# EXAMINING NEGLECTED HEALTH PROBLEMS IN WOMEN AT MID-LIFE IN BANGLADESH

**Md. Rakibul Islam**

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Women's Health Research Program

Department of Epidemiology and Preventive Medicine

School of Public Health and Preventive Medicine

Faculty of Medicine, Nursing and Health Sciences

Monash University

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# Copyright Notices

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# Abstract

Although women's reproductive health has improved remarkably in Bangladesh since her independence in 1971, other aspects of women's health remain neglected. The overall aim of this thesis was to determine the awareness of, and barriers to, cervical cancer (CCa) and breast cancer (BCa) screening, the prevalence and severity of menopausal symptoms, and pelvic floor disorders (PFDs) in Bangladeshi women.

A nationally representative, cross-sectional survey of women aged 30-59 years was conducted in Bangladesh, using a multistage cluster sampling technique, between September 2013 and March 2014. Factors associated with all outcomes were investigated separately, using simple and multivariable logistic regression.

Of 1590 participants, mean age 42.3 (± 8.0) years, 81.3% and 48.6% had ever heard of CCa and CCa screening respectively, while 81.9% and 64.2% had ever heard of BCa and BCa screening, respectively. 8.3% of those who had ever heard of CCa, had been screened for CCa and 8.0% of those who had ever heard of BCa, reported clinical breast examination (CBE). Awareness of CCa was inversely associated with living in a rural area compared with an urban setting and having no education compared with women having education beyond secondary school, while being positively associated with being aged 40–49 years compared with being aged 30-39 years, and being obese. Awareness of BCa was positively associated with being aged 40–49 years and 50–59 years compared with being aged 30–39 years, being overweight and obese, while being inversely associated with rural dwelling, having primary or no education compared with women having education beyond secondary school, and having at least three children compared with ≤2 children. The leading barrier to

both CCa and BCa screening uptake was lack of understanding of the concept of screening healthy women for disease. Having been screened for CCa was associated with being aged 40–49 years compared with 30-39 years and employed outside the home, and inversely associated with rural dwelling and having no education. Women with no education were less likely to have undergone CBE compared with women having education beyond secondary school.

Of the study participants, 59.4% were premenopausal, 8.4% perimenopausal and 32.3% postmenopausal. Nearly all of the women had reached menopause by the age of 50 years. The prevalence of moderate-severely bothersome vasomotor symptoms (VMS) was 4.1% in premenopausal, 33.3% in perimenopausal, and 28.2% in postmenopausal women. Factors associated with moderate-severely bothersome VMS were being perimenopausal or postmenopausal compared with premenopausal and obesity. The prevalence of moderate-severely bothersome joint pain was 40.3% in postmenopausal, 36.2% in perimenopausal, and 15.3% in premenopausal women. Moderate-severely bothersome joint pain was more likely both in perimenopausal and postmenopausal women compared with premenopausal women, and in women with no education compared with women having education beyond secondary school. No women reported prescription therapy for menopausal symptoms.

The weighted prevalence of at least one PFD was 35.3%, urinary incontinence (UI) 23.7% faecal incontinence (FI) 5.3%, and pelvic organ prolapse (POP) 16.2%. Compared with women aged 30-39 years, at least one PFD was more likely for women aged 40-49 years and 50-59 years. Having at least one PFD was significantly associated with having ≥3 compared with fewer children, being in the middle, second lowest or lowest wealth quintiles compared with the highest wealth quintile, and being a self-reported diabetic.

With continued ageing of the population in Bangladesh, the health issues of women at mid-life investigated in this study need to be given a higher priority. Efforts to screen for CCa and downstage BCa need to be accompanied by community-based education. The impact of menopause requires greater recognition as do the prevention and treatment of PFDs.

# Declaration

I hereby declare that this thesis contains no material which has been accepted for the award of any other degree or diploma, except where due reference is made in the text of the thesis.

To the best of my knowledge, this thesis contains no material previously published or written by another person except where due reference is made in the text of the thesis.

Signed:

Date: 10/05/2016

**Monash University**

Declaration for thesis based or partially based on conjointly published or unpublished work.

**General Declaration**

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 one systematic review and 4 original papers published in peer reviewed journals and one unpublished manuscript. The core theme of the thesis is "Neglected health problems in women at mid-life in Bangladesh". The ideas, development and writing up of all the papers in the thesis were the principal responsibility of myself, the candidate, working within the School of Public Health and Preventive Medicine under the supervision of Professor Susan R. Davis and Professor Robin J. Bell.

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 chapters 4 to 9 my contribution to the work involved the following:

| Thesis chapter | Publication title | Publication status | Nature and extent of candidate's contribution |
|---|---|---|---|
| 4 | Prevalence of menopausal symptoms in Asian mid-life women: a systematic review | Published | Study design, data analysis and interpretation, manuscript development and preparation |
| 5 | Bangladesh midlife women's health study (BMWHS): methods, challenges and experiences | Published | Study design, data collection, manuscript development and preparation |
| 6 | Lack of understanding of cervical cancer and screening is the leading barrier to screening uptake in women at mid-life in Bangladesh: population-based cross-sectional survey | Published | Study design, data collection, data analysis and interpretation, manuscript development and preparation |
| 7 | Awareness of breast cancer and barriers to breast screening uptake in Bangladesh: a population-based survey | Published | Study design, data collection, data analysis and interpretation, manuscript development and preparation |
| 8 | Prevalence and severity of vasomotor symptoms and joint pain in women at mid-life in Bangladesh: a population-based survey | Published | Study design, data collection, data analysis and interpretation, manuscript development and preparation |
| 9 | Prevalence of symptomatic Pelvic Floor Disorders in women in Bangladesh | Published | Study design, data collection, data analysis and interpretation, manuscript development and preparation |

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

Signed:

Date: 10/05/2016

# List of Publications, Presentations and Awards

Listed below are the publications, conference presentation and the awards during my candidature.

**Publications included in this thesis**

- **Rakibul M. Islam**, Pragya Gartoulla, Robin J. Bell, Pam Fradkin and Susan R. Davis. Prevalence of menopausal symptoms in Asian women at mid-life: a systematic review. *Climacteric,* Apr 2015; 18(2):157-76. doi: 10.3109/13697137.2014.937689

- **Rakibul M. Islam**, Robin J. Bell, Mohammad B. Hossain and Susan R. Davis. Bangladesh Midlife Women's Health Study (BMWHS): methods, challenges and experiences. *Maturitas,* Jan 2015; 80(1):89-94. doi: 10.1016/j.maturitas.2014.10.005

- **Rakibul M. Islam**, Robin J. Bell, Baki Billah, Mohammad B. Hossain and Susan R. Davis. Lack of understanding of cervical cancer and screening is the leading barrier to screening uptake in women at mid-life in Bangladesh: population-based cross-sectional survey. *The Oncologist,* Dec 2015; 20(12):1386-1392. doi:10.1634/theoncologist.2015-0235

- **Rakibul M. Islam,** Robin J. Bell, Baki Billah, Mohammad B. Hossain and Susan R. Davis. Awareness of breast cancer and barriers to breast screening uptake in Bangladesh: a population- based survey. *Maturitas,* Feb 2016; 84: 68-74. doi:10.1016/j.maturitas.2015.11.002

- **Rakibul M. Islam,** Robin J. Bell, Baki Billah, Mohammad B. Hossain and Susan R. Davis. Prevalence and severity of vasomotor symptoms and joint pain in women at mid-life in Bangladesh: a population-based survey. *Menopause: The North*

*American Menopause Society*, Feb 2016; 23 (7): [Epub ahead of print]. doi: 10.1097/GME.0000000000000615

- **Rakibul M. Islam,** Robin J. Bell, Baki Billah, Mohammad B. Hossain and Susan R. Davis. Prevalence of symptomatic Pelvic Floor Disorders in women in Bangladesh. *Climacteric*, Oct 2016; http://dx.doi.org/10.1080/13697137.2016.1240771.

**Conference Presentations**

- **Rakibul M. Islam,** Robin J. Bell, Baki Billah and Susan R. Davis. Knowledge of cervical cancer and screening barriers among mid-life women in Bangladesh. XXI FIGO World Congress of Gynecology and Obstetrics; Vancouver, Canada, 04-09 October, 2015.

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- Monash Departmental Scholarship, Department of Epidemiology and Preventive Medicine, Monash University, 2016.
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- Monash University Graduate Scholarship (MGS) 2012.
- Monash University International Postgraduate Research Scholarship (MIPRS) 2012.
- Monash University Travel Grant 2013 for field work in Bangladesh.

# List of Abbreviations

| | |
|---|---|
| BBS | Bangladesh Bureau of Statistics |
| BCa | Breast Cancer |
| BMI | Body Mass Index |
| BMRC | Bangladesh Medical Research Council |
| BMWHS | Bangladesh Midlife Women's Health Study |
| BSE | Breast Self-Examination |
| CBE | Clinical Breast Examination |
| CCa | Cervical Cancer |
| CI | Confidence Interval |
| CNG | Compressed Natural Gas |
| CRADI-8 | The Colorectal-Anal Distress Inventory-8 |
| EA | Enumeration Area |
| FI | Fecal Incontinence |
| GCS | Greene Climacteric Scale |
| H-L | The Hosmer and Lemeshow |
| HPV | Human Papillomavirus |
| HF | Hot Flush/Hot Flash |
| KMI | The Kupperman Menopausal Index |
| LMICs | Low-and Middle-Income Countries |
| MENQOL | The Menopause-Specific Quality of Life Questionnaire |
| MHT | Menopausal Hormone Therapy |
| MUHREC | Monash University Human Research Ethics Committee |

| | |
|---|---|
| MRS | Menopause Rating Scale |
| NGO | Non-Government Organization |
| NKMSL | Neugarten and Kraines Menopausal Symptom List |
| NM | Natural Menopause |
| NS | Night Sweats |
| OCP | The Oral Contraceptive Pill |
| OR | Odds Ratio |
| PFDI-20 | The Pelvic Floor Distress Inventory-20 |
| POP | Pelvic Organ Prolapse |
| POPDI-6 | The Pelvic Organ Prolapse Distress Inventory-6 |
| QNV | Questionnaire not validated |
| QUID | The Questionnaire for Urinary Incontinence Diagnosis |
| ROC | The Receiver Operating Characteristic Curve |
| SD | Standard Deviation |
| SPSS | Statistical Package for the Social Sciences |
| SM | Surgical Menopause |
| SMI | Simplified Menopause Index |
| STRAW | The Stages of Reproductive Aging Workshop |
| T/NT/TU= | Translated/Not translated/ Translation unknown |
| UI | Urinary Incontinence |
| VIA | Visual Inspection after application of Acetic Acid |
| V/NV/VU | Validated/Not validated/Validation unknown |
| VMS | Vasomotor Symptoms |
| WHO | World Health Organization |
| XS | Cross Sectional |

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# PART-I

# Chapter 1: General Introduction

## 1.1 Background

Although health of women associated with reproduction has improved remarkably in Bangladesh since her independence in 1971 (1, 2), other conditions especially, cervical cancer (CCa), breast cancer (BCa), urinary incontinence (UI), fecal incontinence (FI), pelvic organ prolapse (POP) and menopausal symptoms, that account for much of the morbidity and mortality of Bangladeshi women beyond their childbearing years, have been neglected.

CCa is the second most common cancer, following BCa, affecting women in Bangladesh, with about 50·1 million women aged 15 years and older, potentially at risk (3). Current estimates reveal that 17,686 Bangladeshi women are diagnosed with, and 10,364 women die from CCa each year (4). The annual crude incidence rate of invasive CCa is higher in Bangladesh (15·9 per 100,000) than the global annual crude incidence rate of 15.1 per 100,000 (3). Bangladesh was among the few countries in the world to introduce visual inspection after application of acetic acid (VIA) in 2004 as the primary screening test in a nationwide community-based opportunistic screening program for women over the age of 29 years. This is now available at 252 facilities, from primary to tertiary care levels (5, 6). However, the screening uptake among women, aged 30-59 years, has been low (8.6%) (6). Knowledge and awareness of CCa and CCa screening, and the reasons for Bangladeshi women's unwillingness to be screened is not understood.

BCa is the leading cancer affecting women in Bangladesh, with an estimated annual crude incidence rate of 22.5 per 100,000 (3, 7). As there is no national cancer registry in Bangladesh, this estimate is based on age-standardized incidence rates in India and Pakistan,

which suggest that each year 30,000 Bangladeshi women are newly diagnosed with BCa (8). Data for the total number of deaths from BCa and the number of women living with a diagnosis of BCa are lacking (3, 9).

UI and FI are the two neglected and silent conditions for Bangladeshi women, the majority of whom are Muslim. Both are humiliating conditions, which often force a woman to limit activities, impede interpersonal relationships, and cause distress and reduced health-related quality of life (10, 11). They have a devastating effect on the quality of life of Muslim women because of the religious laws surrounding leakage of urine and stool onto clothing (12). POP is also a common gynaecological disorder for women in Bangladesh, although its true prevalence may be underestimated because of underreporting by women due to shame, ignorance, and social stigmatization (13). Menopause is another neglected health condition that is likely to impact quality of life. These issues are poorly understood due to a lack of research in this area in Bangladesh.

### 1.2 Rational of the Research

Despite centralised coordination and a potentially effective opportunistic CCa screening program in 44 out of 64 districts in Bangladesh, uptake among the eligible women (30-59 years) was extremely low. Only 8.6% of eligible women attended, despite billboard advertisements, posters or hearing about the program from community health workers (6). It has been suspected that socio-cultural barriers impede CCa screening. This warrants further investigation. No organized approach to the early detection of BCa has been launched in Bangladesh; however, barriers to BCa screening merit investigation along with barriers to CCa screening.

Both UI and FI confine women to the home and make prayer for Muslim women extremely challenging, while POP reduces quality of life considerably and results in significant morbidity (12, 14, 15). There is a compelling need to determine the prevalence of UI, FI and POP amongst Bangladeshi women and to identify the risk factors associated with each, in order to institute interventions aimed at the treatment and ultimately prevention of these conditions. Menopause affects all women from mid-life. The prevalence of menopausal symptoms has not been explored systematically in Bangladesh. The Bangladesh Midlife Women's Health Study (BMWHS) was undertaken to provide an understanding of a broad spectrum of neglected health issues amongst women at midlife in Bangladesh.

### 1.3 PhD Research Objectives

The aim of this study was to improve our understanding of the major non-reproductive neglected morbidities of Bangladeshi women in a large sample of women aged 30-59 years recruited from the community. Our specific objectives were:

i) to investigate the knowledge, awareness and screening practices for CCa and BCa, and to understand the socio-economic, demographic and access factors/barriers to screening for CCa and BCa;
ii) to document the prevalence of UI, FI and POP, and the risk factors for these conditions; and
iii) to determine the prevalence and severity of symptoms of the menopause, taking into account the limitation of many women being uncertain of their age.

# PART-II

# Chapter 2: Cervical Cancer in Developing Countries

## 2.1 Background

CCa, a highly preventable disease, is one of the leading cancers in women worldwide. It is estimated that over 270,000 women die from CCa each year, and approximately 85% of the deaths occur in women living in developing countries (16). CCa mortality rates and the prevalence of infection with human papillomavirus (HPV) in women vary considerably in different regions of the world (17, 18). Low risk regions include Western Asia, Northern America and Australia/New Zealand, while risks are highest in Eastern and Western Africa, Southern Africa, South-Central Asia, Middle Africa and South America (18). The incidence rate of CCa in many developing countries has changed little in recent decades (19).

## 2.2 Risk Factors for, and Symptoms of, Cervical Cancer

Sexually transmitted HPV, the most common viral infection of the reproductive tract, is now well established as causing CCa (3, 16, 20). Although most sexually active women and men will be exposed at some point in their lives, the most likely time for acquiring HPV infection for both sexes is shortly after becoming sexually active (16). Of 15 high risk types of HPV, types 16 and 18 are responsible for about 70% of all CCa cases worldwide (20, 21). Other important risk factors for CCa include multiple sexual partners, early age at first intercourse, early age at first birth, parity and long-term use of contraceptives (16, 22-25).

