for services, ability to seek transport to a facility, and proximity and access to higher-quality, more desirable facilities. What has not been explored, however, is the relationship between SES and some of the social factors that also influence facility-delivery, including midwifery maltreatment. The results presented here suggest that low socio-economic status may be a risk factor for especially challenging interactions in a facility setting given the increased 'social distance' between providers and their clients. This is corroborated by a study by Jewkes et al. in South Africa, where the authors concluded that 'nurses were engaged in a continuous struggle to assert their professional and middle class identity and in the process deployed violence against patients as a means of creating social distance' (Jewkes et al., 1998, p. 1781). If women of lower SES are more likely to experience maltreatment in a facility setting, it raises questions about the long-term impact on women's attitudes towards western medicine and health-seeking beha-viour. Several respondents indicated that women who were maltreated were not likely to return to the clinic for their next deliveries. If women who are maltreated and are thus less likely to return to clinic are disproportionately of lower socio-economic status, maltreatment can increase the well-documented divide in health-seeking behaviour between wealthier, better-educated women and those with less education and fewer economic resources. It is also possible that if women of lower SES avoid the clinic for fear of maltreatment – and perhaps turn to traditional treatments instead – it may reinforce their beliefs about the value of traditional medicine. Thus it is possible that maltreatment reinforces and exacerbates the existing differences seen in the literature indicating that women with the lowest SES are the least likely to deliver in a facility and are also the most likely to endorse traditional treatment.

Table 2
Types of maltreatment identified in northern Ghana.

Type of maltreatment identified	Examples
Physical abuse	Hitting, beating, slapping
Verbal abuse	Scolding, yelling, shaming
Neglect	Leaving women to deliver alone, ignoring pleas for assistance
Discrimination	Treating women poorly based on personal characteristics (e.g. education, wealth)
Denial of traditional practices	Not allowing women to squat during labour, not allowing women to keep the placenta after delivery

This study has several notable strengths. First, this sample consists of 128 community members representing a diverse cross-section of the population of one district in rural northern Ghana. Even among this diverse group, and across both individual inter-views and focus groups, the results were remarkably consistent: although maltreatment does not occur in every facility with every provider, it is still a significant problem that deters some women from seeking facility delivery. These findings are especially com-pelling given that respondents were not prompted to discuss maltreatment—it was described spontaneously as part of more general discussions about the delivery process. In addition, com-munity members' statements were corroborated by health-care providers themselves.

One limitation of this study is that interviewers did not explicitly ask about maltreatment. Thus additional types of mal-treatment may have been identified had the topic been asked about directly. This study also did not obtain first-hand observa-tions of the treatment women receive when they visit a facility. Nonetheless, the consistency of the findings and the variety of respondents who reported similar occurrences suggest that the self-reported data were valid. Finally, this study found a divide in the data between those who described maltreatment in detail and those who had very positive experiences in facilities. In the name of anonymity and increasing respondents' comfort, detailed socio-economic and demographic data were not collected. While this may have increased participation and encouraged more unfiltered interactions, the lack of individual sociodemographic identifiers precludes the ability to situate discrepant experiences within different social and demographic groups. For example, it may be that the wealthier, better educated women were the ones describ-ing all of the positive experiences. However, the data do not allow for such exploration. Future research is needed that collects detailed social, cultural, and demographic data on individual respondents to encourage a more thorough examination of which women are most likely to experience maltreatment.

The results presented here have several important implications. Additional research is needed to better understand the prevalence of abuse in facilities, as well as discovering the precipitating factors and root causes. Are midwives being mistreated by clinicians or those higher up in the hierarchy and simply repeating an interaction style they have learned? Are midwives overworked and lack the tools to cope effectively? Is classism and social distance the root of the problem? What are the variables in the health-care system in Ghana that allow maltreatment to occur? And where is the threshold of tolerance, whereby strong admoni-tions become verbal abuse? These and other questions are critical to address in future research endeavours.

The findings presented here suggest that, as a starting point, health-care worker education and training ought to include modules addressing psychosocial elements of care providing. In addition, curricula that include sensitisation to issues of poverty and health disparities and provide health-care workers with communication tools to assist in their interactions with their patients is needed to change the climate in health-care settings. As Yakong et al. (2010) reported, nursing education in Ghana in

particular must emphasise basic relational practices to improve the interactions between women and their nurses. Perhaps equally important is the need to develop accountability measures that are applied to all facilities and that are attached to consequences— including incentives and rewards for performing well and censure for poor performance. At a minimum, policies that mandate women be allowed to bring a family member with them into the labour ward (which is not allowed at most facilities) will provide witnesses to the care that is being provided and may have a dampening effect on midwife maltreatment.

In summary, maltreatment during labour and delivery, although not universal, is a problem for women in northern Ghana that may prevent some women from seeking facility-based deliv-ery. Community members and health-care providers themselves describe midwives subjecting labouring women to physical abuse, verbal abuse, neglect, discrimination, and denial of traditional practices. Future research is needed that attempts to quantify these behaviours, including the development of a validated instru-ment that can be used to assess the true magnitude of the problem of maltreatment. Future interventions are necessary to address and correct the problem, ensuring that all women who arrive at a facility will receive timely, professional, non-judgmental, high-quality delivery care.

Conflict of interest

The authors have no conflict of interest, financial or otherwise, to disclose.

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‘‘It’s up to the Woman’s People’’: How Social Factors Influence Facility-Based Delivery in Rural Northern Ghana

Cheryl A. Moyer • Philip B. Adongo •
Raymond A. Aborigo • Abraham Hodgson •
Cyril M. Engmann • Raymond DeVries

Abstract To explore the impact of social factors on place of delivery in northern Ghana. We conducted 72 in-depth interviews and 18 focus group discussions in the Upper East Region of northern Ghana among women with newborns, grandmothers, household heads, compound heads, community leaders, traditional birth attendants, traditional healers, and formally trained healthcare providers. We audiotaped, transcribed, and analyzed interactions using NVivo 9.0. Social norms appear to be shifting in favor of facility delivery, and several respondents indicated that facility delivery confers prestige. Community members disagreed about whether women needed permission from their husbands, mother-in-laws, or compound heads to deliver in a facility, but all agreed that women rely upon their social networks for the economic and logistical support to get to a facility. Socioeconomic status also plays an important role alone and as a mediator of other social factors. Several ‘‘meta themes’’ permeate the data: (1) This region of Ghana is undergoing a pronounced transition from traditional to contemporary birth-related practices; (2) Power hierarchies within the community are extremely important factors in women’s delivery experiences (‘‘someone must give the order’’); and (3) This community shares a widespread sense of responsibility for healthy birth outcomes for both mothers and their babies. Social factors influence women’s delivery experiences in rural northern Ghana, and future research and programmatic efforts need to include community members such as husbands, mother-in-laws, compound heads, soothsayers, and traditional healers if they are to be maximally effective in improving women’s birth outcomes.

Keywords Facility delivery ! Ghana ! Pregnancy ! Global health ! Social factors

C. A. Moyer (&) ! R. DeVries
Global REACH, University of Michigan Medical School, 5115 Med Sci 1, 1301 Catherine St., Ann Arbor, MI 48109, USA [redacted]

R. DeVries
[redacted]

P. B. Adongo
University of Ghana, Legon, Ghana
[redacted]

R. A. Aborigo ! A. Hodgson
Navrongo Health Research Centre, Navrongo, Ghana
[redacted]

A. Hodgson
[redacted]

R. A. Aborigo
MONASH University, Melbourne, Australia

C. M. Engmann
University of North Carolina at Chapel Hill, Chapel Hill, NC, USA
[redacted]

Introduction

According to a recent report by the World Health Organization (WHO), a woman’s lifetime risk of dying from pregnancy-related causes in high-income countries is 1 in 3800, however, in sub-Saharan Africa, that risk is 1 in 39 [1]. Universal skilled birth attendance is one of the most effective interventions available to reduce that risk, and in sub-Saharan Africa, skilled birth attendance is often equated with facility-based delivery [2, 3].

Despite WHO recommendations encouraging all women to seek facility-based delivery, numerous barriers have

been documented that prevent women in Africa from delivering in facilities. Distance to the facility [4–8], rural residence [9–14], lack of health insurance and other eco-nomic factors [7, 10–13, 15–18] are some of the many logistical barriers repeatedly linked to lower rates of facility delivery. Less well-studied, however, are the social factors that may serve as barriers for women.

Social factors—drawing upon the medical sociological tradition that sees social structure, social interaction, and culture as critical to understanding health, illness, and care seeking [19–23]—may include such things as community and family hierarchies that require women to seek permis-sion before they can go to a facility, social norms that influence prevailing attitudes toward facility delivery, and the role of social networks in helping women implement decisions made regarding care seeking. The community or family hierarchy is the structure in which cultural ideas relating to autonomy, authority, and power (and the need for some to seek permission from others) are created, sustained, and changed. In one recent study in Africa, for example, only 12 of 111 women who delivered at a facility said they made the decision to go to a facility on their own [24], suggesting an important role for significant others in a woman's life. Throughout this manuscript, we use the term ''social factors'' broadly to encompass all of the above.

In rural northern Ghana, where much of the population is extremely poor and where most families rely on subsistence agriculture for survival, logistical challenges impede facility deliveries. These challenges have been documented for this region and the rest of Ghana in no less than 14 studies, citing cost, lack of health insurance, socioeconomic factors, lack of transport, and being taken by surprise in the middle of the night as key factors in preventing facility delivery [2, 9, 25– 37]. Evidence suggests that social factors also play a role in whether women deliver at home or in a facility. For example, researchers found that women who practice traditional reli-gions in Ghana have lower rates of facility delivery, even when controlling for rural residence and socioeconomic factors [25, 32]. Such findings raise questions about the importance of social structures, social interactions, and cultural practices in influencing where women in northern Ghana deliver their infants.

In this study we use qualitative methodology to explore the impact of social factors on place of delivery in northern Ghana, with specific focus on the impact of community and familial social structures and the role of traditional cultural practices surrounding childbirth.

Methods

This study was nested within the Stillbirth and Neonatal Death Study (SANDS) conducted from July–October, 2010, in the Kassena-Nankana district of the Upper East Region of northern Ghana [38–40].

Setting

In rural northern Ghana where this research was conducted, subsistence farming is predominant, and poverty is wide-spread. Families are patrilineal, and the eldest male, usu-ally referred to as the compound head, typically has the final say in all decisions.

Christianity and Islam are the dominant religions in Ghana, with a small percentage of people reporting prac-ticing traditional religion. The 2008 Ghana Demographic and Health Survey—the most recent year available—indi-cates that 68 % of the country considers themselves Christian, 18 % Muslim, and 9 % traditionalists. However, in the Upper East Region where this study was conducted, nearly 25 % reported practicing traditional religion [41]. (Note that practicing traditional religion does not preclude individuals from also practicing Christianity or Islam.) Traditional religion in Ghana involves periodic communi-cation with the spirits of the ancestors, including providing offerings and pouring libations, and utilizing soothsayers to communicate with the ancestors. In this setting, the com-pound head is the sole mediator between the compound members and the ancestors, often via the soothsayer [40, 42]. Thus any major decision should first be discussed with the compound head. According to a study published in 2003, ''The idea of seeking health treatment without asking for authorization from the compound head is foreign to most interviewees. Doing so will lead to a host of severe sanctions from the gods, the compound members, and the society at large'' [42] (p. 21). The same authors found that husbands and compound heads were the 'gate-keepers' who decide whether or not the sickness of the woman or her child is serious enough to mobilize resources to treat it.

In this setting, women have traditionally preferred to deliver at home for a variety of reasons. First, it is simpler: delivering at home does not require any special permission. Second, women who deliver at home receive social support from their extended families. Another motivation for women to deliver at home is to demonstrate their faith-fulness to spouses. Women who are promiscuous are believed to be more likely to face the wrath of the ances-tors, which can manifest itself through protracted labor. This can only be rectified by the woman confessing her infidelity to the whole extended family in order to have a safe delivery. Thus delivering at home can not only dem-onstrate faithfulness if a woman's labor is short and uncomplicated, it also allows the woman the opportunity to confess her infidelity if that becomes necessary.