In most cases, women do not have any signs or symptoms in the early stages of CCa. Persistent infection with HPV may lead to precancerous lesions that may progress to CCa if left untreated. Symptoms of CCa usually appear when cancer reaches an advanced stage. Common symptoms of CCa include irregular bleeding, intermenstrual (between periods) bleeding or vaginal bleeding after sexual intercourse; bleeding after menopause; back, leg or pelvic pain; and vaginal discharge (16).

### 2.3 Cervical Cancer Control and Prevention

The World Health Organization (WHO) has provided comprehensive CCa control and prevention guidelines for governments and healthcare providers for primary, secondary and tertiary prevention (26). Primary prevention of CCa is through HPV vaccination of girls aged 9-13 years, ideally before they become sexually active. Secondary prevention encompasses cytology based screening (Papanicolaou test/pap smear), screening for women over 30 years of age using VIA or HPV testing, followed by treatment of detected precancerous lesions, which may develop into CCa. Tertiary prevention includes access to cancer treatment including surgery, chemotherapy and radiotherapy (26).

Early detection and education to promote early diagnosis and screening for CCa greatly increases the chances of successful treatment and survival (27). CCa screening can detect cancer at an early stage and treatment has a high potential for cure. Cytology based screening, followed by an evaluation using colposcopy and cervical biopsy for women with cytological abnormalities, is the most common method of CCa screening (28). Although this method of screening is widely used in developed countries (29), it has proven extremely difficult to implement in low-resource settings due to the complex infrastructure required for the screening program, rather than the cost of the test (30, 31). Two alternative methods

of CCa screening are visual examination of the cervix and molecular testing for high-risk types of HPV. The visual methods include unaided visual inspection of the cervix, VIA [synonyms: direct visual inspection, cervicoscopy, aided visual inspection], VIA with low-level magnification, cervicography, and visual inspection with Lugol's iodine (32). VIA is the simplest, most feasible, effective and the least expensive screening test which is based on the principle that most cervical intraepithelial neoplasia 2 and 3 lesions are acetowhite (i.e. they develop a white colour when vinegar or acetic acid is applied to the cervical epithelium) (29, 32, 33). Currently women are treated with cryotherapy when lesions have been detected on VIA in many developing countries, using a single-visit "screen-and-treat" strategy (33, 34). Although there is variability in the performance of VIA, there is substantial evidence to support it's use in developing countries (33, 35, 36). The advantage of VIA is that it is a point-of-care test, which means that women can be immediately informed if a screening test is positive; and it does not require a cytopathology laboratory (29, 36-38). They are also be treated immediately so do not have to return for a second visit.

Ideally HPV vaccination and HPV testing will be implemented in low resource countries in the future. A recent cluster-randomised trial in rural India has reported that a single round of HPV testing can significantly reduce the incidence of, and death from, invasive CCa (39). Other studies have also shown the efficacy of HPV testing as an approach to CCa screening (40, 41). Despite the proven efficacy of HPV testing as a basis for screening in a few developing countries, a major barrier to HPV testing is the current cost of the equipment (32). Socio-cultural acceptability, political will, and public support are also significant challenges to the introduction of HPV testing in developing countries. In some countries, people mistrust governmental health care initiatives involving vaccination where young women are concerned, as they fear these are attempts to control fertility (42). Nonetheless,

the ideal program for CCa prevention, even in resource-poor settings, would include HPV vaccination of adolescent girls and screening of women aged 30-45 years with VIA (42)

## 2.4 Screening Programs, Uptake and Barriers to Screening Uptake in Developing Countries

Although the majority of CCa deaths occur in developing countries, effective population-based CCa screening programs have not yet been implemented in most of these countries (43). In countries where screening programs have been employed, the screening uptake is very low when compared with developed nations (6, 44-49). Numerous studies have reported a broad range of barriers in which socio-cultural, religious and structural barriers are foremost (8, 50-54). Most often there is speculation regarding the barriers, rather than research-derived evidence (51).

Four studies were found, through a systematic database search, in four low income countries of Southern Africa that investigated enablers and barriers to CCa screening uptake (Table 1) (55-58). Studies conducted in Mozambique, Malawi and Zimbabwe reported lack of awareness of, and knowledge about, CCa and CCa screening as a common barrier to screening uptake (55-57). Screening uptake was also lower among multiparous Mozambican women and in women who believed that CCa is caused by a curse/witchcraft (55). Zimbabwean women who were employed and financially independent were more likely to undergo screening (57). A Tanzanian study reported that women who attended a screening service were older, listened regularly to the radio, had a poorer quality of life, had faced cost barriers to obtaining health care in the preceding year, and held a more positive attitude towards CCa screening compared with women who did not attend (58). Six studies in lower-middle income countries explored promoters and barriers to CCa screening (52, 59-63).

Studies undertaken in Bangladesh and India identified almost identical barriers to screening uptake, including socio-demographic, structural issues and lack of knowledge (59, 60). Although the authors reported limited availability of health services and cost as barriers to screening in Bangladesh, the opportunistic screening program had not been initiated in the country when this study was undertaken. Two studies were conducted in Kenya and reported consistent results of lack of knowledge and structural barriers (62, 63). A study in Honduras reported structural, psychological, and socio-cultural and religious barriers that included cost, distance, access, fear, lack of knowledge and male partners' attitude towards screening. The issue of the partner's attitude is that the procedure violates his expectations for his wife's modesty. A study in Indonesia revealed that knowledge and perceptions were the most important barriers to screening as many women were not aware of CCa and were reluctant to go for screening because they were afraid of the procedure or felt shy about exposing themselves to providers (52, 61). Sixteen studies were retrieved from upper-middle income countries that investigated facilitators and barriers to CCa screening (47, 64-78). Included were three from Mexico (71, 73, 78), three from Turkey (67, 68, 77), and two from Brazil (65, 69). Seven studies came from seven individual countries (47, 66, 70, 72, 74-76) while one study included five Latin American countries (64). Most of the Mexican and Turkish studies reported common barriers including lack of knowledge and awareness of CCa and screening, demographic, psychological, and structural factors. One study from Mexico (71) also reported socio-cultural and religious factors as barriers, while a study from Turkey (77) reported negative perceived barriers, based on a health belief model. Lack of knowledge and awareness of CCa and screening were reported as barriers in studies conducted in Botswana, China, Malysia, Nigeria, Peru, Serbia and Thailand (47, 66, 70, 72, 74-76). A study of five Latin American countries reported structural, demographic and psychological factors as barriers to CCa screening uptake (64). Although there is variation

in the reporting of barriers to CCa screening, lack of knowledge and awareness of the disease and understanding of screening are the key barriers in LMICs.

## Table 1: Barriers to CCa screening based on level of income of the countries

| Author & Country | Year | Study design & Methodology | Sampling technique & frame | Sample size (n) | Age group (yrs.) | Screening method used | Barriers themes | Quality rating |
|---|---|---|---|---|---|---|---|---|
| **Low income countries** | | | | | | | | |
| Audet CM et al. Mozambique | 2012 | XS Quantitative Questionnaire survey | Convenience In two clinics | 101 | 30-56 | VIA | A B | Medium |
| Fort VK et al. Malawi | 2011 | XS Qualitative In-depth interview | Convenience In one hospital and catchment area | 20 | 20-50 | VIA | A D E | Medium |
| Mupepi SC et al. Zimbabwe | 2011 | XS Quantitative Questionnaire survey | Random In a rural district | 514 | 12-84 | VIAC | A D | High |
| Perng P et al. Tanzania | 2013 | XS Quantitative Questionnaire survey | Convenience In a rural village | 300 | 25+ | VIA | A B D | High |
| **Lower-middle income countries** | | | | | | | | |
| Ansink AC et al. Bangladesh | 2008 | XS Qualitative Focus group | Convenience In catchment areas of 2 hospitals | 220 Men, women and Adolescents | 20-49 | VIA | A D | Medium |
| Basu P et al. India | 2006 | XS Quantitative Questionnaire survey | Random In one area | 469 | 25-65 | VIA | A D | High |
| Garrett a JJ et al. Honduras | 2013 | XS Qualitative Focus group & in-depth interviews | Convenience In rural settings | 20 | 18-65 | Pap smear | A C D E | Medium |
| Kim YM et al. Indonesia | 2012 | XS Qualitative Focus group | Convenience In 7 health centres | 20 received VIA | 25-50 | Cryotherapy after VIA | **A** | **Low** |
| Ngugi CW et al. Kenya | 2012 | XS Qualitative In-depth interviews | Convenience In one district hospital | 50 | 18+ | VIA/VILLI | A C D | Medium |
| | 2013 | XS | Systematic random | 388 | 15-49 | Pap smear | A | High |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Sudenga SL et al<br>Kenya | | Quantitative<br>Questionnaire survey | In 4 health facilities in under one district | | | | B<br>D | |
| **Upper middle income countries** | | | | | | | | |
| Agurto I et al.<br>Latin America | 2004 | XS<br>Combination of 5 Qualitative studies<br>Focus group & in-depth interviews | Convenience<br>In 6 areas in 5 countries | Unclear | 25-64 | Pap smear | C<br>D | Medium |
| Augusto EF et al.<br>Brazil | 2013 | XS<br>Quantitative<br>Questinnaire survey | Unknown | 351 | 17-79 | Pap smear | B<br>D | Medium |
| Budkaew J at al.<br>Thailand | 2014 | Case-control<br>Quantitative<br>Questionnaire survey & in-depth interviews | Systematic<br>In one medical hospital | 195 | 30-60 | Pap smear | A<br>B<br>D | Medium |
| Duran ET<br>Turkey | 2011 | XS<br>Qualitative<br>Case studies | Convenience<br>In 2 hospitals in a small city | 11 | 15-49 | No specific CCa screening | A<br>C<br>D | High |
| Ersin F et al.<br>Turkey | 2013 | XS<br>Qualitative<br>Focus group | Random<br>In one district | 35 | 40+ | Pap smear | A<br>B<br>D | High |
| Fernandes JV et al.<br>Brazil | 2009 | XS<br>Quantitative<br>Questinnaire survey | Stratified<br>In a city | 267 | 15-69 | Pap smear | B<br>D<br>E | Low |
| Gan DEH et al.<br>Malysia | 2013 | XS<br>Quantitative<br>Questinnaire survey | Multistage random<br>In 5 rural districts | 959 | 20-64 | Pap smear | A<br>B<br>E | High |
| Jia Y et al.<br>China | 2013 | XS<br>Quantitative<br>Questinnaire survey | Convenience<br>In 3 high incidence towns | 5929 | 26-65 | VIA, visual inspection with Lugol's iodine, colposcopy | A<br>B<br>D<br>F | Medium |
| Lazcano-ponce EC et al.<br>Mexico | 1999 | XS<br>Qualitative<br>Focus group | Convenience<br>One urban & one rural city | 4 FG (each 7/8) | 25-35 | Pap smear | A<br>B<br>D<br>E | Medium |
| Markovic M et al. | 2005 | XS | Convenience | 62 | 35-55 | Pap smear | A | High |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Serbia | | Qualitative<br>Focus group | In 2 cities | | | | C<br>D<br>E | |
| Marva´n M L et al.<br>Mexico | 2013 | XS<br>Quantitative<br>Questinnaire survey | Convenience<br>In one urban & 2 rural areas | 384 | 26-64 | Pap smear | A<br>B<br>D | Medium |
| McFarland D M<br>Botswana | 2003 | XS<br>Qualitative<br>Questionnaire & semi-structured interview | Convenience<br>In capital city | 30 | 30+ | Pap smear | A<br>D<br>E | High |
| Nwankwo KC et al.<br>Nigeria | 2011 | XS<br>Quantitative<br>Questinnaire survey | Convenience<br>In a church-based mandatory annual meeting | 815 | 18-70 | Pap smear | A<br>D | Medium |
| Paz-Soldan VA et al.<br>Peru | 2010 | XS<br>Qualitative<br>Focus group | Convenience<br>In 4 cities | 177 | 18-40 | Pap smear | A<br>C | Medium |
| Reis N et al.<br>Turkey | 2012 | XS<br>Quantitative<br>Questinnaire survey | Random<br>In outpatient clinics of 2 cities | 387 | Average age 34.4 years | Pap smear | A<br>B<br>D<br>F | Medium |
| Watkins MM et al.<br>Mexico | 2002 | XS<br>Quantitative<br>Questinnaire survey | Convenience<br>In a rural village | 97 | 16-66 | Pap smear | A<br>B<br>D | Medium |

A= Barriers related to lack of knowledge and awareness about cervical cancer, and screening methods; B=Demographic factors include age, marital status, occupation; C=Psychological factors include fear, anxiety, depression etc.; D= structural barriers include income and cost associated with screening and treatment, distance to the service centres, access and availability to screening; E= Socio-cultural and religious barriers include that family does not allow screening, modesty mostly associated with religion, believing the disease caused by a curse; and F= Perceived barriers, particularly the health belief model.

# Chapter 3: Breast Cancer in Developing Countries

## 3.1 Background

The global burden of BCa incidence and mortality in women is substantial and increasing in LMICs (79-82). It is the most frequently diagnosed cancer and the leading cause of cancer death in women, accounting for 23% of the total cancer cases and 14% of the cancer related deaths (83). The WHO estimated that 508,000 women die from BCa annually and more than 60% of deaths occur in women living in LMICs (Africa and Asia as well as Central and South America) (84-86). More specifically, Asian countries, which represent 59% of the global population, accounted for 39% of the new cases and 44% of BCa deaths, while African countries (15% of the world population) represented 8% of new cases and 12% of deaths (82). In these settings, most cases of BCa are detected in relatively advanced stages when treatment is less likely to be successful (87).

In many developing countries, BCa incidence rates have been reported to be increasing (88). For instance, China's urban cancer registries have reported a 20%-30% increase in the incidence rate of BCa in the past decade (89). A similar pattern of increasing incidence of BCa is observed in urban areas of India (90). Hence, BCa once seen as predominantly a problem of western countries, has become global (18, 79, 91).

## 3.2 Risk Factors for, and Symptoms of, Breast Cancer

The risk factors for BCa are not necessarily 'causes' of BCa. Sex is the strongest risk factor for BCa such that women are 100 times more likely to develop BCa than men (92). Although BCa can occur at an early age, in western countries the risk tends to increase with age. About 75% of BCa cases occur after 50 years of age in Australia (93). However, the

age-specific BCa incidence rates amongst women after 50 years in LMICs may be flat or decline with age, which implies that the mean age at diagnosis in developing countries, is lower than that of developed countries and the peak incidence is in younger women (84, 94). Family history is another significant and well-established risk factor for BCa. A woman with one or more first-degree relatives with BCa is at greater risk than a woman with no affected first-degree relative (95). Other known factors associated with a moderate increased risk of BCa are early age at menarche, late age at menopause, late age at first full term pregnancy, nulliparity, absence of breast feeding, long-term combined estrogen/ progestin hormone replacement therapy, long-term use of oral contraceptives, and a prolonged duration of time between menarche and the first completed pregnancy (95, 96).

A new lump or mass in the breast is the most common symptom of BCa. Other symptoms include nipple discharge, swelling of all or part of a breast, skin irritation or dimpling, breast or nipple pain, nipple retraction, redness, scaliness, or thickening of the nipple or breast skin and deformity of the breast (97, 98).

### 3.3 Breast Cancer Control and Prevention

Three methods of screening for BCa have been proposed: breast self-examination (BSE), clinical breast examination by a health practitioner (CBE), and mammography. Although BSE has not been shown to be associated with a reduction in BCa mortality, it may be an effective tool in breast health education and may increase breast awareness (81, 99). No randomised-controlled trials have been conducted of CBE in women not receiving other types of screening (81, 99, 100). However, it is an important means of diagnosis of women in areas where mammography is unavailable (101). Mammography is the only screening method that has been found to be effective in reducing BCa mortality (102, 103).

Since the incidence of BCa in LMICs is lower than in developed countries, the age at peak incidence is younger when the breast is more glandular (84) and optimum participation rates will be difficult to reach, the benefits of screening mammography in LMICs are likely to be low or even null (104). Also, the cost associated with mammographic screening programs, including buying mammography machines, training radiologists and radiographers, organizing invitations for screening and follow up, maintaining a screening register, managing patients found to have a positive result, and so forth are high for resource poor countries. Added to this, detecting BCa in women using mammographic screening is of little value unless treatment facilities are available, but treatment facilities are currently very limited in most developing countries. Consequently, mammographic screening might not be appropriate for most LMICs. So, screening with CBE, which could result in down staging of breast disease in LMICs, linked to appropriate treatment, is likely to be more cost-effective than screening by mammography (51, 82, 105, 106).

### 3.4 Screening Programs, Uptake and Barriers to Breast Cancer Screening in Developing Countries

Most LMICs do not have organized BCa screening programs and opportunistic screening continues sporadically in many of them (100, 107). Within existing programs, the uptake of screening is often low (108-110). Studies have reported that BCa screening uptake in LMICs, like CCa screening uptake, is also obstructed by socio-demographic, cultural, religious and structural barriers (8, 111-113). In a systematic search of databases, no studies were found to have investigated barriers to BCa screening in low-income countries. Four studies were found in lower-middle income countries which investigated promoters and barriers to BCa screening (Table 2) (114-117). Two studies conducted in India (114, 117) reported lack of knowledge and awareness of BCa, and BCa screening methods as well as

demographic and psychological factors such as not being married, fear and anxiety. A study from Bangladesh (116) reported lack of knowledge and awareness to be the main barrier to BCa screening. Studies conducted in Egypt and India (115, 117) presented all the barriers mentioned above as well as structural barriers which included access, availability and cost.

Thirteen studies were found in upper-middle income countries (53, 112, 118-129), of which seven were from Turkey (112, 121-123, 125, 126, 128). Most Turkish studies reported themes including lack of knowledge and awareness about BCa, and BCa screening methods as well as demographic factors such as being single and psychological factors such as fear and anxiety. The study conducted by Dunder et al. 2012 identified structural barriers which included lack of access and cost as well as socio-cultural and religious factors. Four studies from Iran (53, 118, 127, 129) identified socio-demographic, structural and knowledge barriers. However, the study conducted by Lamyian et al. 2007(127) also identified socio-cultural and religious barriers. The only Malaysian study (120) presented very similar themes to the Iranian studies. The Chinese study (124) reported socio-demographic, cultural, religious, psychological and structural barriers to screening mammography among Chinese and Korean Chinese women. In conclusion, even though each nation portrayed barriers using slightly different terminology, depending on the mix of cultures, religions, perceptions, education and accessibility of screening services, lack of knowledge and understanding of BCa and breast screening emerged as the key barriers to BCa screening in lower-middle and upper-middle income countries.

## Table 2: Barriers to BCa screening based on level of income of the countries

| Author & Country | Year | Study design & Methodology | Sampling technique & frame | Sample size (n) | Age group (yrs.) | Screening method used | Barriers themes | Quality rating |
|---|---|---|---|---|---|---|---|---|
| **Low income countries** | | | | | | | | |
| No studies have found on barriers to BCa screening in Low income countries | | | | | | | | |
| **Lower-middle income countries** | | | | | | | | |
| Aboserea M et al. Egypt | 2011 | XS Quantitative Questionnaire survey | Multistage cluster random In one district | 390 | Unclear | BSE, CBE, Mammography | A B D | Medium |
| Fire KG et al. India | 2013 | XS ? Quantitative Questionnaire survey | Among intervention group of RCT | 52, 011 | 30-69 | BSE, CBE | A B | High |
| Rasu RS et al. Bangladesh | 2011 | XS Quantitative Questionnaire survey | Convenience In one district | 152 Women from uni and college | 40+ | BSE, Mammography | A | High |
| Sreedevi A et al. India | 2014 | XS Quantitative Questionnaire survey | Multistage random In one district | 809 | 15-50 | BSE, CBE, Mammography | A B D | Medium |
| **Upper middle income countries** | | | | | | | | |
| Ahmadian M et al. Iran | 2011/ 2012 | XS Quantitative Questionnaire survey | Multistage cluster random In 4 outpatients clinic | 400 | 35-69 | Mammography | A B D | Medium |
| Al-Naggar RA et al. Malaysia | 2012 | XS Quantitative Questionnaire survey | Random In one area | 200 | 40+ | Mammography | A B D | Low |
| Avci IA et al. Turkey | 2008 | XS Quantitative Questionnaire survey | Unknown In one health center | 387 | 35+ | Mammography | F | Medium |
| Cam O et al. Turkey | 2009 | XS Quantitative Questionnaire survey | Stratified random In 3 health clinics in one area | 382 | 40+ | BSE, CBE, Mammography | A B | Medium |
| Dunder PE et al. | 2012 | XS | Systematic random | 446 | 50-69 | Mammography | D | Medium |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Turkey<br>Important as ref. | | Quantitative<br>Questionnaire survey | In 2 districts | | | | F | |
| Gang M et al.<br>China | 2013 | XS<br>Quantitative<br>Questionnaire survey | Convenience<br>In one city | 406 | 20+ | Mammography | B<br>D<br>F | High |
| Gürsoy AA et al.<br>Turkey | 2011 | XS<br>Quantitative<br>Questionnaire survey | Cluster<br>In catchment area of 2 urban clinics | 1342 | 18+ | BSE, CBE, Mammography | A<br>B<br>E<br>F | Medium |
| Khazaee-Pool M et al.<br>Iran | 2014 | XS<br>Qualitative<br>Focus group | Convenience<br>In one health care centre | 24 | 30+ | BSE, CBE, Mammography | A<br>C<br>D | Medium |
| Kissal A et al.<br>Turkey | 2011 | XS<br>Qualitative<br>Focus group | Convenience<br>In one district | 46 | 60-75 | BSE, CBE, Mammography | A<br>C | High |
| Lamyian M et al.<br>Iran | 2007 | XS<br>Qualitative<br>In-depth interviews | Convenience<br>Unclear | 31 | 40+ | Unknown | C<br>D<br>E | High |
| Monatazeri A et al.<br>Iran | 2003 | XS<br>Quantitative<br>Questionnaire survey | Convenience<br>In 7 health centres | 410 | 19-58 | BSE, CBE | A<br>B<br>D | Medium |
| Secginli S et al.<br>Turkey | 2006 | XS<br>Quantitative<br>Questionnaire survey | Convenience<br>In 3 heath centres | 656 | 20+ | BSE<br>Mammography | A<br>D | Medium |
| Tuzco A et al.<br>Turkey | 2015 | XS<br>Qualitative<br>Focus group | Convenience<br>In one area among migrants women | 39 | 20+ | BSE, CBE, Mammography | A<br>B<br>D | High |
| ***Not an independent sovereign country** | | | | | | | | |
| Azaiza F et al.<br>*Palestine | 2010 | XS<br>Quantitative<br>Questionnaire survey | Stratified<br>In 4 districts | 397 | 30-65 | BSE, CBE, Mammography | A<br>B<br>D<br>E | High |
| Shaheen R et al.<br>*Palestine | 2011 | XS<br>Quantitative<br>Questionnaire/telephone interviews | Convenience<br>Unclear | 100 | 35+ | Diagnostic and Mammography | D | High |

A= Barriers related to lack of knowledge and awareness about cervical cancer, and screening methods; B=Demographic factors include age, marital status, occupation; C=Psychological factors include fear, anxiety, depression etc.; D= structural barriers include income and cost associated with screening and treatment, distance to the service centres, access and availability to screening; E= Socio-cultural and religious barriers include that family does not allow screening, modesty mostly associated with religion, believing disease caused by a curse; and F= Perceived barriers, particularly the health belief model.

# Chapter 4: Prevalence of Menopausal Symptoms in Women in Asian Countries

## 4.1 Introduction

It is evident that there is wide variation in the estimated prevalence of menopausal symptoms across the menopausal stages among women in Asia. However, no systematic review had been conducted of studies reporting the prevalence of menopausal symptoms in this context. This chapter is a paper that systematically reviewed the published articles that have documented the prevalence of menopausal symptoms in Asian women, and explored the reasons for the variation in the findings.

The review found that physical symptoms were the most prevalent symptoms followed by psychological, vasomotor and sexual symptoms, with wide variation in symptom prevalence between the menopausal stages. Variation between studies was also due to differences in modes of recruitment, study design, sampling procedures, the time frame over which symptoms were assessed and use of different assessment tools.

This review paper suggested further studies of representative samples are required to understand whether the variation in prevalence between countries is a function of methodological issues or due to ethnic, cultural or socio-economic differences.

## Declaration for Thesis Chapter 4

**4.2 Manuscript:** Rakibul M. Islam, Pragya Gartoulla, Robin J. Bell, Pam Fradkin and Susan R. Davis. Prevalence of menopausal symptoms in Asian women at midlife: a systematic review. *Climacteric: International Menopause Society,* Apr 2015; 18(2):157-76. DOI: 10.3109/13697137.2014.937689. Epub 2014 Oct 27.

**Declaration by candidate**
In the case of Chapter 4, the nature and extent of my contribution to the work was the following:

| Nature of contribution | Extent of contribution (%) |
|---|---|
| Study concept and design, literature search, data analysis and interpretation, manuscript development and preparation | 65% |

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

| Name | Nature of contribution | Extent of contribution (%) for student co-authors only |
|---|---|---|
| Pragya Gartoulla | Literature search, data analysis and interpretation, and manuscript editing | 10% |
| Robin J. Bell | Study concept and design, data analysis and interpretation, supervision, critical revision of submitted manuscript | 10% |
| Pam Fradkin | Data analysis and interpretation, critical revision of submitted manuscript | 5% |
| Susan R. Davis | Study concept and design, data analysis and interpretation, supervision, critical revision of submitted manuscript | 10% |

The undersigned hereby certify that the above declaration correctly reflects the nature and extend o the candidate's and co-author' contributions to this work

| | | |
|---|---|---|
| **Candidate's Signature** | [redacted] | **Date 10/05/2016** |
| **Main Supervisor's Signature** | [redacted] | **Date 10/05/2016** |

# Prevalence of menopausal symptoms in Asian midlife women: a systematic review

*M. Rakibul Islam, P. Gartoulla, R. J. Bell, P. Fradkin and S. R. Davis*

Women's Health Research Program, School of Public Health and Preventive Medicine, Monash University, Melbourne, Victoria, Australia

Key words: PREVALENCE, MENOPAUSAL SYMPTOMS, ASIAN WOMEN, MIDLIFE, SYSTEMATIC REVIEW

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## ABSTRACT

*Objective* To systematically review published articles for the prevalence of menopausal symptoms in Asian women.

*Methods* A comprehensive and systematic literature search was performed using MEDLINE, EMBASE, PsycINFO, CINAHL, SCOPUS and Google scholar in June 2013 to retrieve all English-language studies that included information on the prevalence of menopausal symptoms in women living in Asian countries. Risk of bias of included studies was assessed using a risk-of-bias tool explicitly designed for the systematic review of prevalence studies.

*Results* Twenty-three independent studies met our inclusion criteria. Physical symptoms were the most prevalent symptoms compared to psychological, vasomotor and sexual symptoms. There was a wide variation in the prevalence of all symptoms across the menopausal stages due to the differences in modes of recruitment, study design, sampling procedures, the time frame over which symptoms were assessed and use of different diagnostic or screening tools. A high level of bias was observed for both external and internal validity for most studies.

*Conclusion* Although there is a wide variation in the reported prevalence of menopausal symptoms, physical symptoms predominate, followed by psychological symptoms, vasomotor symptoms and sexual symptoms. Further studies of representative samples are necessary to understand whether the variations in prevalence reporting are a function of methodological issues or due to ethnic, cultural or other socioeconomic differences.

## INTRODUCTION

The prevalence of various menopausal symptoms, as well as symptom severity, varies depending on the geographic, socioeconomic and cultural context in which women live[1–4]. In developed countries amongst Caucasian women, vasomotor symptoms predominate, whereas several studies have indicated that Asian women mostly report somatic symptoms[2–6]. However, there appears to be substantial variation in the prevalence of menopausal symptoms reported across studies of women in Asia. No systematic review has been conducted of studies reporting the prevalence of menopausal symptoms in the Asian context. The objective of this study was to systematically review the published articles that have documented the prevalence of menopausal symptoms in Asian women and consider potential explanations for the variations in the findings.

## METHODS

### Data sources

A comprehensive and systematic literature search was performed using MEDLINE, EMBASE, PsycINFO, CINAHL, SCOPUS and Google scholar in June 2013 to retrieve all English-language studies that contained information on the prevalence of menopausal symptoms in women living in Asian countries, as listed by the International Monetary Fund[7]. We also completed a retrospective literature search of published review papers to retrieve relevant articles. The subject search and text word search were done separately in all databases and then combined. MeSH terms included climacteric/or menopause/or premature/or perimenopause/or postmenopause and menopaus*.mp, climacteric*.mp, postmenopaus*.

Correspondence: Dr M. Rakibul Islam, Level 6, The Alfred Centre, 99 Commercial Road, Melbourne, VIC 3004, Australia [redacted]

REVIEW
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RIGHTSLINK

mp, post-menopaus*.mp, perimenopaus*.mp, peri-menopaus*.mp, vasomotor*.mp, hot fl#sh*.mp, (night* adj3 sweat*).mp, (vagina* adj3 dry*).mp, (joint* adj3 pain*).mp, (joint* adj3 stiff*).mp, (shoulder* adj3 stiff*).mp and asia*.af.

### Inclusion criteria

We included studies that were cross-sectional or observational, included women with natural or surgical menopause, used validated or non-validated tools, and were conducted either in community or hospital/clinic settings. If any study compared the prevalence of menopausal symptoms in an Asian country with a non-Asian country, we included information only from the Asian country for that particular study.

### Exclusion criteria

We excluded studies undertaken to evaluate treatments for menopausal symptoms, studies of women with co-morbidities such as breast cancer or osteoporosis, studies investigating associations between menopausal symptoms and other variables, studies conducted to assess the quality of life of menopausal women (in the absence of assessment of menopausal symptoms) and studies that included women taking menopausal hormone therapy (MHT) or the oral contraceptive pill (OCP). Studies that reported mean menopausal scores but did not provide prevalence data were also excluded.

### Data extraction

Data were extracted independently by two of the authors (M.R.I. and P.G.). Three other authors (R.J.B., P.F. and S.R.D.) cross-checked all the final papers selected for this review. If there was disagreement on a particular article, consensus was reached by discussion before the final inclusion of the paper. If the study had not used validated tools, the symptoms were divided into four categories based on the Greene Climacteric Scale (GCS) and the Menopause-specific Quality of Life (MENQOL) validated tools. Data were abstracted into evidence tables and summarized descriptively. Our manuscript was structured using the PRISMA checklist.

### Risk-of-bias assessment

The risk of bias of the included studies was assessed using a risk-of-bias tool developed explicitly for the systematic review of prevalence studies[8,9]. The tool includes ten items: (1) national representativeness, (2) target population representativeness, (3) random selection or census undertaken, (4) minimal non-response bias, (5) data collected from subjects, (6) acceptable case definition used, (7) valid and reliable study instrument used, (8) same mode of data collection for all subjects, (9) length of the shortest prevalence period, and (10) appropriateness of numerator(s) and denominator(s) for the parameter, respectively. Items 1–4 assess the external validity of the study and items 5–10 assess the internal validity. All of these items are rated high or low. Item 11, the summary assessment, evaluates the overall risk of study bias and is based on the author's subjective judgement given responses to the preceding ten items rated as low, moderate or high risk.

### Definition of menopause

The Stages of Reproductive Aging Workshop (STRAW) has precisely defined the stages of the menopause transition and these have been used in this review[10]. *Menopause* is defined as 12 or more months of amenorrhea following the final menstrual period. *Early postmenopause* is defined as 1–5 years of amenorrhea, and *late postmenopause* as more than 5 years from the last menstrual period. *Perimenopause* is the development of variable cycle length (early stage) or two or more skipped cycles and an interval of amenorrhea of at least 2 months (late stage).

## RESULTS

A total of 6194 papers were identified by our initial search. We first excluded 1484 duplicates (Figure 1). We then excluded another 4658 studies that were either not conducted in Asia, were clinical trials, included women with co-morbidities or women using MHT or OCP. Of the remaining 52 studies, there were 26 that met our inclusion criteria. Two studies reported results from the same data and one study was excluded due to plagiarism[11] leaving 23 independent studies for our review. Of these, nine studies used a validated tool, either the Menopause Rating Scale (MRS)[12–15], the Greene Climacteric Scale (GCS)[16,17] or the Menopause Specific Quality of Life (MENQOL)[18–20]. The rest of the studies used non-validated questions or questionnaires. The menopausal symptoms presented in all studies were classified as vasomotor, physical/somatic, psychological, and sexual.