In this region of northern Ghana, as in much of sub-Saharan Africa, births are typically considered the domain

of women. Compounds or villages may have elderly women or senior aunts who are considered the ''traditional birth attendant'' (TBA) by virtue of having attended many of the local births over her lifetime. She is likely to have little formal training, and she is likely to rely upon the strategies she has learned in the field to successfully deliver an infant. Thus she may use herbal remedies or other tra-ditional practices to stimulate labor or facilitate delivery. Her services are often offered in exchange for non-cash payments (including such things as crop yields or a fowl), or the cost of her services can be spread out over time. Usually, delivery sessions at home are attended by TBAs and other female relatives within the laboring woman's social network, including her own mother, her mother-in-law, her aunties, or sisters. Births occur in the home, with women laboring in a squatting position and often deliver-ing on the floor. The baby is typically cleaned and bathed by the TBA or the grandmother before being given to the mother.

In an effort to make healthcare more accessible to the poorest residents of Ghana, the Ghanaian government introduced its National Health Insurance Scheme (NHIS) in 2004. According to the 2008 Demographic Health Survey, only about half of childbearing women were covered by the NHIS in the four years after its adoption [41]. Nonetheless, the NHIS and the Ghanaian government are working to improve women's access to and use of services. The gov-ernment eliminated user fees for all maternity care starting in the mid-2000s—even for uninsured women–and preg-nant women who sign up for NHIS have their premium waived to ensure maximum access to prenatal and delivery care. Nonetheless, women who deliver in facilities need to secure and pay for transportation to get to the facility, in addition to bringing a list of delivery supplies that are not provided by the clinic. This list, which includes everything from sheets and towels to gauze and rubber gloves, can prove expensive and may deter some women from using facilities [29].

Identifying Participants

This study took place within the catchment area of the Navrongo Health and Demographic Surveillance System (NHDSS), an ongoing surveillance system in which Community Key Informants (CKIs) living in the commu-nities routinely collect information on vital events includ-ing births, deaths, pregnancies and marriages. The NHDSS is run by the Navrongo Health Research Centre, who recruit and train CKIs to collect data three times per year from everyone in the community. As part of the NDSS data collection, the two Kassena-Nankana districts were divided into five zones (East, West, North, South and Central) and zones were further divided into clusters. We randomly selected two zones for inclusion in this research, and within each selected zone, we randomly selected 12 clusters.

Table 1 illustrates the type of participants included in this study, how they were identified, and how data were collected. In summary, CKIs in each cluster generated a list of mothers whose infants had reached 1 month of age, and the list was stratified based on literacy, place of delivery, and number of previous deliveries to maximize the vari-ability of our sample. Mothers within each group who could be contacted immediately after the child was four weeks old were purposively selected for interview. Tradi-tional Birth Attendants (TBAs), herbalists, and other local healers outside the formal health care system were pur-posely selected by CKIs who identified potential respon-dents based on the individual's knowledge and/or involvement with maternal and child health at the com-munity level. All available health care providers working in the region were also interviewed, including in-depth interviews with nurses, midwives, medical assistants, medical doctors.

For the purpose of focus group recruitment for grand-mothers, household heads, and compound heads, five clusters were randomly selected within each zone. CKIs who live in those communities were consulted in identi-fying grandmothers with relevant experience in neonatal health residing within the selected clusters. CKIs also assisted in identifying household heads and compound heads who had recent experience with pregnancy and childbirth within their household or compound.

Interviews and focus group discussions were conducted until thematic saturation was reached.

Data Collection

We collected data using a study-specific semi-structured interview tool based on published guidelines for assessing newborn care practices [43]. Newborn care practices were the initial focus of the SANDS study, but the interview tool was expanded to include questions about prenatal care, delivery, post-natal care, and traditional birth practices within the community. The tool was also modified to be appropriate for different categories of respondents and different settings. While some core elements of the instrument remained con-stant, mothers with newborn infants, for example, were asked different sets of questions than male compound heads or healthcare providers. In addition, the tool for in-depth inter-views was modified for focus group use.

Interviewers worked in pairs to conduct hour-long in-depth interviews (IDIs) in respondents' homes and in local healthcare facilities. Interviewers audio recorded all IDIs, and a second field team member took field notes. For non-English speakers, interviewers conducted IDIs in the respondent's native language (either Kasem or Nankana).

Table 1 Participants and operational definitions

Type of interaction	Type of respondent (number of participants)	How identified	Operational definition of respondent
In-depth-interview	Women with newborn infant (35)	Community key informant	Women who had delivered an infant more than 4 weeks prior but not longer than 12 weeks prior. This timeframe was chosen to minimize stress on respondents but maximize accuracy of recall
In-depth-interview	Healthcare providers (13)	Employment roster at health facility	Medical assistants, midwives, nurse/midwives, nurses, physicians who were employed by one of the local health facilities
In-depth-interview	Traditional birth attendants (4)	Community key informant	Women in the local community who attend to births outside the health facility and are not considered to be formally trained
In-depth-interview	Herbalists (4)	Community key informant	Traditional healers in the community who provide herbal and traditional remedies for health problems
In-depth-interview	Community leaders (16)	Community key informant	Women's group leaders, assemblymen and assembly women, local tribal chiefs
Focus group discussions	Grandmothers (81)	Community key informant	Any woman who had at least one grandchild within the past year
Focus group discussions	Compound heads (22)	Navrongo demographic surveillance system	Leaders of the 'compounds' where clusters of families live, usually an elder male who oversees multiple related households of extended family
Focus group discussions	Household heads (78)	Navrongo demographic surveillance system	Leaders of a single household, usually the father or elder male in charge of one house within a compound

The interview team then transcribed all IDIs into English, retaining local words and phrases that were difficult to translate. Interviewers conducted IDIs with health care providers in English and transcribed interviews verbatim.

Eight to ten community members participated in each focus group, which typically lasted 60–90 min. All focus groups were audio recorded, conducted in the local lan-guage, and transcribed into English.

Permission and Invitation to Participate

Compound or community leaders in each community granted permission to conduct focus group discussions. The most senior administrative personnel overseeing each health facility granted permission for the conduct of in-depth interviews with providers. These senior adminis-trative personnel included such individuals as the district director of health services or the senior medical officer in charge of the district hospital.

Information about the objectives of the discussion and the purpose of the overall study were provided to each potential participant. Confidentiality with regard to their participation and anonymity with regard to their stored data were assured, and each participant was asked for his or her verbal consent to participate in the interview or focus group discussion. Permission to audio-record the discussions was also sought and obtained.

Participants did not receive any monetary incentive for participating in the discussions. However, two cakes of soap were provided as a token of appreciation for participation. This study was reviewed and approved by the institutional ethics review committees of the Navrongo Health Research Center, and the Universities of Michigan and North Carolina at Chapel Hill.

Data Analysis

At least three of the investigators (CM, RA, CE) read each interview and performed ''in vivo'' coding to identify main codes. This involved making written notes on hard copies of the transcripts and reviewing the notes together. From the in vivo coding, we agreed upon a preliminary coding structure and created a codebook. We entered transcripts into NVivo 9.0 qualitative software. Four separate coders used the codebook to conduct focused coding. Coders included one of the investigators (CM) and three master's level public health researchers.

The coding team met regularly to discuss the meaning and application of codes. We also discussed new themes that had arisen and updated the project codebook accordingly.

During the coding process, facility delivery, home delivery, attitudes toward skilled birth attendance, role of a TBA or midwife, and decision-making in the community were all identified as macro-level codes (or 'parent nodes' in NVivo). Each of these codes and any associated sub-codes (or 'child nodes' in NVivo) were examined with an eye toward identifying social factors that play a role in choice of delivery location. We developed a new set of codes to reflect the social factors present in the data. Socioeconomic status (SES) (e.g., material assets, income,

or occupation) was not formally assessed in our interviews, but sufficient mention was made of SES-related factors that we used illiteracy as a proxy for low SES in our analysis. This is a community in which poverty is widespread, thus illiteracy is a critical stratifier.

Results

Shifting Social Norms Regarding Place of Delivery

Across all types of respondents, attitudes are changing regarding the importance of facility-based delivery. Whereas it used to be normative for women to deliver at home and avoid the clinic, ''É (it) is no more because the world has changed.'' (IDI, Woman with Newborn Infant) As one women's group leader in the district said, ''Oh these days every woman or man knows how clinic delivery is very relevant and safe so that cannot prevent them from delivering at clinic.'' (IDI, Women's Group Leader).

Respondents cited safety and prevention of death as the most important reasons for women to deliver in a facility.

> But for us in the olden days we will stay in the house and will be commanding the woman to push and all of a sudden you will see the woman is lying dead and we will carry her to go and bury. So this is the reason why we have accepted the hospital for women to go and deliver there. (FGD, Grandmother).

Women reported learning about the importance of facility delivery from community health workers and during antenatal care visits. One healthcare provider described how they have been working to dissuade local traditional birth attendants from allowing women to deliver at home:

> These days we have been motivating themÉ We told them that it is not sterilized to É deliver in the house, and then the diseases (like) HIV, hepatitis B, it is carried through blood. And they have no gloves, no preventive tools with them to use to deliver. É So it is better they accompany the woman to the health facility. (IDI, Healthcare Provider).

One local traditional birth attendant reported that women knew the benefits of delivering in a facility to the point that her role in the community was becoming somewhat obsolete:

> Most of them know to such an extent that they don't even (say) good bye (to) me anymore. One was here she just went without (saying) good bye (to) me. We have spoken to them and they understood us that the hospital has benefits for them. For that matter, they don't call me before they go to the hospital and give birth. I always just hear she has gone to give birth in the hospital. (IDI, Traditional Birth Attendant).

One respondent, a local traditional healer, said that facility delivery can enhance a woman's standing in the commu-nity. ''It gives them some level of social prestige among their peers and the baby will also come out safe and strong.'' (IDI, Traditional Healer) This is in contrast to years past, when delivering at home indicated women were self-sufficient and strong enough to deliver without assistance.

Regardless of the general tenor of responses in favor of facility-based delivery, some households still consider it ''taboo'' to deliver in a facility. As one woman described:

> In some families it is a taboo for a woman to deliver in a hospital so any woman in the house if she is in labor will have to deliver in the house. (IDI, Woman with Newborn Infant).

Typically these households were ones practicing traditional religion, in which soothsayers were consulted before women could be allowed to go to the facility. If the local soothsayer was adamant about avoiding the hospital, families feared repercussions from the ancestors if they disobeyed the advice of the soothsayer. Thus the term ''taboo'' was used to mean something that was frowned upon and could bring negative consequences. Conse-quences might be mild (such as bad luck for the compound as a result of angering the ancestors) or severe (such as a maternal or infant death, or death to extended family members).

Perceptions about Permission and Assistance to Deliver in a Facility

Respondents disagreed about the need for women to seek permission to deliver at a facility. Several respondents indicated that husbands, mother-in-laws, compound heads, and soothsayers may need to be consulted before a woman can go to a facility.

> Some (husbands) prevent their wives from visiting the clinic because they have the perception that women were delivering when there were no clinics. (FGD, Compound Heads).

Formally, when a traditional religious compound head goes to consult the gods about a pregnant woman in the compound and the gods indicate that the baby shouldn't be delivered at any facility but at home, they stick to that and that is where the com-plications come and we all know that now. (FGD, Household Heads).

> A lot of the time the decisions are not made by her (the mother). And if she makes them, she needs the

blessing of somebody else. And I think that's a very, very big challenge for her. (IDI, Healthcare provider).

Yet for every respondent in a given community who suggested needing permission was a problem, another indicated it was not. According to one woman with a newborn infant, ''Everyone knows the importance of delivery in clinic so they wouldn't refuse.'' Other typical responses to questions regarding the need for permission included the following:

Interviewer: What about your husband, can your husband prevent you from going to hospital/clinic?
Respondent: No, will your husband allow you to die? (Laughter) (IDI with woman with a newborn infant).

Many respondents indicated that women in labor must rely upon the people around them to help them get to a facility for delivery, and often those people are either not prepared or are not particularly helpful.

For some of them it is the men that delay them. When you are in pains and want the man to go and look for a means to take you to the hospital, he will be running around looking for the old women to come and assist you to deliver. When they come to realize that it is critical on you, they will then take you to the hospital, not for you to deliver but to see whether they can save your lifeÉ They will be delaying until when they see that the old women cannot help you to deliver, that is when they will be running around looking for a car to take you to the hospital. May be by the time they will come with the car the woman might have given birth. (IDI, Woman with Newborn Infant).

When the woman is in labor and is struggling to give birth she cannot ensure there is a nurse, it is the husband or the family member who will do, ensure that there is nurse to assist in delivering the baby and if there is no nurse it means those people did not do their work. (IDI, Chief).

The woman's people have to do whatever they can to get the woman to the hospital for her to deliver safely. (FGD, Household Head).