### Study selection

Our included studies were published between 1981 and 2012. The studies ranged in size from 129 to 3929 participants, with a total number of 18 166 women providing data across the 23 independent studies[12–35]. The study participants ranged in age from 35 to 70 years. Menopausal symptoms were reported according to menopausal status in 11 studies[12–15,20,24–28,32]. Symptoms were reported without reference to menopausal status in six studies[22,29–31,33,34], while three studies reported symptoms only for women classified as postmenopausal[18,19,23]. Three studies provided data on symptoms in pre- and post- but not the category of peri-menopausal women[16,17,21]. Five studies used the STRAW definition to classify menopause

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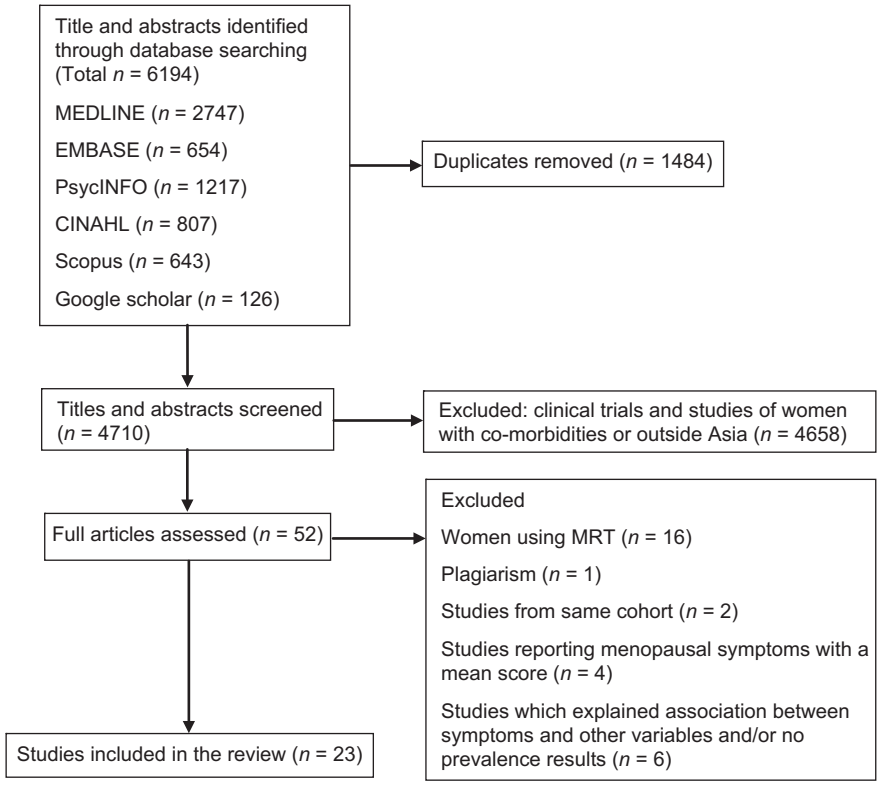


**Figure 1** Study flow diagram. MEDLINE, International biomedical bibliographic database; EMBASE, International biomedical and pharmacological bibliographic database; PsycINFO: Psychological Information Database; CINAHL, Cumulative Index to Nursing and Allied Health Literature; Scopus: A Multidisciplinary Database

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status[12,13,15,17,20], while three studies used WHO criteria. However, the remaining studies did not provide details as to how menopausal status was determined[16,25,34]. One study included both naturally and surgically menopausal women[12] while the rest included only naturally menopausal women. Ten studies did not specifically state that women using MHT had been excluded[12,13,17,21,23,25,29,31–33]. Two studies did not specify whether women using the OCP had been excluded[19,20] and two studies did not report that women using either MHT or OCP had been excluded[14,16].

All of the included studies were cross-sectional. Twelve studies involved random sampling in which nine studies recruited women from the community[13,14,16–19,23,29,31], while, in the other three studies, women were recruited from health centers, electoral rolls and from a telephone directory[12,22,25]. However, one study did not describe the sampling process fully, though this study selected municipal corporation wards randomly[19]. Four studies involved community convenience sampling[24,30,33,34] and seven studies did not specify the sampling procedure[15,20,21,26–28,32]. The sampling frame was unclear in most studies, even those describing recruitment 'from the community'.

Women were asked about symptoms at the time of the survey in six studies[12–14,16,24,28], in the preceding 1 week in one study[17], in the preceding 2 weeks in five studies[25,29,33–35] and in the preceding 1 month in five studies[15,18–20,26]. In two studies, women were asked about symptoms over 12 months[27,32] while one study asked about menopausal symptoms that the women ever experienced[23]. The duration of occurrence of symptoms was not specified in the remaining studies.

## Vasomotor symptoms

All the included studies provided data for the prevalence of vasomotor symptoms (VMS) (Table 1). Ten independent studies reported the prevalence of VMS including hot flushes and night sweats[16,21,22,24,25,27,28,32,34,35], two studies combined hot flushes and sweating[13,15], while two studies reported only hot flushes by menopausal status[12,14]. Six studies provided data also on cold flushes, cold sweats, sudden sweats and sweating[13,15,18,25,29,33], symptoms which are not usually included as VMS. The prevalence of VMS by menopausal status was not included in four studies[29,31,33,34]. Three studies were restricted to postmenopausal women[18,19,23]. None of the studies included a VMS diary; however, about half of the studies used validated questionnaires[12–20]. Only two studies had sample sizes of fewer than 200 women[16,35].

For premenopausal women, the range of the reported prevalence of hot flushes was 8.2–59%, and night sweats, 3.1–34.8%. The studies that provided prevalence data for



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**Table 1** Prevalence of vasomotor symptoms in Asian women at midlife

| *Author/year/country/risk-of-bias indicator (items ranked high†)* | *Study design* | *Sampling method* | *Sample size* | *Age group (years)* | *Instrument used/ validated/translated* | *Menopause type* | *Symptoms (%) in different menopause stages* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | *Symptoms* | *Pre* | *Peri* | *Post* | *Total* |
| Aaron, 2002; India**[21] †1,3,4,6,7,9,10 | XS | Unknown, community | 200 | 40–49 | QNV, T | NM; 50% pre, 50% post | HF | 27 | – | 42 | – |
| | | | | | | | NS | 16 | – | 38 | – |
| Anderson, 2004; Japan[22] †1,7 | XS | Stratified random, electoral rolls | 1430 | 45–60 | QNV, T | NM; SM | HF | 43.5 | 43.8 | 46.1 | 46.0 |
| | | | | | | | NS | 31.4 | 29.7 | 27.9 | 29.2 |
| El Shafie, 2011; Oman**[12] †1,4,10 | XS | Random, health centers | 472 | 40–60 | MRS, V/T | NM; 40.2% pre, 15.5% peri, 44.3% post | HF | 26.3 | 49.3 | 54.5 | 42.2 |
| Fallahzadeh, 2007; Iran**[23] †1,7,9,10 | XS | Cluster, community | 346 | 40–70 | QNV | NM; 100% post | HF | – | – | 73.7 | – |
| Fuh, 2003; Taiwan[24] †3,4,7 | XS | Convenience, community | 1360 | 40–54 | Modified KMI, VU | NM; 54% pre, 27% peri, 19% post | HF | 8.4 | 14.3 | 16.7 | – |
| | | | | | | | NS | 3.1 | 7.8 | 11.4 | – |
| Hilditch, 1999; China[18] †1 | XS | Random, community | 297 | 47–62 | MENQOL, V/T | NM; 100% post | HF | – | – | 15 | – |
| | | | | | | | NS | – | – | 18 | – |
| | | | | | | | Sweating | – | – | 39 | – |
| Ho, 1999; Hong Kong**[25] †1,4,7,10 | XS | Random, residents' telephone directory | 1900 | 44–55 | QNV, VU/T | NM; 66.2% pre, 4.8% peri, 28.4% post | HF | 8.74 | 21.74 | 11.64 | 10.21 |
| | | | | | | | Cold sweats | 4.45 | 4.35 | 6.00 | 4.89 |
| Ikeda, 2005; Japan[26] †1,2,3,4,7 | XS | Unknown, health insurance centers | 398 | 40–<60 | Keio questionnaire, VU/TU | NM; 32.6% pre, 17.4% peri, 50.0% post | HF | 33 | 40 | 42 | 39.6 |
| | | | | | | | NS | – | – | – | 47.2 |
| Ishizuka, 2008; Japan[27] †1,3,7,9 | XS | Unknown, community | 1169 | 50 | SMI, VU/T | NM; 60.1% pre, 25.3% peri, 14.6% post | HF | 27.2 | 49.1 | 52.7 | 36.9 |
| | | | | | | | NS | 34.8 | 59.6 | 63.2 | 45.6 |
| Juang, 2005; Taiwan[28] †3,4,7 | XS | Unknown, community | 1273 | 40–54 | Modified KMI, VU/TU | NM; 57% pre, 28% peri, 15% post | HF | 8.2 | 12.5 | 15.5 | – |
| | | | | | | | NS | 3.0 | 7.1 | 11.9 | – |
| Kapur, 2009; India*,**[16] †1,4,9,10 | XS | Random, different locations | 129 | 30–65 | STRAW, GCS, V/T | NM; 54.3% pre, 25.5% early post, 20.2% late post | HF | 17.14 | – | 51.9 | – |
| | | | | | | | NS | 8.57 | – | 30.5 | – |
| Lock, 1988; Japan**[29] †1,4,7,10 | XS | Random, community | 1141 | 45–55 | QNV, VU/T | NM | HF | – | – | – | 9.5 |
| | | | | | | | NS | – | – | – | 3.2 |
| | | | | | | | Cold flush | | – | – | 1.8 |
| Loh, 2005; Singapore**[17] †10 | XS | Random, community | 656 | 45–60 | Modified GCS, V/T | NM, 39.8% pre, 7.3% peri, 42.5% post, 10.4% post hysterectomy | HF | – | 14.6 | 4.3 | – |
| | | | | | | | NS | – | 10.4 | – | – |
| Melby, 2005; Japan[35] †1,3,4,7,9,10 | XS | Non-random, different locations | 140 | 45–55 | QNV, VU/T | NM; 26.4% pre, 52.9% peri, 20.7% post | HF | 13.2 | 24.3 | 28.6 | – |
| | | | | | | | HF and NS combined | 13.2 | 31.1 | 28.6% | – |

*(Continued)*







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**Table 1** (*Continued*)

| *Author/year/country/risk-of-bias indicator (items ranked high†)* | *Study design* | *Sampling method* | *Sample size* | *Age group* (years) | *Instrument used/ validated/translated* | *Menopause type* | *Symptoms (%) in different menopause stages* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | *Symptoms* | *Pre* | *Peri* | *Post* | *Total* |
| Nisar, 2010; Pakistan**[13] †1,4,10 | XS | Multistage stratified random, community | 3929 | 40–70 | MRS, V/T | NM; 20.1% pre, 29.0% peri, 48.2% post, 1.7% undefined | HF, sweating | 72.2 | 76.7 | 70.2 | – |
| Qazi, 2006; Pakistan**[31] †1,4,6,7,9,10 | XS | Simple random, community | 800 | 45–59 | QNV, VU/TU | NM | HF | – | – | – | 55.5 |
| | | | | | | | NS | – | – | – | 45.0 |
| Rahman, 2010; Malaysia[15] †1,3,4 | XS | Unknown, health centers | 356 | 40–65 | STRAW, Modified MRS, V/T | NM; 23.0% pre, 39.6% peri, 37.4% post | HF, sweating | 35.4 | 64.5 | 21.1 | 41.6 |
| Sharma, 1981; India**[32] †1,2,3,4,7,9,10 | XS | Unknown, community | 405 | 40–55 | Symptom list based on NKMSL, VU/T | NM; 33.3% pre, 33.3% peri, 33.3% post | HF | 59 | 61 | 61 | – |
| | | | | | | | NS | 41 | 53 | 58 | – |
| Shea, 2006; China**[33] †1,3,4,7,10 | XS | Non-random, community | 399 | 40–65 | QNV, VU/T | NM; 28.8% pre, 24.6% peri, 46.6% post | HF, sudden sweats | – | – | – | 10.5 |
| | | | | | | | NS | – | – | – | 7.5 |
| | | | | | | | Cold sweats | – | – | – | 3.8 |
| Sievert, 2008; Bangladesh[34] †1,3, 4,7 | XS | Network & snowball, community | Total: 157 subsample: 30 | Total: 35–59 subsample: 40–55 | QNV, VU/T | NM; 37.0% pre, 13.0% peri; 50.0% post (subsample) | HF (total sample) | – | – | – | 46 |
| | | | | | | | HF (subsample) | – | – | – | 73 |
| Som, 2012; India*[19] †1,4,6,10 | XS | Random, community | 250 | 47–62 | MENQOL, V/TU | NM; 100.0% post | HF | – | – | 47.6 | – |
| | | | | | | | NS | – | – | 49.6 | – |
| Syed Alwi, 2009; Malaysia*[20] †1,3,4,10 | XS | Unknown, different locations in indigenous community | 276 | 40–65 | STRAW, MENQOL, V/T | NM; 21.7% pre, 41.3% peri, 37.0% post | HF | 31.7 | 66.7 | 21.5 | 42.4 |
| | | | | | | | NS | 5.0 | 64.9 | 18.6 | 34.8 |
| Waidyasekera, 2009; Sri Lanka*,**[14] †1,4,10 | XS | Cluster, community | 683 | 45–60 | MRS, V/T | NM; 21.5% pre, 19.2% peri, 59.3% post | HF | 27.3 | 40.9 | 42.7 | – |

XS, cross-sectional; QNV, questionnaire not validated; V/NV/VU, validated/not validated/validated unknown; T/NT/TU, translated/not translated/translated unknown; NM, natural menopause; SM, surgical menopause; STRAW, Stages of Reproductive Aging Workshop; MENQOL, Menopause Specific Quality of Life; MRS, Menopause Rating Scale; GCS, Greene Climacteric Scale; KMI, Kupperman Menopausal Index; NKMSL, Neugarten and Kraines Menopausal Symptom List; SMI, Simplified Menopause Index; HF, hot Flush/hot flash; NW, night sweats/sweating

*, Oral contraceptive pill use is unspecified; **, hormone replacement therapy use is unspecified; †item under the risk-of-bias tool: 1 (national representativeness), 2 (target population representativeness), 3 (random selection or census undertaken), 4 (non-response bias), 6 (acceptable case definition), 7 (valid study instrument), 9 (prevalence period), 10 (appropriateness of numerator and denominator)







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perimenopausal women reported a prevalence of hot flushes and night sweats that ranged from 12.5% to 66.7%, and from 7.1% to 64.9%, respectively. The prevalence of hot flushes for postmenopausal women in the various studies ranged between 4.3 % and 73.7% and for night sweats, between 11.4% and 63.2%.

The prevalences of VMS in all subgroups provided by Nisar and colleagues were very high; however, this study reported prevalence of hot flushes and sweating together[13]. The study conducted by Sivert and colleagues reported two prevalences for hot flushes, one for the total sample (46%) and another for a subsample (73%) of women who wore an ambulatory hot flush monitor for 8 h on average, from mid-morning to early evening[34].

Thus, across the published studies, the range of the reported prevalence of VMS was wide and there was substantial overlap in VMS for premenopausal, perimenopausal and postmenopausal women.

## Physical and somatic symptoms

Prevalence data for physical and somatic symptoms were provided by all studies included in our review (Table 2). Physical and somatic symptoms evaluated in the included studies were described as muscle and joint pain or discomfort, low back pain and back ache, headaches, insomnia and sleeping problems, heart discomfort, poor memory, a decrease in physical energy, strength or stamina, upset stomach, sore throat, numbness in the hands and feet, change in appearance, texture or tone of skin, and making more mistakes than usual.

The prevalences of joint and muscle pain, low back pain or backache, headaches and insomnia for premenopausal women ranged from 10.3% to 82.1%, from 26% to 65%, from 7.3% to 76% and from 6.1% to 54%, respectively. For perimenopausal women, the reported prevalence of joint and muscle pain was between 28.8% and 91.4%, low back pain or backache, between 33.7% and 82.5%, headaches between 12.5% and 86.0% and insomnia between 16.4% and 85.3%. The corresponding prevalences of joint and muscle pain in postmenopausal women ranged from 15.8% to 90.2%, low back pain or backache from 29.8% to 80.0%, headaches from 5.5% to 82% and insomnia from 16.4% to 79.2%. For postmenopausal women, the prevalence of frequent urination ranged from 17% to 84%.

In summary, the reported prevalences of physical symptoms varied widely and differed substantially between studies. Overall, the prevalence of most of these symptoms was lower for premenopausal than for the perimenopausal and postmenopausal groups.

## Psychological symptoms

Twenty-two independent studies provided prevalence data for psychological symptoms, as listed in Table 3. Most of the studies did not employ a validated depression instrument or other psychological assessment tool. In nine studies, the psychological domain of a validated instrument for assessing menopausal symptoms was used. The symptoms reported were depression, anxiety, irritability, nervousness, dizziness, fatigue, being dissatisfied with personal life, experiencing poor memory, crying spells, panic attacks, feeling gloomy, difficulty in concentration, and mood swings.

The range of the estimated prevalence of depression and irritability for premenopausal women was from 15.9% to 72.4% and from 21% to 75.8%, respectively. The reported prevalences of depression for perimenopausal women ranged from 25.8% to 82.8% and of irritability from 26.5% to 85.2%. For postmenopausal women, the reported prevalences of depression ranged from 24.4% to 77.4%, anxiety from 17.3% to 81.2%, irritability from 21.8% to 75.9% and fatigue from 33.3% to 83.8%.

Thus, there was substantial overlap in the reporting of psychological symptoms for the stages of the menopause and marked differences in the prevalences provided by the published studies.

## Sexual symptoms

Eighteen independent studies provided data for the prevalence of sexual symptoms in relation to the menopause (Table 4). Parameters included loss of interest in sex, not being sexually active, change in or reduced sexual desire, sexual problems, avoiding intimacy, vaginal dryness or vaginal pain during sexual activity, and vaginal discharge or itching. Fourteen studies provided data on vaginal dryness of which six studies reported prevalence by menopausal status[12–15,20,24] and eight used validated questionnaires[12–15,17–20]. The reported prevalences of vaginal dryness for premenopausal, perimenopausal and postmenopausal women ranged between 7.4% and 31.8%, 11.1% and 46.2% and 6.1% and 99.6%, respectively. All the studies showed a distinct difference between premenopausal and postmenopausal women for this outcome. In two studies, loss of interest in sex in postmenopausal women, as assessed by a single question in the GCS, was 8.2% and 39.2%[16,17]. Anderson and colleagues also reported the prevalence of loss of interest in sex in all women in the sample (71.5%), but did not use a validated questionnaire[22]. Syed Alwi and colleagues used the MENQOL questionnaire and reported the prevalence of avoiding intimacy by menopausal status[20]. They reported prevalences for this outcome of 10% for premenopausal, 49.1% for perimenopausal and 76.4% for postmenopausal women. Aaron and colleagues reported that 32% of premenopausal women were not sexually active while the corresponding prevalence for postmenopausal women was 54%[21].

In summary, across the published studies, the range of the reported prevalence of sexual symptoms was narrower for premenopausal women than that for postmenopausal women, although overlap between groups was apparent.

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**Table 2** Prevalence of physical and somatic symptoms in Asian women at midlife

| *Author/year/country/ risk-of-bias indicator (items ranked high†)* | *Study design* | *Sampling method* | *Sample size* | *Age group* (years) | *Instrument used/(validated/ translated)* | *Menopause type* | *Symptoms (%) in different menopause stages* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | *Symptoms* | *Pre* | *Peri* | *Post* | *Total* |
| Aaron, 2002; India**[21] †1,3,4,6,7,9,10 | XS | Unknown, community | 200 | 40–49 | QNV, T | NM; 50% pre, 50% post | Aches and pain | 16 | – | 52 | – |
| | | | | | | | Backache | 26 | – | 46 | – |
| | | | | | | | Sleeplessness | 23 | – | 34 | – |
| | | | | | | | Lack of energy | 4 | – | 19 | – |
| | | | | | | | Frequent urination | 11 | – | 17 | – |
| | | | | | | | Stress incontinence | 20 | – | 22 | – |
| Anderson, 2004; Japan[22] †1,7 | XS | Stratified random, electoral rolls | 1430 | 45–60 | QNV, T | NM, SM | Muscle and joint pain | – | – | – | 70.4 |
| | | | | | | | Headaches | – | – | – | 60.6 |
| | | | | | | | Heart beating quickly | – | – | – | 51.7 |
| | | | | | | | Loss of feeling in hands or feet | – | – | – | 43.6 |
| | | | | | | | Parts of body feel numb or tingling | – | – | – | 43.0 |
| El Shafie, 2011; Oman**[12] †1,4,10 | XS | Random, health centers | 472 | 40–60 | MRS, V/T | NM; 40.2% pre, 15.5% peri, 44.3% post | Heart discomfort | 31.6 | 42.5 | 49.3 | 41.1 |
| | | | | | | | Sleeping problems | 33.7 | 38.4 | 52.2 | 43.2 |
| | | | | | | | Muscle and joint problems | 64.2 | 28.8 | 80.4 | 73.3 |
| Fallahzadeh, 2007; Iran**[23] †1,7,9,10 | XS | Cluster, community | 346 | 40–70 | QNV | NM; 100% post | Pain in the bone and joint | – | – | 82.7 | – |
| | | | | | | | Difficulties sleeping | – | – | 54.3 | – |
| | | | | | | | Palpitations | – | – | 51.7 | – |
| | | | | | | | Headache | – | – | 5.5 | – |
| Fuh, 2003; Taiwan[24] †3,4,7 | XS | Convenience, community | 1360 | 40–54 | Modified KMI, VU | NM; 54% pre, 27% peri, 19% post | Insomnia | 45.3 | 51.8 | 58.1 | – |
| | | | | | | | Headaches | 42.3 | 41.6 | 36.2 | – |
| | | | | | | | Backache | 37.4 | 38.7 | 42.4 | – |
| | | | | | | | Arthralgia | 29.8 | 35.2 | 38.6 | – |
| | | | | | | | Myalgia | 25.1 | 26.0 | 26.2 | – |
| | | | | | | | Frequent urination | 23.5 | 32.7 | 25.2 | – |
| Hilditch, 1999; China[18] †1 | XS | Random, community | 297 | 47–62 | MENQOL, V/T | NM; 100% post | Aching in muscles or joints | – | – | 63 | – |
| | | | | | | | Rheumatic or arthritic pains | – | – | 61 | – |
| | | | | | | | Low backache | – | – | 56 | – |
| | | | | | | | Decrease in stamina | – | – | 55 | – |
| | | | | | | | Numbness in hands and feet | – | – | 53 | – |
| | | | | | | | Decrease in physical strength | – | – | 48 | – |
| | | | | | | | Aches in back of neck or head | – | – | 46 | – |
| | | | | | | | Difficulty falling asleep | – | – | 44 | – |
| | | | | | | | Change in appearance, texture or tone of skin | – | – | 43 | – |
| | | | | | | | Frequent urination | – | – | 29.0 | – |

(*Continued*)







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**Table 2** (*Continued*)

| *Author/year/country/ risk-of-bias indicator (items ranked high†)* | *Study design* | *Sampling method* | *Sample size* | *Age group* (years) | *Instrument used/(validated/ translated)* | *Menopause type* | *Symptoms (%) in different menopause stages* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | *Symptoms* | *Pre* | *Peri* | *Post* | *Total* |
| Ho, 1999; Hong Kong**[25] †1,4,7,10 | XS | Random, residents' telephone directory | 1900 | 44–55 | QNV, VU/T | NM; 66.2% pre, 4.8% peri, 28.4% post | Backaches | 27.2 | 33.7 | 29.8 | 28.3 |
| | | | | | | | Aches or joint stiffness | 25.2 | 41.3 | 29.3 | 27.2 |
| | | | | | | | Headaches | 25.8 | 29.4 | 21.6 | 24.7 |
| | | | | | | | Trouble sleeping | 21.0 | 20.6 | 16.4 | 20.8 |
| | | | | | | | Upset stomach | 16.8 | 19.6 | 15.3 | 16.5 |
| | | | | | | | Rapid heart beat | 14.1 | 16.3 | 11.8 | 13.5 |
| | | | | | | | Lack of energy | 12.6 | 16.3 | 10.9 | 12.3 |
| | | | | | | | Sore throat | 10.6 | 12.0 | 11.8 | 11.8 |
| Ikeda, 2005; Japan[26] †1,2,3,4,7 | XS | Unknown, health insurance centers | 398 | 40–<60 | Keio questionnaire, VU/TU | NM; 32.6% pre, 17.4% peri, 50.0% post | Insomnia | 31 | 37 | 38 | 35.8 |
| | | | | | | | Loss of hair | – | – | – | 84.9 |
| | | | | | | | Forgetfulness | – | – | – | 81.1 |
| | | | | | | | Wrinkled skin | – | – | – | 73.6 |
| | | | | | | | Shoulder stiffness | – | – | – | 67.9 |
| | | | | | | | Back pain | – | – | – | 58.5 |
| | | | | | | | Headaches | – | – | – | 39.6 |
| | | | | | | | Joint pain | – | – | – | 37.7 |
| | | | | | | | Urinary frequency | – | – | – | 69.8 |
| | | | | | | | Incontinence | – | – | – | 43.4 |
| | | | | | | | Urinary urgency | – | – | – | 39.6 |
| Ishizuka, 2008; Japan[27] †1,3,7,9 | XS | Unknown, community | 1169 | 50 | SMI, VU/T | NM;60.1% pre, 25.3% peri, 14.6% post | Stiff shoulders | 73.8 | 78.4 | 77.4 | 75.2 |
| | | | | | | | Headache | 37.9 | 38.0 | 38.9 | 38.2 |
| | | | | | | | Palpitation | 35.8 | 33.3 | 34.1 | 35.0 |
| | | | | | | | Insomnia | 31.8 | 45.0 | 44.6 | 37.0 |
| Juang, 2005; Taiwan[28] †3,4,7 | XS | Unknown, community | 1273 | 40–54 | Modified KMI, VU/TU | NM; 57% pre, 28% peri, 15% post | Insomnia | 38.4 | 36.5 | 42.8 | – |
| Kapur, 2009; India*,**[16] †1,4,9,10 | XS | Random, different locations | 129 | 30–65 | STRAW, GCS, V/T | NM; 54.3% pre, 25.5% early post, 20.2% late post | Heart beating quickly or strongly | 8.6 | – | 37.0 | – |
| | | | | | | | Difficulty in sleeping | 20.0 | – | 31.6 | – |
| | | | | | | | Difficulty in concentrating | 18.6 | – | 41.6 | – |
| | | | | | | | Feeling tired or lacking in energy | 38.6 | – | 65.2 | – |
| | | | | | | | Loss of interest in most things | 15.7 | – | 32.5 | – |
| | | | | | | | Pressure or tightness in head or body | 15.7 | – | 33.6 | – |
| | | | | | | | Parts of body feel numb or tingling | 10.0 | – | 32.0 | – |
| | | | | | | | Headaches | 42.9 | – | 26.6 | – |
| | | | | | | | Muscle and joint pain | 42.8 | – | 56.0 | – |

(*Continued*)







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**Table 2** (*Continued*)

| *Author/year/country/ risk-of-bias indicator (items ranked high†)* | *Study design* | *Sampling method* | *Sample size* | *Age group* (years) | *Instrument used/(validated/ translated)* | *Menopause type* | *Symptoms (%) in different menopause stages* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | *Symptoms* | *Pre* | *Peri* | *Post* | *Total* |
| Lock,1988; Japan**[29] †1,4,7,10 | XS | Random, community | 1141 | 45–55 | QNV, VU/T | NM | Stiff shoulders | – | – | – | 51.7 |
| | | | | | | | Headache | – | – | – | 27.7 |
| | | | | | | | Lumbago | – | – | – | 22.4 |
| | | | | | | | Constipation | – | – | – | 21.1 |
| | | | | | | | Insomnia | – | – | – | 11.4 |
| | | | | | | | Aches and pains in joints | – | – | – | 10.9 |
| | | | | | | | Numbness | – | – | – | 9.8 |
| | | | | | | | Sore threat | – | – | – | 9.5 |
| | | | | | | | Heavy feeling in head | – | – | – | 7.6 |
| | | | | | | | Frequent night urination | – | – | – | 1.9 |
| Loh, 2005; Singapore**[17] †10 | XS | Random, community | 656 | 45–60 | Modified GCS, V/T | NM; 39.8% pre, 7.3% peri, 42.5% post, 10.4% post hysterectomy | Muscle and joint pain | 10.3 | – | 15.8 | – |
| | | | | | | | Headaches | 7.3 | – | – | – |
| | | | | | | | Insomnia | 6.1 | 12.5 | 11.5 | – |
| | | | | | | | Lethargy | – | 12.5 | – | – |
| Melby, 2005; Japan[30] †1,3,4,7,9 | XS | Non-random, different locations | 140 | 45–55 | QNV, VU/T | NM; 26.4% pre, 52.9% peri, 20.7% post | Shoulder stiffness | – | – | – | 62.1 |
| | | | | | | | Headache | – | – | – | 39.3 |
| | | | | | | | Lower back pain | – | – | – | 35.7 |
| | | | | | | | Sore throat | – | – | – | 22.1 |
| | | | | | | | Difficulty falling asleep | – | – | – | 17.9 |
| | | | | | | | Muscle pain | – | – | – | 16.4 |
| | | | | | | | Insomnia | – | – | – | 11.4 |
| | | | | | | | Frequent urination | – | – | – | 9.3 |
| Nisar, 2010; Pakistan**[13] †1,4,10 | XS | Multistage stratified random, community | 3929 | 40–70 | MRS, V/T | NM; 20.1% pre, 29.0% peri, 48.2% post, 1.7% undefined | Heart discomfort | 68.8 | 76.0 | 67.9 | – |
| | | | | | | | Sleeping problems | 79.7 | 85.3 | 79.2 | – |
| | | | | | | | Bladder problems | 34.6 | 46.2 | 34.2 | – |
| Qazi, 2006; Pakistan**[31] †1,4,6,7,9,10 | XS | Simple random, community | 800 | 45–59 | QNV, VU/TU | NM | Low backache | – | – | – | 75.0 |
| | | | | | | | Headache | – | – | – | 70.2 |
| | | | | | | | Tiredness | – | – | – | 67.7 |
| | | | | | | | Sleep disturbance | – | – | – | 53.7 |
| | | | | | | | Irritability | – | – | – | 52.0 |
| | | | | | | | Lethargy | – | – | – | 45.2 |
| Rahman, 2010; Malaysia[15] †1,3,4 | XS | Unknown, health centers | 356 | 40–65 | STRAW, Modified MRS, V/T | NM; 23.0% pre, 39.6% peri, 37.4% post | Heart discomfort | 3.7 | 28.4 | 16.5 | 18.3 |
| | | | | | | | Sleeping problems | 29.2 | 66.7 | 51.1 | 52.2 |
| | | | | | | | Joint and muscular discomfort | 43.9 | 91.4 | 90.2 | 80.1 |
| | | | | | | | Bladder problems | 9.7 | 9.9 | 20.3 | 13.8 |

(*Continued*)