The Role of Socioeconomic Status (SES)

We found that illiterate women in our sample (which we used as a proxy for SES) did not appear less knowledgeable about facility delivery or any less inclined to seek FBD than literate women. Yet logistical barriers to seeking care, such as obtaining transportation, the cost of transportation, and the cost of care-seeking were frequently mentioned among illiterate women. As one village chief explained in an in-depth interview, ''Most of the women here deliver at home because of the poverty situation here. É If you don't have money, you can't go and hire a car to carry the woman to the clinic.''

We found that in addition to being a social factor that impacts delivery decisions on its own, SES may play an important role as a mediator of other social factors that can influence delivery decisions. For example, we found that women who reported the need to seek permission before traveling to a health facility and women in families that practice traditional religion were likely to be illiterate. Consulting the gods before deciding a course of action features prominently in traditional religions:

Interviewer: When you said sometimes the family has to consult the gods before the woman will give birth, what are they always looking (for)?
Respondent: They always do it to find out whether the baby is coming from God or somewhere elseÉ Because the landlord (compound head) is an old person he will like to follow what tradition says, thereby preventing the woman from going to the hospital to deliver. (IDI, Women's group leader).

Lower SES also appeared to be linked to more traditional healthcare practices: ''If there is no money to buy drugs when you go to the hospital, you have to stay home and see whether you can get local herbs to treat yourself.'' (IDI, Woman with Newborn Infant) Traditional delivery prac-tices, including the use of a TBA, have typically been less expensive than hospital-based delivery care. As such, illiterate women with presumably fewer economic resources reported sometimes opting for traditional care. Even now that maternity care is covered for all women in Ghana, the barriers erected by differences in SES are not entirely alleviated: ''Maybe some (women) are ashamed because they don't have nice clothes to cover the baby after delivery and end up not going (to the facility).'' (IDI, Chief).

Meta Themes

In addition to these social factors, we found several ''meta themes'' worthy of further exploration.

Transition

The Kasena Nankana society is in the process of transition, with traditional maternal and child health practices giving way to more contemporary ones. Respondents regularly used phrases like ''in the olden days'' or ''before the hos-pitals'' or ''before modernity.'' These phrases appeared to reflect a past that was not particularly distant—for the grandmothers, they often referred to the time when they

delivered their own children. This timing fits with the implementation of the Community-based Health Planning and Services Initiative (CHPS) in Northern Ghana in the 1990s [44–46], in which community health centers and trained healthcare providers were placed throughout the Kassena-Nankana District. While the majority of respondents spoke in terms that were favorable to contemporary practices, many provided very detailed accounts of what is done traditionally. The extent to which those traditional practices are being maintained throughout the community is not clear. It is also unclear whether contemporary practices are providing an alternative or an adjunct to traditional practices. For example, some respondents described a preference for traditional treatment: ''The father will tell the wife that in their days they were using traditional herbs É so you should go for them rather than the clinic or hospital.'' (FGD, Grandmother) Others described use of traditional treatment only when Western medicine fails. ''We know that the Western medicine is always better than the local herbs, but if it also fails we have no option than to go for the local treatment.'' (FGD, Compound Head).

Other community members describe a pronounced shift from the ''olden days'', when women were expected to deliver at home with a traditional birth attendant, to more contem-porary hospital deliveries. ''We had that in olden days. (Men) were not allowing (women) to go (to the hospital) at all but É everybody now understands the need for a woman to deliver in the hospital. And even if someone hears you are preventing your wife from going to hospital to deliver, the community will not agree with you.'' (IDI, Chief).

Power Hierarchies in the Community

Our data suggest that when it comes to important delivery decisions, some women may consult with their mothers-in-law and their husbands, who may in turn consult with compound heads: ''The power is in the hands of the com-pound head, who is the grandfather. He owns the family members and takes decisions over them.'' (FGD, Grand-mothers) Compound heads, in turn, may consult with spiritual leaders to reach a decision. Each step requires time, and each step impacts the likelihood of physical and financial resources being made available. As one healthcare provider described, ''Someone must give the order that, 'Go to the hospital.' You see, there is that chain of command. You see?'' (IDI, Healthcare Provider) As one grandmother described, ''The woman has the power, but she is living in someone's house. So she must inform the husband.'' (FGD, grandmothers).

Yet these hierarchies are not universal—some women report making their own decisions, and some compound heads denounce the role of spiritual leaders, for example. ''If it is too serious you don't even have to wait for the husbandÉ. We the women always decide and now inform our husbands (that we are going to the hospital.)'' (FGD, Grandmothers) This suggests that the soothsayer, the husband, and the compound head are no longer considered the final authorities. This marks a substantial transition from years past when women would never have considered seeking healthcare without explicit involvement of the soothsayer, her husband, or the head of her compound.

Yet for the vast majority of women, we found that individual decision-making is not the norm. For those women who do make their own decisions, they still must rely upon others for the resources to operationalize their decisions. We were not able to determine from our data what lay at the root of these differences in decision-making autonomy.

Community Responsibility for Pregnancy and Delivery

One final theme we found is the widespread sense of responsibility that community members feel for women to deliver their babies safely. Not only mothers themselves, but also grandmothers, household heads, compound heads, community leaders, traditional birth attendants, herbalists, traditional healers, and healthcare providers in this com-munity all spoke about their shared role in ensuring that women have safe deliveries. Quotes indicate that respon-sibility for a healthy delivery rests not just with the indi-vidual woman, but also with her entire extended family, including all of ''the woman's people''.

As one compound head described, poor birth outcomes affect the entire community. ''If you also get angry and leave her alone and on the day of delivery she loses the baby or she loses her own life, it will spoil the commu-nity—that takes us backward.'' (FGD, Compound Head).

Discussion

Social factors play an important role in whether women in rural northern Ghana seek and obtain delivery in a health facility. Social norms appear to be shifting in favor of facility delivery, with many respondents using phrases like, ''Now we are enlightened'' to explain the shift from home deliveries to facility deliveries. While the phrase ''enlightened'' may reflect community members' acceptance of public health and education campaigns, it may also be a window into the way community members perceive the move from traditional to more contemporary birth practices. Not unlike the adoption of Western religions brought by missionaries, the adoption of Western medical practices may be imbued with a degree of status as it reflects a shift away from the ways of the past.

Traditional religion—at least as it pertains to traditional beliefs surrounding delivery—appears to be decreasing in prominence. Our data did not reflect any references to women proving their faithfulness or having difficult labor as punishment by the ancestors. Our data also included numerous quotes that reflected a degree of disapproval of traditional religious practices: ''We don't do that, we are Christians.''

Similarly, our data suggest that traditional birth practices and traditional decision-making structures in rural Ghana are tightly linked. And as traditional decision-making structures shift, so too does the emphasis on traditional birth practices. Soothsayers, husbands, and compound heads once held complete authority over women's healthcare seeking behavior, and in generations past, these community members believed strongly that women ought to deliver at home as had occurred for thousands of years prior. Yet the power of the soothsayer, the husband, and the compound head appears to be waning slightly in this region of Ghana [47, 48]. Not only does this allow more latitude for women (and grandmothers) to make decisions about where women may deliver their infants, it also loosens the ties between the leadership groups. For example, whereas a compound head used to be bound to follow the instructions of the soothsayer, the reduction in the soothsayer's power brings increased latitude for the compound head to make his own decisions. Increasing education and emphasis on the value of facility-based delivery means more and more compound heads are approving facility deliveries for the women in their compounds. But in the telling words of one health-care provider, ''Someone must give the order (to go to the hospital).'' Rarely is that the woman herself.

While reports conflict on whether women need to seek permission from their husbands, mother-in-laws, or compound heads to deliver in a facility, it is clear that women must rely upon the people in their social networks for the economic or logistical support to help them get to a facility. Such reliance does not always translate to a safe and timely arrival. Socioeconomic status also plays a critical role in impacting delivery decisions directly, in addition to serving as a mediating factor through its relationship to other social factors such as traditional religion and traditional health-care practices.

Our data both conflict with and reinforce previously published research. For example, contrary to our findings, both Jansen [33] and Bazzano et al. [27] published studies in Ghana that found that delivering at home was seen to raise a woman's status within her family and community. Other studies report on a general preference for home delivery [18, 49, 50], while our study and another by the lead author in a separate region in Ghana [28, 29] find that most women report preferring to deliver in a facility. These discrepant findings may reflect changes in norms over time, given that data collected several years ago may reflect a different reality than data collected more recently. These differences may also reflect significant regional variability throughout Africa. Yet given independent samples col-lected in the same year (2010) in two separate regions in Ghana, social norms in Ghana may indeed be shifting to favor facility delivery.

Our results dovetail well with the few studies that have addressed the importance of social and community factors in influencing facility delivery rates. For example, no fewer than nine studies in sub-Saharan Africa have addressed the role of spouses and other key decision-makers in influencing facility-delivery [27, 33, 35, 50–55]. As Lori and Boyle describe, ''Men are excluded from the actual process of childbirth due to cultural norms, yet because of their status as 'decision makers' in the family they have the power to decide if the woman is brought to the hospital for care'' [53] (pp. 465–466). This can lead to the process of delays described in our study, whereby women must rely upon men to help them get to a facility, yet those men may not be prepared to provide such assistance.

Our findings also reinforce similar results found when authors explored general health seeking behavior, as opposed to focusing on delivery behaviors. For example, Janzen described a concept known as ''collective kinship therapy'' in the Congo whereby a group of friends and family is obliged to seek a cure for an individual who falls ill [56]. In this setting, illness is treated based on its perceived origin, and western medicine may provide only one piece of the perceived cure. Janzen illustrates not only the plurality of medical options available in low-income settings, but also the collective nature of care seeking— similar to what we see in parts of rural Ghana.

These findings have several implications for research, practice, and policy. First, future research is needed that disentangles the role of social factors and their mechanism of action. For example, much of the published literature cites the importance of SES-related variables in influencing facility delivery rates, yet none explores the clusters of social factors that are likely linked to SES. Without a clear understanding of those factors, their individual influences and their relationship to SES, interventions are unlikely to be maximally effective.

We believe that community-based outreach is one crit-ical step in improving facility-based delivery rates. We found that the broader community is an important player during the childbirth process in both giving women formal permission to seek a facility delivery and in providing the instrumental support necessary to get them from their homes to the facility. This finding is especially provocative given the tendency for maternal and child health interventions to focus upon individual women rather than their broader social network and the social structure in which

they live. Typical intervention strategies include providing targeted education for pregnant women and attempting to boost women's autonomy. In a culture in which the entire community feels a degree of responsibility over a woman's delivery, such strategies may fall short. Future research is needed that addresses community-based solutions to the challenges in maternal and child health.

We also found a need for programmatic efforts that assist providers in embracing the transition from traditional to contemporary practices that is occurring in this com-munity, rather than seeing traditional practices as unilat-erally negative. This may involve proactively integrating aspects of traditional practices into formal settings, or working with local community leaders to develop cultur-ally-appropriate alternatives to unsafe traditional practices. Gabrysch et al. [57] demonstrated the success of such an effort in Peru, where community members and health care providers worked together to develop a culturally-appro-priate delivery care model .

With regard to policy implications, we found that socioeconomic status does not have a straightforward relationship to facility-delivery. Simply providing health insurance may not be sufficient to offset the impact of differences in socioeconomic status on facility delivery rates. Fortunately, Ghana provides an excellent 'test case' for such a statement, as nationalized health insurance was made available in the mid 2000s and is only now being widely adopted. As a greater percentage of women avail themselves of health insurance in Ghana (that includes free birth care), researchers and policy makers need to observe the relationship that increasing uptake has to facility delivery rates. Women with the lowest SES, living in the most traditional homes, subject to the most hierarchical decision making processes, may also be the women who do not sign up for national health insurance. Thus policies designed to address socioeconomic variables need to pay attention to the cluster of factors that accompany low SES.

This study has several notable strengths. First, it includes a diverse sample of individuals representing a variety of interests with regard to childbearing. Second, we believe this study is the first to disaggregate two very important functions of a woman's spouse or immediate family: giving permission to deliver in a facility and pro-viding sufficient assistance for that permission to be meaningful. Previous studies have described the need for women to seek permission, but none has linked that per-mission to the next, arguably equally important step: operationalizing the permission into action that results in the woman getting to the facility.

Methodological limitations to this study include poten-tial bias associated with having graduate student inter-viewers, rather than community members themselves. However, four of the interviewers were local Ghanaian graduate students. And given the volume of information readily volunteered and the 20-year history of the Navr-ongo Health Research Center's conduct of research in this area, we do not believe the characteristics of the inter-viewers unduly biased responses. Perhaps the most sig-nificant limitation is that we collected data in one language and translated it into English for analysis. Nuances in meaning may have been lost in that process, despite our efforts to maintain data integrity by retaining local words when the English translation seemed inadequate. Future studies would benefit from analysis conducted in the local languages. In addition, this study was not designed to assess differences across socioeconomic status. Thus the observations made must be tempered with the knowledge that our sample varies by literacy level, but we did not consciously build in wealth-related stratifiers in selecting our sample. Our findings suggest differences in the impact of social factors by SES, but further research that is designed to test the relationship between SES and social factors is warranted.

In summary, we found that social factors have a pro-found impact on women's delivery experiences in rural northern Ghana. Future research and programmatic efforts need to include a focus beyond the individual woman if they are to be maximally effective. Potential targets include community and family members who are involved in healthcare decision-making and provide the logistical and financial assistance to operationalize those decisions.

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10.2 Appendix 2: List of publications not related to thesis

1. Tindana PO, Rozmovits L, Boulanger RF, Bandewar SVS, Aborigo RA, Hodgson AVO, et al. Aligning community engagement with traditional authority structures in global health research: a case study from northern Ghana. Am J Public Health. 2011;101: 1857–1867. doi:10.2105/AJPH.2011.300203

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10.3 Appendix 3: Focus group guide (Traditional Birth Attendants)

Topic guide for FGD participants (TBAs)
FGD IDNO: |__|__|__|_ |__|__|__|_ |__|__|__|__|__| Audio IDNO |__|__|__| _ |__|__|__|_
(To be assigned by moderator) (To be assigned by moderator)
Date of interview: ____/____/____ Community:----------
DD /MM/ YYYY
Category of participants: ----------
FGD N^{o} for participant type: |___|___| N^{o} of FGD participants: |___|___|
Moderator: ---------- Note-taker:----------

Participant #	First name	Age	Education	Occupation	Marital Status	Religion	Ethnicity
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

DOMAINS OF INTEREST	QUESTIONS AND PROBES
Section A: Common health problems in pregnancy	What are the common health problems that pregnant women or women who have just given birth suffer in this community? At what stage of the pregnancy do these health problems occur? Why? What causes the health problems**? (PROBE for lifestyle, access to health care, traditional causes)**

Section B: Signs and symptoms of severity of health problems	Which of these health problems do all (most) pregnant women or women who have just delivered suffer? (**PROBE for signs and symptoms)** Which of these health problems are serious but not life-threatening? (**PROBE for signs and symptoms)** Which of these health problems are life-threatening? (**PROBE for signs and symptoms)**
Section C: Care-seeking behaviors based on severity	How do you treat the health problems that all (most) pregnant women suffer? (**PROBE for place of treatment, medicines used or behaviours adopted)** How do you treat the health problems that are serious but not life-threatening? (**PROBE for place of treatment, medicines used or behaviours adopted)** How do you treat the health problems that are life-threatening? (**PROBE for place of treatment, medicines used or behaviours adopted)** Which of these health problems are hospital health problems? **(PROBE for reasons)** Which of these health problems are can only be treated at home? **(PROBE for reasons)**
Section D: Management of health problems in pregnancy at the community level	How do you treat the health problems of pregnant women or women who have just delivered that can only be treated at home? **(PROBE for traditional ways of managing life-threatening health problems)** How good is the home treatment for life-threatening health problems in pregnant women or women who have just delivered? **(PROBE for any further actions after traditional treatments?**
Section E; Management of health problems in pregnancy at the health facility	How does the health facility treat the health problems of pregnant women or women who have just delivered that you take to them? **(PROBE for concerns about the treatment usually received)** How good is the hospital treatment for life-threatening health problems in pregnant women or women who have just delivered? **(PROBE for perceptions about caesarean section)**
Further information	If there is any issue related to how life-threatening health problems are identified and managed in this community that we haven't discussed, you can bring it up or let me know. If I need further information on the issues that we have just discussed, which group of people or individuals should I talk to?

10.4 Appendix 4: In-depth interview guide (Healers)

Topic guide for IDIs (Healers)
IDI IDNO: |__|__|__|_ |__|__|__|_ |__|__|__|__|__| **Audio IDNO** |__|__|__| _ |__|__|__|_ |__|__|__|__
(To be assigned by moderator) (To be assigned by moderator)
Date of interview: ____/____/____ **Community:**----------
DD /MM/ YYYY
Category of Interviewee: ----------

IDI N^{o} for participant type: |___|___|

Moderator: ----------

Age |___|___| Education: ----------

Occupation: ---------- Marital: ----------

Status: ---------- Religion: ----------

Ethnicity: ----------

DOMAINS OF INTEREST	QUESTIONS AND PROBES
Section A: Common health problems in pregnancy	What are the common health problems that pregnant women or women who have just given birth suffer in this community? At what stage of the pregnancy do these health problems occur? Why? What causes the health problems**? (PROBE for lifestyle, access to health care, traditional causes)**
Section B: Signs and symptoms of severity of health problems	Which of these health problems do all (most) pregnant women or women who have just delivered suffer? (**PROBE for signs and symptoms)** Which of these health problems are serious but not life-threatening? (**PROBE for signs and symptoms)** Which of these health problems are life-threatening? (**PROBE for signs and symptoms)**
Section C: Care-seeking behaviours based on severity	How do you treat the health problems that all (most) pregnant women suffer? (**PROBE for place of treatment, medicines used or behaviours adopted)** How do you treat the health problems that are serious but not life-threatening? (**PROBE for place of treatment, medicines used or behaviours adopted)** How do you treat the health problems that are life-threatening? (**PROBE for place of treatment, medicines used or behaviours adopted)**

	Which of these health problems are hospital health problems? **(PROBE for reasons)** Which of these health problems are can only be treated at home? **(PROBE for reasons)**
Section D: Management of health problems in pregnancy at the community level	How do you treat the health problems of pregnant women or women who have just delivered that can only be treated at home? **(PROBE for traditional ways of managing life-threatening health problems)** How good is the home treatment for life-threatening health problems in pregnant women or women who have just delivered? **(PROBE for any further actions after traditional treatments?**
Section E; Management of health problems in pregnancy at the health facility	How does the health facility treat the health problems of pregnant women or women who have just delivered that you take to them? **(PROBE for concerns about the treatment usually received)** How good is the hospital treatment for life-threatening health problems in pregnant women or women who have just delivered? **(PROBE for perceptions about caesarean section)**
Further information	If there is any issue related to how life-threatening health problems are identified and managed in this community that we haven't discussed, you can bring it up or let me know. If I need further information on the issues that we have just discussed, which group of people or individuals should I talk to?

10.5 Appendix 5: Consent form for TBAs in focus group discussions

Explanatory Statement for participants in the focus group discussions (Traditional birth attendants)

***This information sheet is for you to keep*.**

My name is Raymond Aborigo, I am conducting a research project with Pascale Allotey, a professor in the Department of Global Public Health towards a PhD at Monash University. I am also a staff of the Navrongo Health Research Centre. This means that I will be writing several research articles from the project that I'm conducting. We have funding from the Global Public Health Department of Monash University, Malaysia to conduct the research. You are invited to take part in this study. Please read this Explanatory Statement in full before making a decision.

You have been selected to participate in this study because you are a traditional birth attendant who can help us to understand how the community perceives pregnancy-related complications.

We collected a list of traditional birth attendants who serve this particular community from the Navrongo Health Research Centre and your name was included. We are moving round inviting traditional birth attendants on our list to participate in our research and it is now your turn to be invited into the study.

The aim/purpose of the research

We are conducting this study to find out how the community thinks about illnesses related to pregnancy at the community level and how that affects the choices that they make in seeking treatment. We would also like to know how you manage pregnancy complications at the community level. After that, we would like you to help us find individuals or groups of people who can help us understand better, the issues that we will be discussing with you.

Possible benefits

There are no direct benefits to you as a participant in this study but we are hopeful that the knowledge that we will get from this study will help us know how the community views pregnancy complications, how they manage them and the difficulties that they face in seeking treatment. This research has the potential to contribute information towards targeting maternal health interventions at the community level more appropriately. We will also know how best communities can help themselves to prevent pregnancy-related complications.

What does the research involve?

The study involves a discussion that will be audio recorded and transcribed. We have a question guide that we will follow to ask you and other people who will be part of the group so that you can discuss the issues that will be raised. Because we cannot write everything that you will be saying, we will like to audio record it so that we can listen to it later on and write out our discussion.

How much time will the research take?

The discussion will last between 1 hour and 1 hour 30 minutes.

Inconvenience/discomfort
If you agree to participate in the study, it will require 1 hour to 1 hour 30 minutes of your time that you could have used to do something else. However, I will ensure that I do not prolong the discussion longer than it is necessary.

Payment
You will not be paid for your participation in this study. However, if you suffer any injury as a result of your participation in the study, the study will take care of you. You will also be given two cakes of soap as a sign of appreciation for your participation in the study.

Can I withdraw from the research?
Being in this study is voluntary and you are under no obligation to consent to participate. However, if you do consent to participate, you may withdraw from further participation at any stage but you will only be able to withdraw data prior to the publication of the study results. You will not suffer any consequences if you refuse to participate in the study or if you withdraw your participation or your data.

Confidentiality
The data that will be collected from you will be confidential. Your name will not be taken as part of the data collection process so that your identify can be protected. All the data collected will be filed in locked cabinets and only investigators on the study will have access to it. Study results will be reported in aggregate and no individual's name will be mentioned in them.

Storage of data
Data collected will be stored in accordance with Monash University regulations, kept on University premises, in a locked filing cabinet for 5 years. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

Results
If you would like to be informed of the aggregate research finding, please contact Raymond Aborigo [redacted] The findings are accessible for a period of 5 years.

If you would like to contact the researchers about any aspect of this study, please contact the Chief Investigator:	If you have a complaint concerning the manner in which this research **(PROJECT NUMBER)** is being conducted, please contact:
Prof. Pascale Allotey Global Public Health Monash University, Sunway campus [redacted]	**Dr. John Awoonor-Williams** **The Chair,** **Navrongo Health Research Centre** **Institutional Review Board,** **Box, 114, Navrongo – Ghana** [redacted]

Consent for traditional birth attendants

Consent form for individuals participating the focus group discussions (Traditional birth attendants)

NOTE: This consent form will remain with the Monash University researcher for their records

I agree to take part in the Monash University research project specified above. I have had the project explained to me, and I have read the Explanatory Statement, which I will keep for my records. I understand that agreeing to take part means that:

I agree to take part in the discussion ☐ Yes ☐ No

I agree to allow the interview to be audio-taped ☐ Yes ☐ No

and/or

I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project without being penalised or disadvantaged in any way.

and/or

I understand that any data that the researcher extracts from the focus group for use in reports or published findings will not, under any circumstances, contain names or identifying characteristics.

and/or

I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party.

and/or

I understand that data from the focus group transcripts and audio-tape recordings will be kept in a secure storage and accessible to the research team. I also understand that the data will be destroyed after a 5 year period.

Participant's name

Signature **or** **Thumbprint**

Date

10.6 Appendix 6: Consent form for traditional healers

Explanatory Statement for in-depth interview participants (Traditional healers)
***This information sheet is for you to keep*.**
My name is Raymond Aborigo, I am conducting a research project with Pascale Allotey, a professor in the Department of Global Public Health towards a PhD at Monash University. I am also a staff of the Navrongo Health Research Centre. This means that I will be writing several research articles from the project that I'm conducting. We have funding from the Global Public Health Department of Monash University to conduct the research.
You are invited to take part in this study. Please read this Explanatory Statement in full before making a decision.

You are being invited to participate in this study because a traditional birth attendant thinks that you can help us to understand how the community perceives and manages pregnancy-related complications better.

The aim/purpose of the research
We are conducting this study to find out how the community thinks about illnesses related to pregnancy at the community level and how that affects the choices that they make in seeking treatment. We would also like to know how you manage pregnancy-related illnesses at the community level. After that, we would like you to help us find individuals or groups of people who can help us understand the issues that we will be discussing with you better.

Possible benefits
There are no direct benefits to you as a participant in this study but we are hopeful that the knowledge that we will get from this study will help us know how the community views and manages pregnancy-related illnesses as well as the difficulties that they face in seeking treatment. This research has the potential to contribute information towards targeting maternal health interventions at the community level more appropriately. We will also know how best communities can help themselves to prevent pregnancy-related illnesses.

What does the research involve?
The study involves an interview with you that will be audio recorded and transcribed. We have a question guide that we will use to help us discuss the issues that I mentioned earlier. Since we cannot write everything that you will be saying, we will like to audio record it so that we can listen to it later on and write it out.