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**Table 2** (*Continued*)

| *Author/year/country/ risk-of-bias indicator (items ranked high†)* | *Study design* | *Sampling method* | *Sample size* | *Age group* (years) | *Instrument used/(validated/ translated)* | *Menopause type* | *Symptoms (%) in different menopause stages* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | *Symptoms* | *Pre* | *Peri* | *Post* | *Total* |
| Sharma, 1981; India**[32] †1,2,3,4,7,9,10 | XS | Unknown, community | 405 | 40–55 | Symptom list based on NKMSL, VU/T | NM; 33.3% pre, 33.3% peri, 33.3% post | Sleeplessness | 54 | 64 | 64 | – |
| | | | | | | | Palpitations | 67 | 75 | 64 | – |
| | | | | | | | Dizziness | 65 | 74 | 67 | – |
| | | | | | | | Feelings of tiredness | 89 | 93 | 88 | – |
| | | | | | | | Headaches | 76 | 86 | 82 | – |
| | | | | | | | Backaches | 62 | 71 | 64 | – |
| | | | | | | | Weight change | 55 | 70 | 56 | – |
| Shea, 2006; China**[33] †1,3,4,7,10 | XS | Non-random, community | 399 | 40–65 | QNV, VU/T | NM; 28.8% pre, 24.6% peri, 46.6% post | Backache | – | – | – | 44.1 |
| | | | | | | | Feeling tired | – | – | – | 35.8 |
| | | | | | | | Easily awoken | – | – | – | 34.8 |
| | | | | | | | Insomnia | – | – | – | 32.1 |
| | | | | | | | Aching joints | – | – | – | 33.2 |
| | | | | | | | Dizziness | – | – | – | 25.6 |
| | | | | | | | Heart palpitations | – | – | – | 25.1 |
| | | | | | | | Headache | – | – | – | 21.8 |
| | | | | | | | Stiff shoulders | – | – | – | 14.8 |
| Sievert, 2008; Bangladesh[34] †1,3, 4, 7 | XS | Network & snowball, community | Total: 157 subsample: 30 | Total: 35–59 subsample: 40–55 | QNV, VU/T | NM; 37.0% pre, 13.0% peri, 50.0% post (subsample) | Dizzy spells. | – | – | – | 69.0 |
| | | | | | | | Lack of energy | – | – | – | 65.0 |
| | | | | | | | Backaches | – | – | – | 59.0 |
| | | | | | | | Aches/stiffness in joints | – | – | – | 64.0 |
| | | | | | | | Trouble sleeping | – | – | – | 60.0 |
| Som, 2012; India*[19] †1,4,6,10 | XS | Random, community | 250 | 47–62 | MENQOL, V/ TU | NM; 100.0% post | Feeling tired or worn out | – | – | 95.2 | – |
| | | | | | | | Feeling a lack of energy | – | – | 86.8 | – |
| | | | | | | | Decrease in physical strength | – | – | 83.2 | – |
| | | | | | | | Changes in tone of skin | – | – | 85.6 | – |
| | | | | | | | Low backache | – | – | 80.0 | – |
| | | | | | | | Frequent urination | – | – | 84.0 | – |
| | | | | | | | Involuntary urination during laughing or coughing | – | – | 61.6 | – |
| Syed Alwi, 2009; Malaysia*[20] †1,3,4,10 | XS | Unknown, different locations in indigenous community | 276 | 40–65 | STRAW, MENQOL, V/T | NM; 21.7% pre, 41.3% peri, 37.0% post | Feeling tired or worn out | 46.7 | 86.8 | 80.3 | 75.7 |
| | | | | | | | Feeling a lack of energy | 55.0 | 83.3 | 84.3 | 77.5 |
| | | | | | | | Decrease in physical strength | 51.7 | 71.0 | 76.5 | 68.8 |
| | | | | | | | Changes in tone of skin | 31.6 | 42.9 | 53.9 | 44.6 |
| | | | | | | | Low backache | 65.0 | 82.5 | 78.4 | 77.2 |
| | | | | | | | Frequent urination | 21.6 | 32.4 | 51.9 | 37.3 |
| | | | | | | | Involuntary urination during laughing or coughing | 6.7 | 27.2 | 47.1 | 30.1 |

*(Continued)*







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**Table 2** (*Continued*)

| *Author/year/country/ risk-of-bias indicator (items ranked high†)* | *Study design* | *Sampling method* | *Sample size* | *Age group (years)* | *Instrument used/(validated/ translated)* | *Menopause type* | *Symptoms (%) in different menopause stages* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | *Symptoms* | *Pre* | *Peri* | *Post* | *Total* |
| Waidyasekera, 2009; Sri Lanka *,**,***14 †1,4,10 | XS | Cluster, community | 683 | 45–60 | MRS, V/T | NM; 21.5% pre, 19.2% peri, 59.3% post | Heart discomfort | 31.3 | 35.6 | 32.3 | – |
| | | | | | | | Sleep problems | 25.7 | 31.1 | 39.6 | – |
| | | | | | | | Joint and muscular discomfort | 62.5 | 81.8 | 76.7 | – |
| | | | | | | | Physical and mental exhaustion | 45.5 | 62.6 | 54.1 | – |

XS, cross-sectional; QNV, questionnaire not validated; V/NV/VU, validated/not validated/validated unknown; T/NT/TU, translated/not translated/translated unknown; NM, natural menopause; SM, surgical menopause; STRAW, Stages of Reproductive Aging Workshop; MENQOL, Menopause Specific Quality of Life; MRS, Menopause Rating Scale; GCS, Greene Climacteric Scale; KMI, Kupperman Menopausal Index; NKMSL, Neugarten and Kraines Menopausal Symptom List; SMI, Simplified Menopause Index
*, Oral contraceptive pill use is unspecified; **, hormone replacement therapy use is unspecified; †, item under the risk-of-bias tool: 1 (national representativeness), 2 (target population representativeness), 3 (random selection or census undertaken), 4 (non-response bias), 6 (acceptable case definition), 7 (valid study instrument), 9 (prevalence period), 10 (appropriateness of numerator and denominator)

## Risk of bias

We identified a high risk of bias for eight of the ten items assessed by the risk-of-bias tool: national representativeness, target population representativeness, random selection or census undertaken, non-response bias, acceptable case definition, valid study instrument, prevalence period, and the appropriateness of numerator and denominator. The items for which there was high risk of bias are included in the first column of Tables 1–4.

Three studies had a high risk of bias both for the external and internal validity items. These studies used non-validated questionnaires and also used a convenience sampling procedure[21,30,32]. Six studies had moderate ratings for items related to both external and internal validity including two studies which used validated tools[16,19] and four studies in which the validation status of the questionnaire was not clear[25,27,29,34]. Five studies had moderate and low external and internal validities, respectively[12–14,24,28] (Table 5).

## DISCUSSION

Our aim was to systematically review the published data for the prevalence of menopausal symptoms in Asian women. Our key findings were that physical and somatic symptoms were consistently dominant; the prevalence of VMS in the studies that had non-representative samples and did not use validated instruments was low; prevalence symptoms were more consistently reported in studies that used validated tools and random sampling in community-based settings, and, overall, there was a marked variation in symptom prevalence across the studies.

The prevalence of physical symptoms in these studies of Asian women was higher than other symptoms that characterize the menopause. After physical symptoms, we observed psychological symptoms to be the next in prevalence followed by VMS and sexual symptoms. This pattern is in line with the Asian Menopause Survey and the Pan Asia Menopause Study, neither of which were included in our analysis as these studies did not meet our inclusion criteria[6,36]. In contrast, studies in western countries portray a different picture with VMS dominating menopausal symptomatology[37–39].

Our review demonstrated ethnic variation in the reporting of the prevalence of menopausal symptoms across Asia, consistent with the Pan-Asia Menopause study[36] and other studies[3,37,38,40–42]. Studies conducted in China, Hong Kong, Japan, Taiwan and Singapore reported a low prevalence of VMS compared with studies conducted in Bangladesh, India, Iran, Malaysia, Oman, Pakistan and Sri Lanka. A recent study conducted in Japanese-American women in Hawaii revealed that the reporting of a low prevalence of hot flushes is due to a reporting bias[4] which might be true for some of our included studies. In addition, objective measures of VMS detect more hot flushes than women report subjectively[4,43]. Consistent with this, the study conducted in Bangladesh reported a large difference in the



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**Table 3** Prevalence of psychological symptoms in Asian women at midlife

| *Author/year/country/ risk-of-bias indicator (items ranked high†)* | *Study design* | *Sampling method* | *Sample size* | *Age group* (years) | *Instrument used/ (validated/ translated)* | *Menopause type* | *Symptoms (%) in different menopause stages* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | *Symptoms* | *Pre* | *Peri* | *Post* | *Total* |
| Aaron, 2002 ;India**[21] †1,3,4,6,7,9,10 | XS | Unknown, community | 200 | 40–49 | QNV, T | NM; 50% pre, 50% post | Fatigue | 31 | – | 42 | – |
| | | | | | | | Depression | 18 | – | 29 | – |
| | | | | | | | Irritability | 21 | – | 28 | – |
| Anderson, 2004; Japan[22] †1,7 | XS | Stratified random, electoral rolls | 1430 | 45–60 | QNV, T | NM, SM | Difficulty concentrating | | – | – | 76.2 |
| | | | | | | | Feeling tense or nervous | – | – | – | 65.5 |
| | | | | | | | Feeling unhappy or depressed | – | – | – | 58.8 |
| | | | | | | | Irritability | – | – | – | 52.2 |
| | | | | | | | Panic attacks | – | – | – | 30.7 |
| | | | | | | | Crying spells | – | – | – | 26.0 |
| El Shafie, 2011; Oman**[12] †1,4,10 | XS | Random, health centers | 472 | 40–60 | MRS, V/T | NM; 40.2% pre, 15.5% peri, 44.3% post | Depression | 33.2 | 38.4 | 42.1 | 38.0 |
| | | | | | | | Irritability | 33.7 | 35.6 | 42.6 | 38.8 |
| | | | | | | | Anxiety | 38.4 | 53.4 | 50.7 | 46.6 |
| | | | | | | | Physical/mental exhaustion | 37.4 | 47.9 | 55.0 | 47.2 |
| Fallahzadeh, 2007; Iran**[23] †1,7,9,10 | XS | Cluster, community | 346 | 40–70 | QNV | NM; 100% post | Memory problems | – | – | 52.9 | – |
| Fuh, 2003; Taiwan[24] †3,4,7 | XS | Convenience, community | 1360 | 40–54 | Modified KMI, VU | NM; 54% pre, 27% peri, 19% post | Dizzy spells | 38.6 | 38.9 | 42.4 | – |
| | | | | | | | Fatigue | 30.1 | 33.0 | 33.3 | – |
| Hilditch, 1999; China[18] †1 | XS | Random, community | 297 | 47–62 | MENQOL, V/T | NM; 100% post | Experiencing poor memory | – | – | – | 81 |
| | | | | | | | Being bored | – | – | – | 48 |
| | | | | | | | Dizziness | – | – | – | 44 |
| | | | | | | | Anxious or nervous | – | – | – | 26 |
| | | | | | | | Depressed, down or blue | – | – | – | 21 |
| Ho, 1999; Hong Kong**[25] †1,4,7,10 | XS | Random, residents' telephone directory | 1900 | 44–55 | QNV, VU/T | NM; 66.2% pre, 4.8% peri, 28.4% post | Nervous tension | 19.0 | 20.1 | 16.4 | 18.6 |
| | | | | | | | Feeling blue | 16.8 | 29.4 | 15.1 | 16.9 |
| | | | | | | | Dizzy spells | 15.7 | 25.0 | 12.5 | 15.3 |
| | | | | | | | Difficulty in concentration | 12.4 | 20.6 | 12.0 | 12.7 |

(*Continued*)







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**Table 3** (*Continued*)

| *Author/year/country/ risk-of-bias indicator (items ranked high†)* | *Study design* | *Sampling method* | *Sample size* | *Age group* (years) | *Instrument used/ (validated/ translated)* | *Menopause type* | *Symptoms (%) in different menopause stages* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | *Symptoms* | *Pre* | *Peri* | *Post* | *Total* |
| Ikeda, 2005; Japan[26] †1,2,3,4,7 | XS | Unknown, health insurance centers | 398 | 40–< 60 | Keio questionnaire, VU/TU | NM; 32.6% pre, 17.4% peri, 50.0% post | General fatigue | 69 | 68 | 67.5 | – |
| | | | | | | | Anxiety | – | – | – | 47.2 |
| | | | | | | | Irritability | – | – | – | 45.3 |
| | | | | | | | Depression | – | – | – | 41.5 |
| | | | | | | | Nervousness | – | – | – | 35.8 |
| Ishizuka, 2008; Japan[27] †1,3,7,9 | XS | Unknown, community | 1169 | 50 | SMI, VU/T | NM; 60.1% pre, 25.3% peri, 14.6% post | Depression | 41.7 | 50.9 | 49.3 | 45.0 |
| | | | | | | | Irritation | 37.3 | 41.5 | 40.5 | 38.8 |
| | | | | | | | Chills | 42.7 | 42.7 | 43.6 | 42.9 |
| | | | | | | | Fatigue | 73.8 | 78.4 | 77.4 | 64.7 |
| Kapur, 2009; India*,**[16] †1,4,9,10 | XS | Random, different locations | 129 | 30–65 | STRAW, GCS, V/T | NM; 54.3% pre, 25.5% early post, 20.2% late post | Feeling tense or nervous | 17.1 | – | 33.2 | – |
| | | | | | | | | 20.0 | – | 31.6 | – |
| | | | | | | | Excitable | 27.1 | – | 46.9 | – |
| | | | | | | | Feeling unhappy or depressed | | | | |
| | | | | | | | Irritability | 21.4 | – | 43.4 | – |
| | | | | | | | Feeling dizzy or faint | 18.6 | – | 43.1 | – |
| Lock, 1988; Japan**[29] †1,4,7,10 | XS | Random, community | 1141 | 45–55 | QNV, VU/T | NM | Irritability | – | – | – | 11.9 |
| | | | | | | | Loss of memory | – | – | – | 9.5 |
| | | | | | | | Difficulty in concentrating | – | – | – | 6.1 |
| | | | | | | | Stress | – | – | – | 5.4 |
| | | | | | | | Nervous tension | – | – | – | 5.1 |
| Loh, 2005; Singapore**[17] †10 | XS | Random, community | 656 | 45–60 | Modified GCS, V/T | NM; 39.8% pre, 7.3% peri, 42.5% post, 10.4% post hysterectomy | Irritability | 5.7 | – | – | – |
| | | | | | | | Irritability (slight) | – | – | – | 25.0 |
| | | | | | | | Difficulty in concentration | 5.4 | – | – | – |
| | | | | | | | Difficulty in concentration (slight) | – | – | – | 24.7 |
| | | | | | | | Tense or nervous (slight) | – | – | – | 17.2 |
| | | | | | | | Tense or nervous (moderate or marked) | – | – | – | 3.4 |

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**Table 3** (*Continued*)

| *Author/year/country/ risk-of-bias indicator (items ranked high†)* | *Study design* | *Sampling method* | *Sample size* | *Age group* (years) | *Instrument used/ (validated/ translated)* | *Menopause type* | *Symptoms (%) in different menopause stages* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | *Symptoms* | *Pre* | *Peri* | *Post* | *Total* |
| | | | | | | | Depressed easily (slight) | – | – | – | 17.1 |
| | | | | | | | Depressed easily (moderate or marked) | – | – | – | 3.0 |
| | | | | | | | Loss of interest (slight) | – | – | – | 17.4 |
| | | | | | | | Loss of interest (moderate or marked) | – | – | – | 2.6 |
| Melby, 2005; Japan[30] †1,3,4,7,9 | XS | Non–random, different locations | 140 | 45–55 | QNV, VU/T | NM; 26.4% pre, 52.9% peri, 20.7% post | Memory loss | – | – | – | 45.0 |
| | | | | | | | Stress | – | – | – | 40.7 |
| | | | | | | | Psychological anxiety | – | – | – | 30.7 |
| | | | | | | | Irritability | – | – | – | 28.6 |
| | | | | | | | Loss of concentration | – | – | – | 27.1 |
| | | | | | | | Depression | – | – | – | 22.9 |
| | | | | | | | Nervous tension | – | – | – | 20.0 |
| Nisar, 2010; Pakistan**13 †1,4,10 | XS | Multistage stratified random, community | 3929 | 40–70 | MRS, V/T | NM; 20.1% pre, 29.0% peri, 48.2% post, 1.7% undefined | Depressive mood | 72.4 | 82.8 | 77.4 | – |
| | | | | | | | Irritability | 75.8 | 85.2 | 75.9 | – |
| | | | | | | | Anxiety | 70.0 | 82.0 | 72.3 | – |
| | | | | | | | Physical and mental exhaustion | 85.2 | 88.7 | 83.8 | – |
| Qazi, 2006; Pakistan**31 †1,4,6,7,9,10 | XS | Simple random, community | 800 | 45–59 | QNV, VU/TU | NM | Nervousness | – | – | – | 59.2 |
| | | | | | | | Irritability | – | – | – | 52.0 |
| | | | | | | | Depression | – | – | – | 38.0 |
| | | | | | | | Hypertension | – | – | – | 31.5 |
| Rahman, 2010; Malaysia[15] †1,3,4 | XS | Unknown, health centers | 356 | 40–65 | STRAW, Modified MRS, V/T | NM; 23.0% pre, 39.6% peri, 37.4% post | Depressive mood | 15.9 | 47.5 | 27.1 | 32.6 |
| | | | | | | | Irritability | 35.4 | 54.6 | 21.8 | 37.9 |
| | | | | | | | Anxiety | 35.4 | 55.4 | 17.3 | 36.5 |
| | | | | | | | Physical and mental exhaustion | 43.4 | 75.9 | 72.2 | 67.1 |
| Sharma, 1981; India**32 †1,2,3,4,7,9,10 | XS | Unknown, community | 405 | 40–55 | Symptom list based on NKMSL, VU/T | NM; 33.3% pre, 33.3% peri, 33.3% post | Tension | 56 | 64 | 63 | – |
| | | | | | | | Nervousness | 68 | 68 | 67 | – |
| | | | | | | | Lack of concentration | 63 | 67 | 69 | – |
| | | | | | | | Feeling blue | 56 | 68 | 67 | – |