How much time will the research take?
The interview will last between 40 and 60 minutes.

Inconvenience/discomfort
If you agree to participate in the study, it will require about 40 to 60 minutes of your time that you could have used to do something else. However, I will ensure that I do not drag the discussion longer than it is necessary.

Payment

You will not be paid for your participation in this study. However, if you suffer any injury as a result of your participation in the study, the study will take care of you. You will also be given two cakes of soap as a sign of appreciation for your participation in the study.

Can I withdraw from the research?

Being in this study is voluntary and you are under no obligation to consent to participate. However, if you do consent to participate, you may withdraw from further participation at any stage but you will only be able to withdraw your data only before the publication of the study results. You will not suffer any consequences if you refuse to participate in the study or if you withdraw your participation or your data.

Confidentiality

The data that will be collected from you will be treated as confidential. Your name will not be taken as part of the data collection process so that your identify can be protected. All the data collected will be filed in locked cabinets and only investigators on the study will have access to them. Study results will be reported in aggregate and no individual's name will be mentioned in them.

Storage of data

Data collected will be stored in accordance with Monash University regulations, kept on University premises, in a locked filing cabinet for 5 years. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

Results

If you would like to be informed of the aggregate research findings, please contact Raymond Aborigo [redacted] The findings are accessible for a period of 5 years.

If you would like to contact the researchers about any aspect of this study, please contact the Chief Investigator:	If you have a complaint concerning the manner in which this research **(PROJECT NUMBER)** is being conducted, please contact:
Prof. Pascale Allotey Global Public Health Monash University, Sunway campus +60355144962	**Dr. John Awoonor-Williams** **The Chair,** **Navrongo Health Research Centre** **Institutional Review Board,** **Box, 114, Navrongo – Ghana** **Tel: +233 382122348**

Thank you.

Raymond Aborigo

Consent form for individuals participating in in-depth interviews

(Traditional healers)

NOTE: This consent form will remain with the Monash University researcher for their records

I agree to take part in the Monash University research project specified above. I have had the project explained to me, and I have read the Explanatory Statement, which I will keep for my records. I understand that agreeing to take part means that:

I agree to take part in the discussion ☐ Yes ☐ No

I agree to allow the interview to be audio-taped ☐ Yes ☐ No

and/or

I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project without being penalised or disadvantaged in any way.

and/or

I understand that any data that the researcher extracts from the focus group for use in reports or published findings will not, under any circumstances, contain names or identifying characteristics.

and/or

I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party.

and/or

I understand that data from the in-depth interview transcripts and audio-tape recordings will be kept in a secure storage and accessible to the research team. I also understand that the data will be destroyed after a 5 year period.

Participant's name

Signature **or** **Thumbprint**

Date

10.7 Appendix 7: Screening Tool

No	Question	Variable
1	Date of interview ☐☐ ☐☐ ☐☐ ☐☐ ☐☐ ☐☐	
2	Name:……..	
3	Age ☐☐ ☐☐	
4	Compound name: ……..	
5	Compound number ☐☐ ☐☐ ☐☐ ☐☐ ☐☐	
6	Village name:.....	
7	Section:…….	
8	Level of education 1. None 2. Primary 3. Secondary 4. Tertiary 5. Vocational/Technical 6. Other (Specify :……)	
9	Number of deliveries ☐☐ ☐☐	
10	Number of live deliveries ☐☐ ☐☐	
11	Date of birth of index child? ☐☐ ☐☐ ☐☐ ☐☐ ☐☐ ☐☐	
12	Place of delivery of index child? 1. Hospital 2. Health Centre 3. Clinic 4. Community health compound 5. On the way to health facility 6. Home (Nurse) 7. Home (TBA) 8. Home (Specify:……) 9. Other (Specify :……)	
13	Were you attending antenatal during your last pregnancy? 1. Yes 2. No ***If No, Please skip to Q15***	
14	How many antenatal visits? ☐☐ ☐☐	
15	During your last pregnancy, did you fall sick to the extent that you had to seek care? Yes No ***If No, please end interview***	
16	What was wrong with you? 1. Prolonged labour 1. Yes 2. No 2. Retained placenta 1. Yes 2. No 3. Ruptured uterus 1. Yes 2. No	

	4. Infection 1. Yes 2. No 5. Hemorrhage 1. Yes 2. No 6. Cord around neck 1. Yes 2. No 7. Severe headache, blurred vision, swelling feet 1. Yes 2. No 8. High blood pressure 1. Yes 2. No 9. Abnormal lying 1. Yes 2. No 10. Shock 1. Yes 2. No 11. Respiratory distress 1. Yes 2. No 12. Spirit Child 1. Yes 2. No 13. Witchcraft 1. Yes 2. No 14. Severe malaria 1. Yes 2. No 15. Other (Specify……..) 1. Yes 2. No 16. Termination/Abortion 1. Yes 2. No	
17	Where did you go to seek care? *(Circle all that apply)* 1. Traditional healer 2. Hospital 3. Health centre/clinic 4. Home treatment 5. No treatment sought 6. Other (Specify :……..) ***Skip Q18 if treatment was sought from only one source.***	
18	In what order did you visit the places of care? ***(If more than one source is mentioned in Q17, please write the order in which the woman sought care)*** Traditional Healer [ ][ ] Hospital [ ][ ] Home treatment [ ][ ] Other [ ][ ]	
19	How long did you stay at the final place of care? [ ][ ]	
20	Do you think the sickness was serious to the extent that if you did not seek treatment you would have died? 1. Yes 2. No	

10.8 Appendix 8: Socio-cultural and biomedical audit tool

This questionnaire was adapted from four standardardised verbal and social autopsy questionnaires by WHO, INDEPTH Network (2 tools) and D'Ambrouso et al. (2010)

Study title: CONTEXTUALIZING MATERNAL MORBIDITY AND MORTALITY THROUGH MATERNAL HEALTH AUDITS
BIOMEDICAL AND SOCIO-CULTURAL AUDIT OF NEAR MISSES

For the woman and family members or care-giver during the near miss event

NA= NOT APPLICABLE = 88

DK=DON'T KNOW=99

Time Start: |___||___| : |___||___|

SECTION A: BACKGROUND INFORMATION

Instructions to interviewer: Complete this section before the interview

1. Case ID	|___||___||___||___||___||___|	2. Name of respondent	
3. Village name		4. Section	
5. Compound Name		6. Compound No.	|___||___||___||___||___|
7. Date of interview	|___||___|/|___||___| /|___||___|	8. Date of near miss	|___||___|/|___||___| /|___||___|
9. Age of case	|___||___|	10. Gravidity	|___||___| (pregnancies)
11. Parity	|___||___| (births)	12. Number of children alive	|___||___|
13. Ethnicity	Kasem Nankani Builsa Other, Specify _____		

14. What is the highest level of school you attended?	1. None 2. Primary 3. Junior High 4. Senior high	5. College/Vocational/Academy 6. University 7. Other, specify _____
15. What is your main occupation/what kind of work do you mainly do?	Housewife Laborer Farmer Informal business/low skilled Formal business	Military Government Manager/administration Transportation worker Unemployed Other, specify

	Professional/technical _____

16. Marital status	Married/Living with a partner Divorced Separated Widowed Never married → Q24
17. What type of marriage are you in?	1. Polygamous 2. Monogamous
18. If polygamous, what is your position among the wives?	☐☐
19. Is your husband alive?	1. Yes → Q21 2. No 88. NA
20. When did your husband die?	|___||___|/|___||___| /|___|___|___|___| [DD / MM / YYYY] 99. Dk 88. NA DK → If DK: Did he die during the past: 3 months Year 6 months 2 years or more 88. NA
21. What is/was the occupation of your husband?	Labourer Farmer/Agriculture Informal business/low skilled Formal business Professional/technical Military Government Manager/administration Transportation worker Unemployed Other, specify _____ 88. NA
22. What is/was the highest level of school that your husband attended?	None Primary Junior High Senior high Academy University Other, specify _____ 88. NA 99. DK
23. What was the highest level (grade) of school your husband finished at that level of education	Grade ____ 88. NA 99. DK

24. How many respondent/s are present at interview?	|___||___|
25. Record their relationship to the case **(Circle all that apply– probe by saying "any more")**	Husband Grandmother Grandfather Mother Mother-in-law Father Father-in-law Brother Brother-in-law Sister Sister-in-law Son Daughter Neighbours Respondent only Other, specify _____

26. Near miss event? (IF NO/UNSURE/DON'T KNOW → **END INTERVIEW)**	YES → If YES, record time of illness: <28 weeks or <6 months pregnant >6 months pregnant, prior to onset of labour Childbirth Postpartum → record |___||___| Days

SECTION B: SOCIO-CULTURAL AUDIT

B1: OPEN HISTORY QUESTIONS

Instructions to interviewer - Allow the respondent to tell you in her own words. Keep prompting until the respondent says there is nothing else to add. While recording, underline any unfamiliar terms and write them in the local language.

ASK

24. Could you tell me about the complication that you suffered? (Probe for feeding, traditional recommended practices and behaviours)

_____

_____

B2: PREVENTIVE BEHAVIOUR

27. Did you want the pregnancy at the time that you knew you were pregnant?		1. Yes Q31 2. No
		1. Yes 2. No Q30 88. NA Q35
31. Did you seek antenatal care during this pregnancy?	Yes No	
32. Where did you go for antenatal care?	1. Health facility 2. TBA 3. Traditional healer 4. Grandmother 5. Other, specify 88. NA	→ Q42
33. How many ANC visits did you have?	|___||___| 99. DK 88. NA	
34. How old was the pregnancy when you made your last ANC visit	|___||___|Months 88. NA	
35. Were you advised to deliver at the health facility?	Yes No → Q35 88. NA	

36. Why did they advise you to deliver at the health facility?	There were problems with the pre Part of the routine at ANC Previous deliveries were at home Other, specify _____ 88. NA 99. DK		
37. Did the health worker recommend any lifestyle or behaviour to you in order to prevent illness?	Yes No 88. NA		
28. Did you do anything not to get pregnant?			
29. What did you do?		1. Family planning, Specify method 2. Abstinence 3. Other, Specify Q31 88. NA	
30. Why did you not do anything?		1. Didn't know what to do 2. Couldn't access a family planning method 3. Partner didn't want me to use a method 4. Other, Specify 88. NA	

38. Were you tested for HIV-AIDS	1. Yes 2. No 88. NA	
39. Did you take the malaria medicine that they give to pregnant women?	1. Yes 2. No 88. NA	
40. How many times did you take the antimalarial medicines?	|___||___| 88. NA	
41. What other medications did you receive at the antenatal clinic? **(Circle all that apply– probe by saying "any more")**	1. Immunisation against tetanus 2. Folate acid 3. Dewormers 4. Iron supplements 5. Pain killers 6. Nothing 7. Other, Specify _____ 88. NA	
42. Were you sleeping under a bed net during the pregnancy?	1. Yes 2. No	

B3: FIRST DELAY

43. Tell me about how you realised that you had a complication and needed to do something about it.

(Probe for first symptom recognised, other symptoms, when did they realise it was severe, who recognized the first symptom and severe symptoms, how did she feel, what was the problem,) ***Timing*** *(probe for how long it took from first symptom to realise it was severe)*

---

44. What was the first symptom that you recognised?	1. Fits 2. Swelling on some part of the body 3. Swelling of the feet and ankles 4. Swelling of the face 5. Blurred vision 6. Strong and sudden abdominal pain 7. Smelly vagina discharge 8. Vaginal bleeding 9. Anaemia 10. Breathless when carrying out normal activities 11. Sudden collapse 12. Fever 13. Shivering 14. Sweating a lot 15. Swollen glands 16. Lumps in neck 17. Lumps in groin 18. Lumps in arm 19. Cough 20. Coughing up blood 21. Yellowness of skin/eyes 22. Infected wounds 23. Other(Specify:.....)
45. Who recognized the first symptom	1. Self 2. Relative / neighbour 3. TBA, other traditional provider 4. Nurse 5. Midwife 6. Doctor 7. Obstetrician 8. 8. Other, specify _____
46. What were the other symptoms? **(circle all that apply – probe by**	24. Fits 25. Swelling on some part of the body 26. Swelling of the feet and ankles 27. Swelling of the face

saying "any more")	28. Blurred vision 29. Strong and sudden abdominal pain 30. Smelly vagina discharge 31. Coma 32. Anaemia 33. Breathless when carrying out normal activities 34. Sudden collapse 35. Fever 36. Shivering 37. Sweating a lot 38. Swollen glands 39. Lumps in neck 40. Lumps in groin 41. Lumps in arm 42. Cough 43. Coughing up blood 44. Yellowness of skin/eyes 45. Infected wounds
47. What were the severe symptoms? **(circle all that apply – probe by saying "any more")**	1. Fits 2. Swelling on some part of the body 3. Swelling of the feet and ankles 4. Swelling of the face 5. Blurred vision 6. Strong and sudden abdominal pain 7. Smelly vagina discharge 8. Coma 9. Anaemia 10. Breathless when carrying out normal activities 11. Sudden collapse 12. Fever 13. Shivering 14. Sweating a lot 15. Swollen glands 16. Lumps in neck 17. Lumps in groin 18. Lumps in arm 19. Cough 20. Coughing up blood 21. Yellowness of skin/eyes 22. Infected wounds
48. How long did it take from first symptom to realise it was severe	|___||___| Hours

49. Did you initiate treatment at home?	1. Yes 2. No → Q53		

50. What kind of treatment was done at home?	1. Drugs 2. Herbs 3. Other, Specify _____ 88. NA 99. Don't Know		
51. What kind of drugs did you take at home?	1. Malaria drug, Specify _____ 2. Antibiotic, Specify _____ 3. Paracetamol 4. Other, Specify _____ 88. NA 99. DK		
52. How long after illness started was care initiated at home?	|___||___| Days 88. NA		
53. Did you seek treatment outside the home?	1. Yes Q55 → 2. No		
54. If no, why did you not seek treatment outside the home? ***(Please end interview if treatment was not sought outside the home unless the traditional provider is resident in the patient's home. In that case, please complete the section on traditional provider)***	1. Money not available for transport 2. Money not available for care 3. Transport not available 4. Husband/other relative made another decision 5. Did not think care was necessary 6. Didn't know where to go 7. Poor health service quality 8. Clinic not open 9. Distance to health facility was too far 10. No-one to take care of children 11. Other reason, specify _____ 88. NA		
55. On which day after the first symptom did you go outside the home to seek care?	|___||___| Days 88. NA		
56. Where did you go to seek treatment? **(circle all that apply – probe by saying "anywhere else")**	1. Hospital 2. Health centre 3. Health clinic 3. Community health compound 4. Drug shop 5. Traditional birth Attendant/healer/spiritualist 6. Other, specify _____ 88. NA		
57. care sought in chronological order **type of provider** - use codes above **when** – days after illness started			

TYPE OF PROVIDER:	WHEN?	FACILITY NAME:
1:_____	DAY:_____	_____
2:_____	DAY:_____	_____
3:_____	DAY:_____	_____
88. NA		

		1ST Source	2ND Source	3RD Source
58. How did you to go to the various providers? ***(Please tick based on responses to Q57 above)***	1. Private car 2. Public transport 3. Bicycle 4. Motorcycle 5. Taxi 6. On foot 7. Other (specify)_____ 88. NA	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
59. How much time did it take to go to the providers?	Hours (Record 00 if less than 1 hr) 88. NA 99. DK	|___||___| |___| |___|	|___||___| |___| |___|	|___||___| |___| |___|
60. What kind of treatment was given at each of the care providers? **(circle all that apply – probe by saying "anywhere else")**	1. Tablets, Specify_____ 2. Blood Transfusion 3. IV fluid 4. Iron injections 5. Antibiotics by injection 6. Oxygen 7. Herbs 8. Caesarean section 9. Other, Specify_____ 88. NA 99. DK	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

IF TRADITIONAL PROVIDER WAS CONSULTED PLEASE PROCEED WITH B4 IF NOT GO TO B5

B4: TRADITIONAL PROVIDER

61. Can you narrate how care was provided by the traditional provider? *(Probe : Who took the decision to go to this provider, Why the choice of this provider, who was the provider, advice given, treatment given, reasons for choice of treatment),* were medicine/herbs available? What was your opinion on the availability and conduct of the provider? What were your impressions about the treatment you received? How did you pay for the services? What was your impression of the cost of care? How long did you remain at that providers place? Why did you leave the provider's place? Where did you go next? Were there delays in receiving care? Can you describe how you felt? How did you look like, were you in labour)?

_____

62. Who took the decision to go to the traditional provider?	1. Relative or neighbour 2. Husband 3. TBA 4. Self 5. Other, Specify _____ 88. NA
63. What was the reason for choosing the traditional provider? **(circle all that apply – probe by saying "anywhere else")**	01. Money not available 02. No-one to take care of children 03. Husband/other relative made another decision 04. Did not know where to go 05. Poor health service quality 06. Clinic not open 07. Transportation not available 08. Transportation too expensive 09. Distance to health facility was too far 10. Other reason, specify _____ 11. 88. NA
64. When you arrived at the traditional provider's place, how long did you have to wait before you were attended to?	|___||___||___| Minutes 88. NA
65. Who attended to you?	1. TBA 2. Traditional healer/herbalist 3. Spiritualist

	4. Soothsayer 5. Other, Specify 88. NA
66. Were the necessary medicines/herbs available at the traditional provider's place?	1. Yes 2. No 88. NA
67. Did you have to go out of the traditional provider's place to get medicine or herbs?	1. Yes 2. No 88. NA
68. What were your impressions of the traditional provider's place?	1. Ready for emergenceis 2. Not ready for emergencies 3. Other, Specify 88. NA
69. Do you think there was a delay in receiving care at the traditional provider's place?	1. Yes 2. No 88. NA
70. Did you have to pay for the treatment?	1. Yes 2. No 88. NA
71. What was your impression of the cost of care?	1. Reasonably priced 2. Too expensive 3. Free 4. Other, Specify

		88. NA
72. Did the delivery occur during this time?		Yes No 88. NA
73. Did the traditional provider tell you what caused the complication?		Yes No 88. NA
74. What did he/she say was wrong with you?		
75. Any other information on the events that took place when you reached the traditional provider's place?		
		|___||___| Days
82. Did you seek care at the health facility?	1. Yes 2. No → Q134	88. NA
83. Were there problems in taking the decision to seek care at the health facility?	1. Yes 2. No → Q85 88. NA	
84. What was/were they? (circle all that apply – probe by saying "anything else")	Money not available for transport Money not available for care Transport not available Husband/other relative made another decision Did not think care was necessary	

	Didn't know where to go Poor health service quality Clinic not open Distance to health facility was too far No-one to take care of children Other reason, specify _____ 88. NA		
85. Who assisted you take the decision to seek care at the health facility? (circle all that apply – probe by saying "anybody else")	1. No-one 2. Relative / neighbor 3. TBA, other traditional provider 4. Nurse 5. Midwife 6. Doctor 7. OBGYN 8. Other, specify _____ 88. NA		
86. What was the reason for that decision? (circle all that apply – probe by saying "anything else")	1. Have health insurance 2. Seriousness of illness 3. All efforts at home failed (last resort) 4. Preference for health facility care 5. Assurance of quality care 6. Free delivery 7. Proximity to health facility 8. Other, Specify _____ 88. NA		

87. How long did it take between the recognition of the first symptom to your decision to visit the health facility?	|___||___| Days (Record 00 88. NA	
88. Any other information on the decisions to seek care?		
76. How long did you remain at this level of care?		
77. Why did you leave this level of care?		1. Recovered 2. Referred 3. Couldn't continue to pay the bills 4. Responsibilities back home 5. Condition was not improving 6. Wanted to go to the hospital 7. Other, Specify 88. NA
78. Where did you go next?		1. Home 2. Traditional provider 2. Health facility 88. NA

79. How much did you pay for transport to go and see the traditional provider?	|___||___||___||___|GHS	

80. How much did you pay for treatment at the traditional provider's place?	|___||___||___||___|GHS	
81. How much did you pay for other costs (incl. accommodation, feeding etc)?	|___||___||___||___|GHS	

B.5: DECISION TO SEEK CARE AT THE HEALTH FACILITY

B.6: SECOND DELAY: THE JOURNEY TO THE HEALTH FACILITY

89. Can you please describe your journey to the health facility?

(Probe; were there delays in reaching the health facility once a decision had been made to seek care? Probe for her symptoms during this time (how she felt, what she looked like, if she was in labour)

_____
_____
_____

90. Were there problems in getting to the health facility?	1. Yes 2. No → Q92 88. NA
91. What was/were they? (circle all that apply – probe by saying "anything else")	Money not available No-one to take care of children Husband/other relative made another decision Did not know where to go Poor health service quality Clinic not open Transportation not available Transportation too expensive Distance to health facility was too far

	Other reason, specify _____ NA
92. How long did it take to arrange transport?	|___||___| Hours (Record 00 if less than 1 hour) 88. NA
93. Was it difficult to arrange transport?	1. Yes 2. No 88. NA
94. How long did it take for the transport to reach the health facility?	|___||___| Hours (Record 00 if less than 1 hour) 88. NA
95. Was it difficult to pay for transport?	1. Yes 2. No 88. NA
96. Was money borrowed to pay for transport?	1. Yes 2. No 88. NA
97. How much did it cost?	|___||___||___||___|GHS 88. NA
98. Were there birth arrangements (or a birth plan) made by the family?	1. Yes

	2. No 88. NA
99. Were there birth arrangements (or a birth plan) made by the community?	1. Yes 2. No 88. NA
100. Who assisted you at the time you were trying to find transport? (circle all that apply – probe by saying "anybody else")	No-one Relative / neighbour TBA, other traditional provider Nurse Midwife Doctor Obstetrician (Specialist) Other, specify _____ 88. NA
101. Did the delivery occur during this time?	1. Yes 2. No 88 NA
102. Any other information on the events that took place when you were trying to seek care at the health facility?	

104. What happened at the health facility that you visited?	1. Received care ——→ Q109 2. Referred 88. NA
105. What was the reason for referring you?	1. Lack of equipment 2. For better care 3. Lack of blood 4. Lack of oxygen 5. Other, Specify _____ 88. NA
106. Where did they refer you to?	1. Hospital 2. Health centre 3. Private clinic 4. Drug shop 5. Traditional healer 6. Traditional birth Attendant 6. Other, specify _____ 88. NA
107. Did you go to where you were referred to?	1. Yes ——→ Q109 2. No 88. NA
108. Why did you not go to where you were referred ? **(circle all that apply – probe by saying "anything else")**	01. Money not available 02. No-one to take care of children 03. Husband/other relative made another decision 04. Did not know where to go 05. Poor health service quality 06. Clinic not open 07. Transportation not available 08. Transportation too expensive 09. Distance to health facility was too far 10. Other reason, specify _____ 88. NA
109. When you arrived at the health facility, how long did you have to wait before you were attended to?	|___||___||___| Minutes 88. NA
110. Who attended to you?	01. CHO 02. Nurse 03. Midwife 04. Doctor 05. Obstetrician 06. Other, specify 88. NA
111. Were there necessary medicines/supplies available in the health facility?	1. Yes 2. No 88. NA
112. Did you have to go out of the facility to get medicines or supplies?	1. Yes 2. No ——→ Q114 88. NA
113. Were there problems getting medicines or supplies outside the facility? (Either finding an open market to buy medicines, finding the required medicines at the market?)	1. Yes 2. No 88. NA
114. What were your impressions of the health personnel at the facility? **(circle all that apply – probe by saying "anything else")**	1. Acted promptly/saved her life 2. Delayed in attending to her 3. Wanted to help but did not have supplies 4. Did not care 5. Insulting 6. Welcoming/comforting 7. Other, Specify _____ 88. NA
115. What were your impressions of the health facility?	1. Ready for emergenceis 2. Not ready for emergencies 3. Other, Specify _____ 88. NA
116. Do you think there was a delay in receiving care at	1. Yes

the health facility?	2. No 88. NA
117. Were there problems in receiving care when you reached the health facility?	01. Yes 02. No 88. NA
118. What was/were they? **(circle all that apply – probe by saying "anything else")**	01. Money not available 02. Drugs/supplies not available 03. Staff not available 04. Did not know where to go 05. Poor health service quality 06. Clinic not open 07. Other reason, specify _____ 88. NA
119. Did you have to pay for the treatment?	1. Yes 2. No 3. NHIS ——→ Q121 88. NA
120. What was your impression of the cost of care?	1. Reasonably priced 2. Too expensive 3. Free services 3. NHIS 88. NA
121. Who assisted you at the health facility?	01. No-one 02. Relative / neighbour 03. TBA, other traditional provider 04. Nurse 05. Midwife 06. Doctor 07. Obstetrician 08. Other, specify _____ 88. DK 99. NA
122. Did the delivery occur during this time?	01. Yes 02. No ——→ Q124 03. 88. NA
123. What was the method of delivery?	01. Vaginal (Normal/ assisted) 02. Caesarean 03. 88. NA
124. Did a health professional ever tell you what caused the complication?	01. Yes 02. No 88. NA
125. What treatment was given?	1. Blood transfusion 2. Vacuum extraction 3. Oxygen 5. Other, Specify _____ 88. NA
126. What did they say was wrong with you?	1. Haemorrahage 2. Anaemia 3. Obstructed labour 4. Eclampsia 5. Unsafe abortion 6. puerperal sepsis 7. Other, Specify _____ 88. NA
127. Any other information on the events that took place when you reached the health facility?	
128. How long did you remain at this level of care?	|___||___| Days (**Record 00 if less than one day**) 88. NA

129. Why did you leave this level of care?	1. Recovered 2. Referred 3. Couldn't continue to pay the bills 4. Needed to take care of responsibilities back home 5. Condition was not improving 6. Wanted to go and try traditional medicine 7. Other, Specify _____ 88. NA
130. Where did you go next?	1. Home 2. Traditional provider 3. Referred facility

B.7 : THIRD DELAY – CARE AT THE HEALTH FACILITY

103. *Can you tell me about the events that occurred when you arrived at the health facility?*

(Probes: What were the treatments given? What were your impressions of the facility? (e.g. means of entry; availability or personnel; appropriately trained staff; communication; cleanliness etc. Were there delays in receiving good care when you reached the health facility? Can you describe how you felt? How did you look like, were you in labour?)