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**Table 3** (*Continued*)

| *Author/year/country/ risk-of-bias indicator (items ranked high†)* | *Study design* | *Sampling method* | *Sample size* | *Age group* (years) | *Instrument used/ (validated/ translated)* | *Menopause type* | *Symptoms (%) in different menopause stages* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | *Symptoms* | *Pre* | *Peri* | *Post* | *Total* |
| | | | | | | | Forgetfulness | 47 | 49 | 52 | – |
| | | | | | | | Feelings of fright/ dread | 50 | 49 | 49 | – |
| | | | | | | | Mood fluctuations | 66 | 77 | 66 | – |
| | | | | | | | Depression | 59 | 68 | 68 | – |
| Shea, 2006; China**[33] †1,3, 4,7,10 | XS | Non-random, community | 399 | 40–65 | QNV, VU/T | NM; 28.8% pre, 24.6% peri, 46.6% post | Feeling irritable | – | – | – | 46.1 |
| | | | | | | | Crying easily | – | – | – | 26.1 |
| | | | | | | | Feeling gloomy | – | – | – | 18.8 |
| | | | | | | | Feeling depressed | – | – | – | 18.0 |
| | | | | | | | Feeling anxious | – | – | – | 11.0 |
| Sievert, 2008; Bangladesh[34] †1,3, 4,7 | XS | Network & snowball, community | Total: 157; subsample: 30 | Total: 35–59; subsample: 40–55 | QNV, VU/T | NM; 37.0% pre, 13.0% peri, 50.0% post (subsample) | Dizzy spells | – | – | – | 69.0 |
| | | | | | | | Nervous tension | – | – | – | 67.0 |
| | | | | | | | Feeling depressed | – | – | – | 57.0 |
| | | | | | | | Irritability | – | – | – | 53.0 |
| | | | | | | | Difficulty concentrating | – | – | – | 51.0 |
| Som, 2012; India*[19] †1,4,6,10 | XS | Random, community | 250 | 47–62 | MENQOL, V/TU | NM; 100.0% post | Dissatisfied with personal life | – | – | 62.4 | – |
| | | | | | | | Feeling anxious or nervous | – | – | 81.2 | – |
| | | | | | | | Experiencing poor memory | – | – | 80.4 | – |
| | | | | | | | Feeling depressed, down or blue | – | – | 72.0 | – |
| | | | | | | | Impatient with other people | – | – | 62.4 | – |
| Syed Alwi, 2009;Malaysia*[20] †1,3,4,10 | XS | Unknown, different locations in indigenous community | 276 | 40–65 | STRAW, MENQOL, V/T | NM; 21.7% pre, 41.3% peri, 37.0% post | Dissatisfied with personal life | 16.7 | 22.8 | 19.6 | 20.3 |
| | | | | | | | Feeling anxious or nervous | 71.7 | 78.1 | 77.5 | 76.4 |
| | | | | | | | Experiencing poor memory | 63.3 | 70.1 | 78.4 | 71.7 |

(*Continued*)







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**Table 3** (*Continued*)

| *Author/year/country/risk-of-bias indicator (items ranked high†)* | *Study design* | *Sampling method* | *Sample size* | *Age group (years)* | *Instrument used/ (validated/ translated)* | *Menopause type* | *Symptoms (%) in different menopause stages* | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | *Symptoms* | *Pre* | *Peri* | *Post* | *Total* |
| | | | | | | | Feeling depressed, down or blue | 71.6 | 75.4 | 79.4 | 76.1 |
| | | | | | | | Impatient with other people | 43.4 | 51.7 | 59.8 | 52.8 |
| Waidyasekera, 2009; Sri Lanka[*,**,14] †1,4,10 | XS | Cluster, community | 683 | 45–60 | MRS, V/T | NM; 21.5% pre, 19.2% peri, 59.3% post | Physical and mental exhaustion | 45.5 | 62.6 | 54.1 | – |
| | | | | | | | Anxiety | 20.1 | 22.0 | 22.8 | – |
| | | | | | | | Depressive mode | 19.6 | 25.8 | 24.4 | – |
| | | | | | | | Irritability | 21.0 | 26.5 | 23.9 | – |

XS, cross-sectional; QNV, questionnaire not validated; V/NV/VU, validated/not validated/validated unknown; T/NT/TU, translated/not translated/translated unknown; NM, natural menopause; SM, surgical menopause; STRAW, Stages of Reproductive Aging Workshop; MENQOL, Menopause Specific Quality of Life; MRS, Menopause Rating Scale; GCS, Greene Climacteric Scale; KMI, Kupperman Menopausal Index; NKMSL, Neugarten and Kraines Menopausal Symptom List; SMI, Simplified Menopause Index

*, Oral contraceptive pill use is unspecified; **, hormone replacement therapy use is unspecified; †, item under the risk-of-bias tool: 1 (national representativeness), 2 (target population representativeness), 3 (random selection or census undertaken), 4 (non-response bias), 6 (acceptable case definition), 7 (valid study instrument), 9 (prevalence period), 10 (appropriateness of numerator and denominator)

prevalence of VMS between women who wore an ambulatory hot flush monitor and women reporting VMS by questionnaire[34].

With respect to menopause-associated psychological well-being, most of the studies in our review did not employ a validated questionnaire. The two studies used the Hospital Anxiety and Depression Scale; however, they reported mean scores rather than prevalence of anxiety and depression[24,28]. None of the included studies used a validated sexual function questionnaire, limiting the quality of data for the prevalence and severity of sexual symptoms in women in Asia. Notably, no study reported on distress due to sexual dysfunction.

Discrepancies in study designs, modes of recruitment, sampling procedures, time frames over which symptoms were assessed and use of different assessment tools contributed to the inconsistencies in our findings. Half of the studies used either convenience sampling or the sampling process was not specified. Studies recruited women from different locations in the community such as primary-care centers, government offices, schools, colleges and university staff, women's clinics, gynecological clinics and hospitals, private nursing homes, ladies clubs, parent associations, women's groups and networks, and women living in 'any other household or street'[16,20,30]. However, it is impossible to know, despite the diversity of recruitment settings, the representativeness of these samples. The time frame over which women were asked to report their symptoms was wide ranging. Variations in the period of ascertainment likely contributed to the variation of the reported prevalence of symptoms.

Consistent with these concerns, application of the risk-of-bias tool demonstrated a high level of bias in eight of the ten items related to both external and internal validities. An overall assessment of risk of bias of evidence across studies and outcomes was not included because it has been suggested that general judgements should not be made in the context of systematic reviews that are intended to inform decisions across a variety of settings[9].

Our systematic search of the literature for studies that met our inclusion criteria is a strength of this review. Another strength is the inclusion of all Asian countries and all menopausal symptom domains. This contrasts with previous reviews which have been restricted to only some Asian countries[1,44] and which did not cover all domains of menopausal symptoms[1,45]. A limitation was our focus on symptom prevalence. This required exclusion of some studies that had not provided prevalence data, although they had employed validated questionnaires. Although we excluded all studies that specified that women using MHT or the OCP were included in their analyses, we included several studies that provided no statement regarding MHT or OCP use in their publications. Amongst these were ten studies that potentially included women using MHT[12,13,17,21,23,25,29,31–33], two studies in which women OCP users may have been included[19,20] and two studies that may have included either MHT or OCP users[14,16].



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**Table 4** Prevalence of sexual symptoms in Asian women at midlife

| *Author/year/country/ risk-of-bias indicator (items ranked high†)* | *Study design* | *Sampling method* | *Sample size* | *Age group* (years) | *Instrument used/ validated/ translated* | *Menopause type* | *Symptoms (%) in different menopause stages* | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | *Symptoms* | *Pre* | *Peri* | *Post* | *Total* |
| Aaron, 2002; India**[21] †1,3,4,6,7,9,10 | XS | Unknown, community | 200 | 40–49 | QNV, T | NM; 50% pre, 50% post | Not sexually active | 32 | – | 54 | – |
| | | | | | | | Did not enjoy sex | 24 | – | 34 | – |
| | | | | | | | Reduced sexual desire | 38 | – | 59 | – |
| Anderson, 2004; Japan[22] †1,7 | XS | Stratified random, electoral rolls | 1430 | 45–60 | QNV, T | NM, SM | Loss of interest in sex | – | – | – | 71.5 |
| El Shafie, 2011; Oman**[12] †1,4,10 | XS | Random, health centers | 472 | 40–60 | MRS, V/T | NM; 40.2% pre, 15.5% peri, 44.3% post | Sexual problems | 14.7 | 32.9 | 26.8 | 25.3 |
| | | | | | | | Vaginal dryness | 7.4 | 19.2 | 16.3 | 14.6 |
| Fallahzadeh, 2007; Iran**[23] †1,7,9,10 | XS | Cluster, community | 346 | 40–70 | QNV | NM; 100% post | Vagina dryness | – | | 15.3 | – |
| Fuh, 2003; Taiwan[24] †3,4,7 | XS | Convenience, community | 1360 | 40–54 | Modified KMI, VU | NM; 54% pre, 27% peri, 19% post | Vaginal dryness | 11.0 | 17.1 | 24.4 | – |
| Hilditch, 1999; China[18] †1 | XS | Random, community | 297 | 47–62 | MENQOL, V/T | NM; 100% post | Decrease sexual desire since menopause | – | – | 90.0 | – |
| | | | | | | | Vaginal dryness during sexual intercourse | – | – | 17.0 | – |
| Ikeda, 2005; Japan[26] †1,2,3,4,7 | XS | Unknown, health insurance centers | 398 | 40–< 60 | Keio questionnaire, VU/TU | NM; 32.6% pre, 17.4% peri, 50.0% post | Vaginal discharge | – | – | – | 30.2 |
| | | | | | | | Vaginal itching | – | – | – | 18.9 |
| Kapur, 2009; India*,**[16] †1,4,9,10 | XS | Random, different locations | 129 | 30–65 | STRAW, GCS, V/T | NM; 54.3% pre, 25.5% early post, 20.2% late post | Loss of interest in sex | 22.9 | – | 39.2 | – |
| Lock, 1988; Japan**[29] †1,4,7,10 | XS | Random, community | 1141 | 45–55 | QNV, VU/T | NM | Lack of sexual desire | – | – | – | 4.4 |
| | | | | | | | Uterine bleeding | – | – | – | 0.3 |
| Loh, 2005; Singapore**[17] †10 | XS | Random, community | 656 | 45–60 | Modified GCS, V/T | NM; 39.8% pre, 7.3% peri, 42.5% post, 10.4% post hysterectomy | Loss of interest in sex | – | 10.4 | 8.2 | – |
| | | | | | | | Vaginal dryness | – | – | 6.1 | 12.6 |
| Melby, 2005; Japan[30] †1,3,4,7,9,10 | XS | Non-random, different locations | 140 | 45–55 | QNV, VU/T | NM; 26.4% pre, 52.9% peri, 20.7% post | Vaginal discharge | – | – | – | 20.0 |
| | | | | | | | Vaginal dryness | – | – | – | 5.0 |
| | | | | | | | Painful/difficult sexual intercourse | – | – | – | 2.9 |
| | | | | | | | Uterine bleeding | – | – | – | 1.4 |

(*Continued*)







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**Table 4** (*Continued*)

| *Author/year/country/ risk-of-bias indicator (items ranked high†)* | *Study design* | *Sampling method* | *Sample size* | *Age group* (years) | *Instrument used/ validated/ translated* | *Menopause type* | *Symptoms (%) in different menopause stages* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | *Symptoms* | *Pre* | *Peri* | *Post* | *Total* |
| Nisar, 2010; Pakistan**13 †1,4,10 | XS | Multistage stratified random, community | 3929 | 40–70 | MRS, V/T | NM; 20.1% pre, 29.0% peri, 48.2% post, 1.7% undefined | Sexual problems | 64.0 | 74.0 | 60.5 | – |
| | | | | | | | Dryness of vagina | 31.8 | 46.7 | 27.2 | – |
| Qazi, 2006; Pakistan**31 †1,4,6,7,9,10 | XS | Simple random, community | 800 | 45–59 | QNV, VU/TU | NM | Dryness of vagina | – | – | – | 15.0 |
| | | | | | | | Postmenopausal bleeding | – | – | – | 10.5 |
| Rahman, 2010; Malaysia[15] †1,3,4 | XS | Unknown, health centers | 356 | 40–65 | STRAW, Modified MRS, V/T | NM; 23.0% pre, 39.6% peri, 37.4% post | Sexual problems | 20.7 | 41.2 | 26.3 | 30.9 |
| | | | | | | | Dryness of vagina | 19.5 | 41.2 | 45.9 | 37.9 |
| Shea, 2006; China**33 †1,3,4,7,10 | XS | Non-random, community | 399 | 40–65 | QNV, VU/T | NM; 28.8% pre, 24.6% peri, 46.6% post | Vaginal dryness, itching, or burning | – | – | – | 14.3 |
| | | | | | | | Vaginal pain during sex | – | – | – | 7.0 |
| Som, 2012; India*19 †1,4,6,10 | XS | Random, community | 250 | 47–62 | MENQOL, V/ TU | NM; 100.0% post | Change in sexual desire | – | – | 87.2 | – |
| | | | | | | | Vaginal dryness during intercourse | – | – | 99.6 | – |
| | | | | | | | Avoiding intimacy | – | – | 68.8 | – |
| Syed Alwi, 2009;Malaysia*20 †1,3,4,10 | XS | Unknown, different locations indigenous community | 276 | 40–65 | STRAW, MENQOL, V/T | NM; 21.7% pre, 41.3% peri, 37.0% post | Change in sexual desire | 43.3 | 69.2 | 81.4 | 68.1 |
| | | | | | | | Vaginal dryness during intercourse | 11.7 | 41.2 | 80.3 | 49.3 |
| | | | | | | | Avoiding intimacy | 10.0 | 49.1 | 76.4 | 50.7 |
| Waidyasekera, 2009; Sri Lanka*,**14 †1,4,10 | XS | Cluster, community | 683 | 45–60 | MRS, V/T | NM; 21.5% pre, 19.2% peri, 59.3% post | Vaginal dryness | 8.3 | 11.5 | 9.3 | – |

XS, cross-sectional; QNV, questionnaire not validated; V/NV/VU, validated/not validated/validated unknown; T/NT/TU, translated/not translated/translated unknown; NM, natural menopause; SM, surgical menopause; STRAW, Stages of Reproductive Aging Workshop; MENQOL, Menopause Specific Quality of Life; MRS, Menopause Rating Scale; GCS, Greene Climacteric Scale; KMI, Kupperman Menopausal Index; NKMSL, Neugarten and Kraines Menopausal Symptom List; SMI, Simplified Menopause Index

*, Oral contraceptive pill use is unspecified; **, hormone replacement therapy use is unspecified; †, item under the risk of bias tool: 1 (national representativeness), 2 (target population representativeness), 3 (random selection or census undertaken), 4 (non-response bias), 6 (acceptable case definition), 7 (valid study instrument), 9 (prevalence period), 10 (appropriateness of numerator and denominator)







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**Table 5** Review of authors' subjective judgements about the overall risk of bias for each included study

| | *Bias in external validity* | | | |
|---|---|---|---|---|
| *Bias in internal validity* | – | *Low* | *Medium* | *High* |
| – | – | 1 | – | 1 |
| Low | 1 | 1 | 5 | 2 |
| Medium | – | – | 6 | 1 |
| High | – | 1 | 1 | 3 |

External validity: 1/4, low, 2/4, medium; 4/4, high; internal validity: 1/4, low, 2–3/4, medium; 4/4, high. Numbers inserted in the boxes represent the number of articles that are associated with respective risk of biases

## CONCLUSION

There is wide range of reported prevalence of menopausal symptoms from different studies conducted in Asia. Physical and somatic symptoms predominate, followed in frequency by psychological, VMS and sexual symptoms. There is a need for further studies of representative samples to understand whether the variations in prevalence reporting is a function of methodological issues or due to ethnic, cultural or other socioeconomic differences.