_____

131. How much did you pay for transport to go to the health facility?	|___||___||___||___||___|GHS
132. How much did you pay for treatment at the health facility?	|___||___||___||___||___|GHS
133. How much did you pay for other costs (incl. accommodation, feeding etc)?	|___||___||___||___||___|GHS **(Record 00 if service was free)**

134. We identified that there were problems with [e.g. finding transport]. In your opinion, what caused these delays to occur and what steps were taken to overcome them?
135. Do you think the delays could have been avoided?
136. Do you think that anything could have been done to prevent the complication?
137. How did the complication affect the family? (probe for time and income)

138. Is there anything that you or anyone else could have done differently to prevent this complication?

What?

_____

_____

SECTION C: BIOMEDICAL AUDIT

C1: CHILDBIRTH

139. Pregnancy Outcome	Live birth Still birth Abortion *Foetal distress*	Major malformation Other, specify _____
140. Place of delivery	01. Own/relative's home 02. TBA/ traditional providers home 03. Midwife's home 04. Birthing hut / health post 05. Health centre: _____	06. Private clinic 07. Hospital 08. On the way to health facility 09. Other place: _____
141. Attendant at delivery, tick as many as apply	01. No-one 02. Relative / neighbour 03. TBA, other traditional provider 04. Nurse 05. Midwife 06. Doctor 07. Obstetrician (Specialist) 08. Other, specify _____	
142. Where did complication start	Home 2. Health facility 3. On the way to health facility	
143. Delays present, (Circle all that apply)	First Delay Second Delay Third Delay	

144. Can you tell me about the history of your health? *Prompts*: Start with a review of systems: any problems / known medical conditions with your head (eyes, ears, nose throat); nervous system (headaches, dizziness, fainting, shivering, seizures); CV system (chest pains, shortness of breath, cough, bloody cough, fever, wheeze); GI system (nausea, vomiting, vomiting blood, vomiting black material, abnormal bowels, bloody stool); GU (urination, vaginal discharge, pelvic pain etc). Describe any injury or accidents	
145. Did you know that you were sick or that there was a problem with your health?	1. Yes 2. No 88. NA
146. Did a health professional or traditional provider ever tell you that you have a disease?	1. Yes 2. No 88. NA
147. Were you taking any medication?	1. Yes 2. No 88. NA
148. Can you describe your symptoms (how you felt)?	
149. How long did the sickness last?	|___||___|Days 88. NA
150. Do you have any medical records or documents on the illness?	1. Yes 2. No 88. NA
151. Is there any other information on the illness/es that led to your complication?	1. Yes, Specify _____ 2. No 88. NA

C.1: COMPLICATIONS DURING CHILDBIRTH OR WITHIN 6 WEEKS OF CHILDBIRTH

	1=YES	**2=NO**	**88=NA**

152. Was labour prolonged more than 24 hours?	1	2	88
153. Was the baby's position abnormal?	1	2	88
154. Was the baby too big for delivery?	1	2	88
155. Did an unusual part of baby such as hand or feet come out first?	1	2	88
156. Did the placenta remain inside?	1	2	88
157. Was the baby delivered alive?	1	2	88
158. Did you receive any information that you had any delay in reduction of uterus size?	1	2	88
159. Did you receive any information saying that the uterus came out after delivery?	1	2	88
160. Was the delivery by operation?	1	2	88
161. Was delivery assisted using instrument to pull/suck baby out?	1	2	88
162. Did you have major bleeding around pregnancy or delivery?	1	2	88
163. Was there any attempt to terminate pregnancy?	1	2	88
164.Was this your first pregnancy?	1	2	88
165. Was it a multiple pregnancy?	1	2	88
166. Did you have major bleeding in 1st 3 months of your most recent pregnancy?	1	2	88
167. Have you had a previous delivery by operation?	1	2	88
168. Was your blood pressure raised during your most recent pregnancy?	1	2	88
169. Have you ever had fits?	1	2	88
170. Did you have fits only during your most recent pregnancy?	1	2	88
171. Have you ever had a problem called epilepsy?	1	2	88
173. Did you have any swelling of any part of your body during your most recent pregnancy?	1	2	88
174. Did you have swelling of your feet and ankles?	1	2	88
175. Did you have swelling of your face?	1	2	88
176. Did you have general swelling of your body?	1	2	88
177. Did you have blurred vision?	1	2	88
178. Did you have very strong and sudden abdominal pain in the 3 days before the day of the illness became serious?	1	2	88
179. Did you have foul smelling vaginal discharge?	1	2	88
180. Did you require/get antibiotics by injection (by a shot in your arm or leg) or infusion (by a needle in your veins)?	1	2	88
181. Did you have a coma that lasted 1 day or more in the few days before the onset of the illness became serious?	1	2	88
182. Were you very pale/did you have anaemia (low blood)?	1	2	88
183. Did you require/get blood transfusion?	1	2	88
184. Did you require/get iron injections?	1	2	88
185. Did you have any operation in the month before death?	1	2	88
186. Did you have an operation to remove your womb?	1	2	88
187. Were you breathless carrying out normal activities?	1	2	88
188. Did you have weight loss?	1	2	88
189. Were you so sick before that you had to stay in bed for most of the day?	1	2	88
190. Did you collapse suddenly?	1	2	88

191. Did you have a sudden and strong fever?	1	2	88
192. Did you have a fever that started at anytime?	1	2	88
193. Did you have a fever that came and went?	1	2	88
194. Did you have a fever with shivering?	1	2	88
195. Did you have fever that lasted for more than 3 weeks?	1	2	88
196. Were you sweating a lot at night?	1	2	88
197. Did you have swollen glands/lumps in your neck, groin, or under your arms?	1	2	88
198. Did you have a stiff neck?	1	2	88
199. Did you have a cough?	1	2	88
200. Were you coughing for more than 3 weeks?	1	2	88
201. Were you coughing up blood?	1	2	88
202. Did you have any yellowness of the skin or eyes?	1	2	88
203. Did you have any open or infected wound?	1	2	88
204. Do you have any history of Tuberculosis?	1	2	88
205. Do have HIV/AIDS?	1	2	88
206. Did you have Malaria?	1	2	88
207. Do you have a liver disease?	1	2	88
208. Do you have cancer?	1	2	88
209. Do you have any heart disease?	1	2	88
210. Did you have any prior injury from an accident or violence?	1	2	88
211. Do you think you brought the complication upon yourself?	1	2	88

212. Is there anything else you would like to tell me about your illness?
213. What do you think caused the illness?
214. Is there anything you would like to ask me?

After all relevant questions have been asked, end the interview and THANK the respondent

Re-assure confidentiality and respect for the information provided

Explain that the results of the study will be presented to the health service/public in a compiled way, with no information that could identify individuals who provided information

Notes / Interviewer's observations

Time End: |___||___| : |___||___|

10.9 Appendix 9: Consent form for women in the socio-cultural and biomedical audit

Explanatory Statement for women participating in the socio-cultural and biomedical audits (Women with pregnancy-related complications)

***This information sheet is for you to keep*.**

My name is Raymond Aborigo, I am conducting a research project with Pascale Allotey, a professor in the Department of Global Public Health towards a PhD at Monash University. I am also a staff of the Navrongo Health Research Centre. This means that I will be writing several research articles from the project that I'm conducting. We have funding from the Global Public Health Department to conduct the research.

You are invited to take part in this study. Please read this Explanatory Statement in full before making a decision.

You are being invited to participate in this study because you gave birth within the past 3 months and after talking to you, we have realised you suffered a pregnancy-related complication during the last pregnancy. Your contact information was obtained from the Navrongo health research centre that has been taking information on births, deaths, marriages, pregnancies and so on within your community for the past 20 years.

The aim/purpose of the research

We are conducting this study to find out the causes of your pregnancy complication and the processes that you went through to have it treated. We are interested in processes that helped and those that posed problems to you when you were looking for treatment. We are particularly interested in the processes at the community level but we will be discussing your experiences at the health facility if you sought treatment there.

Possible benefits

There are no direct benefits to you as a participant in this study but we are hopeful that the knowledge that we will get from this study will help us know how the community views and manages pregnancy-related illnesses as well as the difficulties that they face in seeking treatment. This research has the potential to contribute information towards targeting maternal health interventions at the community level more appropriately. We will also know how best communities can help themselves to prevent pregnancy-related illnesses.

What does the research involve?

The study involves an interview with you. I have a questionnaire that will be administered to you and it will mainly be on your experiences during the pregnancy complication and how you finally recovered from it.

How much time will the research take?

The interview will last between 1hour and 1 hour 30 minutes.

Inconvenience/discomfort

If you agree to participate in the study, it will require about 1 hour to 30 minutes of your time that you could have used to do something else. However, I will ensure that I do not drag the discussion longer than it is necessary.

Some of the questions require personal information on both your past and present health status. Other questions are sensitive and could bring back painful memories. Your name and contact information will also be included on the questionnaire so that we can contact you in case we need further information on your complication. Medical doctors will be using your information to determine the cause of your complication and if they need further information we may contact you.

Payment

You will not be paid for your participation in this study. However, if you suffer any injury as a result of your participation in the study, the study will take care of you. You will also be given two cakes of soap as a sign of appreciation for your participation in the study.

Can I withdraw from the research?

Being in this study is voluntary and you are under no obligation to consent to participate. However, if you do consent to participate, you may withdraw from further participation at any stage but you will only be able to withdraw your data only before the publication of the study results. You will not suffer any consequences if you refuse to participate in the study or if you withdraw your participation or your data.

Confidentiality

The data that will be collected from you will be treated as confidential. All the data collected will be filed in locked cabinets and only investigators on the study will have access to them. Study results will be reported in aggregate and no individual's name will be mentioned in them.

Storage of data

Data collected will be stored in accordance with Monash University regulations, kept on University premises, in a locked filing cabinet for 5 years. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

Results

If you would like to be informed of the aggregate research findings, please contact Raymond Aborigo[redacted]. The findings are accessible for a period of 5 years.

If you would like to contact the researchers about any aspect of this study, please contact the Chief Investigator:	If you have a complaint concerning the manner in which this research **(PROJECT NUMBER)** is being conducted, please contact:
Prof. Pascale Allotey Global Public Health Monash University, Sunway campus [redacted]	**Dr. John Awoonor-Williams** **The Chair,** **Navrongo Health Research Centre** **Institutional Review Board,** **Box, 114, Navrongo – Ghana** [redacted]

Consent form for participants in the socio-cultural and biomedical audit

Consent form for individuals participating in the socio-cultural and biomedical audits (Women with pregnancy-related complications)

NOTE: This consent form will remain with the Monash University researcher for their records

I agree to take part in the Monash University research project specified above. I have had the project explained to me, and I have read the Explanatory Statement, which I will keep for my records. I understand that agreeing to take part means that:

I agree to be interviewed by the researcher ☐ Yes ☐ No

I agree to make myself available for a further interview if required ☐ Yes ☐ No

I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project without being penalised or disadvantaged in any way.

and/or

I understand that any data that the researcher extracts from the interview for use in reports or published findings will not, under any circumstances, contain names or identifying characteristics.

and/or

I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party.

and/or

I understand that data from the in-depth interview transcripts and audio-tape recordings will be kept in a secure storage and accessible to the research team. I also understand that the data will be destroyed after a 5 year period.

Participant's name

Signature **or** **Thumbprint**

Date

10.10 Appendix 10: Focus group guide (Community leaders)

FGD GUIDE FOR COMMUNITY LEADERS

Community perceptions of Pregnancy

- How is pregnancy received in this community? Probe for community attitudes towards pregnancy and child birth, especially desire for children.
- Are there traditional practices associated with pregnancy? Probe for taboos and cultural imperatives.
- What is the responsibility of the family to the pregnant woman? Probe for the responsibility of men and the community at large. Ask if these responsibilities are being fulfilled.
- What are your opinions about family planning? Probe: If they will encourage their spouses to take up a method.

Awareness of pregnancy danger signs

- What are some of the signs of severe disease in pregnant women?
- How does the community manage such health problems?
- What improvements are needed?

Complains from pregnant women

- We carried out a study with pregnant women who suffered complications during pregnancy and they told us that the family delayed in taking the decision to go to the hospital.
- As a community, how can you deal with such a problem?
- Does the family or community make birth arrangements to ensure that the woman delivers safely? Probe for the specifics.
- Even though most community members can walk to a community clinic, when they are referred to the hospital in Navrongo, they usually have difficulty reaching the referral point especially on non-market days.
- As a community, what can you do to support pregnant women in need of emergency care to reach the referral point in time?
- Some of the women that we talked to also complained that during the period of their pregnancies, some of their husbands still beat them.
- Why do men beat their wives? Probe why such a thing will happen during pregnancy. Does pregnancy protect or increase the practice?
- As a community, what can you do to stop this practice?
- Some of the women who participated in our study said that sometimes you ask them to visit the traditional healer first before going to the hospital. Occasionally too, when a pregnant woman has made a couple of visits to the health facility and things are not getting better, you ask them to try traditional remedies.

- What is the difference between the treatment that is offered by herbalists and that offered by the hospitals

- What usually motivate community members to send sick pregnant women to traditional healers first?
- Where would you prefer that pregnant women go for health care? why?
- How can you encourage pregnant women to use that source of care?
- How often does the pregnant woman have to visit the hospital before her condition is declared as one for the traditionalist? Probe for success stories from traditional treatments.
- What makes you declare some illnesses as being caused by evil spirits?
- Can conditions caused by evil spirits be managed in health facilities?

The Role of Men

- How are men involved in caring for pregnancies in this community?
- Will men in this community agree to accompany their pregnant wives to antenatal clinics? Why?
- Do they take interest in what happens at the antenatal clinic? Find out if they supervise their wives to take their medicines.
- How does the community work with the DHMT in implementing maternal health interventions at the community level?

10.11 Appendix 11: In-depth interview guide (Health workers)

IDI GUIDE FOR FORMAL HEALTH CARE PROFESSIONALS

FACILITY PREPAREDNESS

- What are the services that your facility provides to pregnant women?
- What are some of the signs of severe disease in pregnant women?
- What kind of maternal complications can your facility handle? Find out what happens if the facility cannot handle a particular complication.
- Kindly describe your responsibilities to pregnant women? Probe for responsibilities of the facility and that of the individual as a professional.
- What are the responsible behaviours that pregnant women have to exhibit in order to ensure a safe delivery? Probe for health worker expectations from the family and the community.

Maternal health interventions:

- What maternal health interventions are currently being carried out in the community? Probe for routine maternal health programs such as home visits.
- How is the community involved in these interventions? Do you think community involvement is necessary?
- What suggestions can you make for improvement?

Formal Health Worker Issues:

- In our study, the women told us that some health workers sometimes do not treat them well and that is why some do not use the health facility for delivery.
- How can you solve such a problem?
- Even though most community members can walk to a community clinic, when they are referred to the hospital in Navrongo, they usually have difficulty reaching the referral point especially on non-market days.
- How can you help solve such a problem?
- Some of the women that we talked to also complained that whenever they come to the facilities they do not usually get the needed attention and so they usually return home still unwell. They said they could visit the facility up to 3 times with the same compliant and nothing will be done about it.
- How can you ensure that such women do not lose trust in the health care system and resort to home remedies including herbs.
- Please describe what is usually done during antenatal visits? Probe for procedures during delivery and the postnatal period.
- Are there instances where the hospital has failed to treat some conditions and the women were asked to try home treatment? Probe for the problem and the outcome.
- What are your views on the use of traditional healers and herbalists by pregnant women suffering complications?

The Role of Men

- Do you think men should have a stronger role to play in maternal health? Probe for the specific role.
- Do men in this community accompany their pregnant wives to antenatal clinics? Why?

- Do they take interest in what happens at the antenatal clinic? Find out if they supervise their wives to take their medicines.
- How can you improve the involvement of men in reproductive health issues? What are the strategies being adopted by the health service?

10.12 Appendix 12: Consent form for community leaders

Explanatory Statement for participants in the focus group discussions (Community leaders)
***This information sheet is for you to keep*.**
My name is Raymond Aborigo, I am conducting a research project with Pascale Allotey, a professor in the Department of Global Public Health towards a PhD at Monash University. I am also a staff of the Navrongo Health Research Centre. This means that I will be writing several research articles from the project that I'm conducting. We have funding from the Global Public Health Department to conduct the research.
You are invited to take part in this study. Please read this Explanatory Statement in full before making a decision.

You have been selected to participate in this study because your community key informant says that you usually participate in taking decisions for the community. We therefore got your contact information from him/her.

The aim/purpose of the research
We are conducting this study to find out how the community thinks about illnesses related to pregnancy at the community level and how that affects the choices that they make in seeking treatment. We would also like to know how you manage pregnancy complications at the community level. We have had some interviews with women who suffered pregnancy-related complications in your community and we will like to discuss the causes of those complications with you to find out what you can do as community leaders.

Possible benefits
There are no direct benefits to you as a participant in this study but we are hopeful that the knowledge that we will get from this study will help us know how the community views pregnancy complications, how they manage them and the difficulties that they face in seeking treatment. This research has the potential to contribute information towards targeting maternal health interventions at the community level more appropriately. We will also know how best communities can help themselves to prevent pregnancy-related complications.

What does the research involve?
The study involves a discussion that will be audio recorded and transcribed. We have a question guide that we will follow to ask you and other people who will be part of the group so that you can discuss the issues that will be raised. Because we cannot write everything that you will be saying, we will like to audio record it so that we can listen to it later on and write out our discussion.

How much time will the research take?
The discussion will last between 1 hour and 1 hour 30 minutes.

Inconvenience/discomfort
If you agree to participate in the study, it will require 1 hour to 1 hour 30 minutes of your time that you could have used to do something else. However, I will ensure that I do not prolong the discussion longer than it is necessary.

Payment
You will not be paid for your participation in this study. However, if you suffer any injury as a result of your participation in the study, the study will take care of you. You will also be given two cakes of soap as a sign of appreciation for your participation in the study.

Can I withdraw from the research?
Being in this study is voluntary and you are under no obligation to consent to participate. However, if you do consent to participate, you may withdraw from further participation at any stage but you will only be able to withdraw data prior to the publication of the study results. You will not suffer any consequences if you refuse to participate in the study or if you withdraw your participation or your data.

Confidentiality
The data that will be collected from you will be confidential. Your name will not be taken as part of the data collection process so that you identify can be protected. All the data collected will be filed in locked cabinets and only investigators on the study will have access to it. Study results will be reported in aggregate and no individual's name will be mentioned in them.

Storage of data
Data collected will be stored in accordance with Monash University regulations, kept on University premises, in a locked filing cabinet for 5 years. A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

Results
If you would like to be informed of the aggregate research finding, please contact Raymond Aborigo[redacted] The findings are accessible for a period of 5 years.

If you would like to contact the researchers about any aspect of this study, please contact the Chief Investigator:	If you have a complaint concerning the manner in which this research **(PROJECT NUMBER)** is being conducted, please contact:
Prof. Pascale Allotey Global Public Health Monash University, Sunway campus [redacted]	**Dr. John Awoonor-Williams** **The Chair,** **Navrongo Health Research Centre** **Institutional Review Board,** **Box, 114, Navrongo – Ghana** [redacted]

Thank you.
Raymond Aborigo

Consent form for individuals participating the focus group discussions (Community leaders)
NOTE: This consent form will remain with the Monash University researcher for their records

I agree to take part in the Monash University research project specified above. I have had the project explained to me, and I have read the Explanatory Statement, which I will keep for my records. I understand that agreeing to take part means that:

I agree to take part in the discussion	☐ Yes	☐ No
I agree to allow the interview to be audio-taped	☐ Yes	☐ No

and/or

I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project without being penalised or disadvantaged in any way.

and/or

I understand that any data that the researcher extracts from the focus group for use in reports or published findings will not, under any circumstances, contain names or identifying characteristics.

and/or

I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party.

and/or

I understand that data from the focus group transcripts and audio-tape recordings will be kept in a secure storage and accessible to the research team. I also understand that the data will be destroyed after a 5 year period.

Participant's name

Signature **or** **Thumbprint**

Date

10.13 Appendix 13: Consent form for health workers (IDIs)

Explanatory Statement for participants in the in-depth interviews
***This information sheet is for you to keep*.**
My name is Raymond Aborigo, I am conducting a research project with Pascale Allotey, a professor in the Department of Global Public Health towards a PhD at Monash University. I am also a staff of the Navrongo Health Research Centre. This means that I will be writing several research articles from the project that I'm conducting. We have funding from the Global Public Health Department to conduct the research.
You are invited to take part in this study. Please read this Explanatory Statement in full before making a decision.

You have been selected to participate in this study because your community key informant says that you usually participate in taking decisions for the community. We therefore got your contact information from him/her.

The aim/purpose of the research
We are conducting this study to find out how the community thinks about illnesses related to pregnancy at the community level and how that affects the choices that they make in seeking treatment. We would also like to know how you manage pregnancy complications at the community level. We have had some interviews with women who suffered pregnancy-related complications in your community and we will like to discuss the causes of those complications with you to find out what you can do as community leaders.

Possible benefits
There are no direct benefits to you as a participant in this study but we are hopeful that the knowledge that we will get from this study will help us know how the community views pregnancy complications, how they manage them and the difficulties that they face in seeking treatment. This research has the potential to contribute information towards targeting maternal health interventions at the community level more appropriately. We will also know how best communities can help themselves to prevent pregnancy-related complications.

What does the research involve?
The study involves a discussion that will be audio recorded and transcribed. We have a question guide that we will follow to ask you and other people who will be part of the group so that you can discuss the issues that will be raised. Because we cannot write everything that you will be saying, we will like to audio record it so that we can listen to it later on and write out our discussion.

How much time will the research take?
The discussion will last between 1 hour and 1 hour 30 minutes.

Inconvenience/discomfort

If you agree to participate in the study, it will require 1 hour to 1 hour 30 minutes of your time that you could have used to do something else. However, I will ensure that I do not prolong the discussion longer than it is necessary.

Payment

You will not be paid for your participation in this study. However, if you suffer any injury as a result of your participation in the study, the study will take care of you. You will also be given two cakes of soap as a sign of appreciation for your participation in the study.

Can I withdraw from the research?

Being in this study is voluntary and you are under no obligation to consent to participate. However, if you do consent to participate, you may withdraw from further participation at any stage but you will only be able to withdraw data prior to the publication of the study results. You will not suffer any consequences if you refuse to participate in the study or if you withdraw your participation or your data.

Confidentiality

The data that will be collected from you will be confidential. Your name will not be taken as part of the data collection process so that your identify can be protected. All the data collected will be filed in locked cabinets and only investigators on the study will have access to it. Study results will be reported in aggregate and no individual's name will be mentioned in them.

Storage of data

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Results

If you would like to be informed of the aggregate research finding, please contact Raymond Aborigo [redacted] The findings are accessible for a period of 5 years.

If you would like to contact the researchers about any aspect of this study, please contact the Chief Investigator:	If you have a complaint concerning the manner in which this research **(PROJECT NUMBER)** is being conducted, please contact:
Prof. Pascale Allotey Global Public Health Monash University, Sunway campus [redacted]	**Dr. John Awoonor-Williams** **The Chair,** **Navrongo Health Research Centre** **Institutional Review Board,** **Box, 114, Navrongo – Ghana** [redacted]

Thank you

Raymond Aborigo