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## 4.3 An Update of Systematic Review on Prevalence of Menopausal Symptoms in Women at Mid-life in Asia

The systematic review of the 'prevalence of menopausal symptoms in Asian mid-life women' included all papers published as of June 2013. Following all the same criteria used in that review (130), a systematic literature search was conducted that resulted 20 articles (131-150) reporting prevalence of menopausal symptoms in Asian countries between July 2013 and March 2016.

Consistent with our previous review (130), this update showed that physical symptoms were more prevalent than psychological, vasomotor and sexual symptoms with large variation between the menopausal stages (Table 3-6). However, our own study (145) reported a high prevalence of VMS which was consistent with a recent study conducted in Australia using the same questionnaire (MENQOL) to assess menopausal symptoms (151).

The reasons for the difference in prevalence between studies was similar to what was found in our previous review. The application of the risk-of-bias tool demonstrated a high level of bias in most studies, especially in the four items related to external validity. Two studies, including our own, had low (152) or no (145) risk of bias in both the areas of external and internal validity.

Our update demonstrated that the variation in prevalence might be a function of methodological issues rather than the issue of ethnic, cultural or socio-economic differences. Further nationally representative studies are needed in Asian countries, especially in China, Japan and Korea where a low prevalence of vasomotor symptoms is often reported.

In conclusion, with an ageing population, menopause is becoming a growing health issue in Asian countries. A more accurate picture of menopausal symptoms could be established in Asian countries in the future, if nationally representative large studies are conducted using validated questionnaires.

**Table 3: Prevalence of vasomotor symptoms in Asia**

| Author/ Year/ Country/ Risk-of-bias indicator (Items ranked high†) | Study Design | Sampling Method/ Settings | Sample Size (n) | Age Group (yrs.) | Instrument Used/ (Validated/ Translated) | Menopause Type | Symptoms (%) in different menopause stages | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Symptoms | Pre | Peri | Post | Total |
| AlDughaither, A. et al. 2015; Saudi Arabia* †1, 2, 3, 4 | XS | Convenience A primary care clinic | 119 | 45-60 | MRS V/T | NM 26.0% Pre 41.2% Peri 32.8% Post | HF & sweating | 7.6 | 24.4 | 15.1 | 47.1 |
| Alizadeh, M. et al. 2014 ; Iran †1, 2, 3, 4 | XS | Convenience Health centres | 300 | 40-60 | MENQOL V/T | NM 21.6% Pre 31.9% Peri 46.5% Post | HF | 31.4 | 70.0 | 75.6 | 54.0 |
| | | | | | | | NS | 19.2 | 39.7 | 64.0 | 38.0 |
| Batool, S. F. et al. 2014; Pakistan*, ** †1, 2, 3, 4, 6, 10 | XS | Convenience 3 Hospitals | 200 | 45-55 | MRS VU/TU | Not clear | HF & sweating | - | - | - | 73.5 |
| Bindhu, A. S. et al. 2014; India* †1, 2, 3, 4, 6 | XS | Convenience Community | 320 | 43-55 | GCS VU/TU | NM 50.0% Pre 50.0 Post | HF | 32.5 | - | 49.4 | 40.9 |
| | | | | | | | NS | 27.5 | - | 38.1 | 32.8 |
| Chou, M. F. et al. 2014; China* †1, 2, 3 | XS | Convenience A clinic | 442 | 40-60 | MRS V/T | NM 37.8% Pre 28.1% Peri 34.2% Post | HF & sweating | 33.5 | 68.5 | 72.8 | - |
| Dasgupta, D. et al. 2015; India †1, 2, 7, 10 | XS | Multistage random Community | 1400 | 40-55 | QNV VU/T | NM 48.9% Peri 51.1% Post | HF | - | 37.0 | 41.6 | 39.4 |
| | | | | | | | NS | - | 42.5 | 50.6 | 46.2 |
| Ghazanfarpour, | XS | Convenience | 349 | 38-78 | MENQOL | NM | HF | - | - | - | 58.9 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| M. et al. 2015; Iran* †1, 3 | | Health care centres | | | V/T | 100.0% Post | NS | - | - | - | 56.1 |
| | | | | | | | Sweating | - | - | - | 63.3 |
| Ghimire, N. et al. 2015 Nepal*, ** †1, 2, 4 | XS | Convenience Community | 924 | 40-60 | MRS V/T | Unknown 31.0% Pre 17.8% Peri 51.2% Post | HF | 31.4 | 34.5 | 42.4 | 37.6 |
| Islam, R. et al. 2016; Bangladesh | XS | Random Community | 1590 | 30-59 | MENQOL V/T | NM 59.3% Pre 8.4% Peri 32.3% Post | HF | 17.0 | 65.7 | 60.8 | 35.2 |
| | | | | | | | NS | 9.9 | 64.8 | 44.6 | 25.7 |
| | | | | | | | Sweating | 6.1 | 41.0 | 23.1 | 15.0 |
| Jayabharati, B. et al. 2016; India* †1, 3, 4, 6, 10 | XS | Convenience Community | 130 | 45-55 | MRS V/TU | Unknown 100% Post | HF | - | - | 72.0 | - |
| | | | | | | | NS | - | - | 71.5 | - |
| Joseph, N. et al. 2014; India* †1, 2, 3 | XS | Convenience Clinics | 110 | 40-65 | MRS V/T | NM 11.8% Pre 15.5% Peri 72.7% Post | HF & sweating | - | - | - | 81.8 |
| Joshi, M. et al. 2015; India*, ** †1, 3 | XS | Convenience Community | 1000 | 30-60 | MRS VU/TU | Unknown 58.7% Pre 14.6% Peri 26.7% Post | HF & sweating | - | - | - | 22.0 |
| Kolisetty, R. et al. 2015; India* †1, 2, 3, 6, 7, 9 | XS | Convenience Hospital | 152 | 40-54 | QNV VU/TU | NM 100% Post | HF | - | - | 38.6 | - |
| | | | | | | | NS | - | - | 43.7 | - |
| Rokhade, C.J. et al. 2013 ; India* †1, 2, 3, 4, 6, 7, 9, 10 | XS | Convenience Community | 115 | 51-55 | QNV VU/TU | NM 100% Post | HF | - | - | 12.2 | - |
| | | | | | | | NS | - | - | 8.7 | - |
| Ryu, K.J. et al. 2015 ; Korea †1, 2, 3 | XS | Convenience Health centres | 1,906 | 45-65 | MRS VU/TU | 100% Post | HF & sweating | - | - | 58.0 | - |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| Singh A. et al. 2014 ; India*, ** †1, 2, 4, 7 | XS | Random Community | 252 | 40-54 | QNV VU/T | NM 100% Post | HF | - | - | 46.4 | - |
| | | | | | | | NS | - | - | 45.6 | - |
| Srivastava, M. Et al. 2015; India** †1, 2, 3, 4, 6, 10 | XS | Unknown Community | 117 | > 40 | MRS V/TU | NM Not classified | HF, cold sweats & clod hands and feet | - | - | - | 53.9 |
| Subrahmanyam, N.et al. 2016; India** †1, 2, 3, 4, 6 | XS | Convenience Community | 120 | 40-55 | GCS V/TU | NM 48.3% Peri 51.7% Post | HF | - | - | - | 46.7 |
| | | | | | | | NS | - | - | - | 50.0 |
| Yim, G. et al. 2015 Korea* †1, 2, 3 | XS | Convenience Health centres | 1,774 | 44-56 | MENQOL V/T | NM 42.6% Pre 16.9% early Peri 19.8% late Peri 20.7% Post | HF | 30.1 | 47.1 | 60.1 | 42.7 |
| | | | | | | | NS | 18.4 | 30.5 | 45.7 | 28.6 |
| | | | | | | | Sweating | 22.8 | 37.3 | 54.2 | 34.7 |
| Zhang, J. et al. 2016 China* †1, 4, 6 | XS | Convenience Community | 2429 | 40-59 | Modified KMI V/TU | NM 38.9% early Peri 31.5% late Peri 18.8% early Post 10.8 Late Post | HF | - | - | - | 34.5 |

* OCP use is unspecified; ** HRT use is unspecified; †Item under the risk of bias tool: 1 (National representativeness), 2 (Target population representativeness), 3 (Random selection or census undertaken), 4 (non-response bias), 6 (acceptable case definition), 7 (valid study instrument), 9 (prevalence period), 10 (appropriateness of numerator and denominator)

Note: XS= Cross-sectional; QNV= Questionnaire not validated; V/NV/VU= Validated/Not validated/Validated unknown; T/NT/TU= Translated/Not translated/ Translated unknown; NM= Natural Menopause; MENQOL= Menopause Specific Quality of Life; MRS= Menopause Rating Scale; GCS= Green Climacteric Scale.

**Table 4: Prevalence of physical/somatic symptoms in Asia**

| Author/ Year/ Country/ Risk-of-bias indicator (Items ranked high†) | Study Design | Sampling Method | Sample Size (n) | Age Group (yrs.) | Instrument Used/ (Validated/ Translated) | Menopause Type | Symptoms (%) in different menopause stages | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Symptoms | Pre | Peri | Post | Total |
| AlDughaither, A. et al. 2015; Saudi Arabia* †1, 2, 3, 4 | XS | Convenience A primary care clinic | 119 | 45-60 | MRS V/T | NM 26.0% Pre 41.2% Peri 32.8% Post | Heart discomfort | 8.4 | 16.8 | 10.1 | 35.3 |
| | | | | | | | Sleep problems | 7.6 | 8.4 | 10.1 | 26.1 |
| | | | | | | | Muscle and joint pain | 20.2 | 36.1 | 24.4 | 80.7 |
| Alizadeh, M. et al. 2014 ; Iran †1, 2, 3, 4 | XS | Convenience Health centres | 300 | 40-60 | MENQOL V/T | NM 21.6% Pre 31.9% Peri 46.5% Post | Muscle and joint pain | 56.0 | 85.2 | 76.4 | 69.0 |
| | | | | | | | Feeling tired | 57.9 | 72.1 | 72.2 | 66.0 |
| | | | | | | | Decrease in physical strength | 48.8 | 76.7 | 70.0 | 62.0 |
| | | | | | | | Experiencing poor memory | 41.6 | 62.1 | 69.3 | 56.0 |
| Batool, S. F. et al. 2014; Pakistan*, ** †1, 2, 3, 4, 6, 10 | XS | Convenience 3 Hospitals | 200 | 45-55 | MRS VU/TU | Not clear | Heart discomfort | - | - | - | 76.5 |
| | | | | | | | Sleep problems | - | - | - | 85.0 |
| | | | | | | | Muscle and joint pain | - | - | - | 59.0 |
| Bindhu, A. S. et al. 2014; India* †1, 2, 3, 4, 6 | XS | Convenience Community | 320 | 43-55 | GCS VU/TU | NM 50.0% Pre 50.0 Post | Lack of energy | 42.5 | - | 56.9 | 49.7 |
| | | | | | | | Muscle and joint pain | 31.9 | - | 40.0 | 35.9 |
| | | | | | | | Difficulties sleeping | 25.0 | - | 35.0 | 30.0 |
| Chou, M. F. et al. 2014; China* †1, 2, 3 | XS | Convenience A clinic | 442 | 40-60 | MRS V/T | NM 37.8% Pre 28.1% Peri 34.2% Post | Heart discomfort | 40.7 | 66.1 | 72.2 | - |
| | | | | | | | Sleep problems | 68.3 | 78.2 | 86.1 | - |
| | | | | | | | Muscle and joint pain | 81.4 | 91.9 | 93.4 | - |
| Dasgupta, D. et al. 2015; India †1, 2, 7, 10 | XS | Multistage random Community | 1400 | 40-55 | QNV VU/T | NM 48.9% Peri 51.1% Post | Painful urination | - | 16.0 | 17.7 | 16.9 |
| | | | | | | | Increased frequency of urination | - | 28.1 | 36.6 | 32.5 |
| | | | | | | | Stress urinary incontinence | - | 51.2 | 55.4 | 53.1 |
| Ghazanfarpour, M. et al. 2015; | XS | Convenience Health care | 349 | 38-78 | MENQOL V/T | NM 100.0% Post | Muscle and joint pain | - | - | - | 74.8 |
| | | | | | | | Decrease in physical strength | - | - | - | 70.2 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Iran*<br>†1, 2, 3 | | centres | | | | | Decrease in stamina | - | - | - | 65.0 |
| | | | | | | | Difficulty in sleeping | - | - | - | 59.8 |
| Ghimire, N. et al. 2015<br>Nepal*, **<br>†1, 2, 4 | XS | Convenience<br>Community | 924 | 40-60 | MRS<br>V/T | Unknown<br>31.0% Pre<br>17.8% Peri<br>51.2% Post | Heart discomfort | 41.1 | 45.9 | 53.6 | 48.1 |
| | | | | | | | Sleep problems | 48.8 | 52.7 | 69.3 | 58.8 |
| | | | | | | | Muscle and joint discomfort | 62.8 | 65.5 | 78.5 | 71.3 |
| Islam et al. 2016;<br>Bangladesh | XS | Random<br>Community | 1590 | 30-59 | MENQOL<br>V/T | NM<br>59.3% Pre<br>8.4% Peri<br>32.3% Post | Muscle and joint pain | 42.3 | 76.2 | 75.1 | 55.8 |
| | | | | | | | Feeling tired | 55.2 | 88.6 | 84.6 | 67.5 |
| | | | | | | | Decrease in physical strength | 61.8 | 91.4 | 93.1 | 74.7 |
| | | | | | | | Difficulty in sleeping | 26.1 | 55.2 | 56.4 | 38.3 |
| Jayabharati, B. et al.<br>2016;<br>India*<br>†1, 3, 4, 6, 10 | XS | Convenience<br>Community | 130 | 45-55 | MRS<br>V/TU | Unknown<br>100% Post | Muscle pain | - | - | 67.0 | - |
| | | | | | | | Sleep problems | - | - | 60.3 | - |
| | | | | | | | Difficulty in urination | - | - | 62.0 | - |
| Joseph, N. et al. 2014;<br>India*<br>†1, 2, 3 | XS | Convenience<br>Clinics | 110 | 40-65 | MRS<br>V/T | NM<br>11.8% Pre<br>15.5% Peri<br>72.7% Post | Heart discomfort | - | - | - | 70.0 |
| | | | | | | | Sleep problems | - | - | - | 72.7 |
| | | | | | | | Muscle and joint pain | - | - | - | 85.4 |
| Joshi, M. et al. 2015;<br>India*, **<br>1, 3 | XS | Convenience<br>Community | 1000 | 30-60 | MRS<br>VU/TU | Unknown<br>58.7% Pre<br>14.6% Peri<br>26.7% Post | Heart discomfort | - | - | - | 45.0 |
| | | | | | | | Sleep problems | - | - | - | 24.5 |
| | | | | | | | Pain in hands and legs | - | - | - | 73.6 |
| Kolisetty, R. et al. 2015;<br>India*<br>†1, 2, 3, 6, 7, 9 | XS | Convenience<br>Hospital | 152 | 40-54 | QNV<br>VU/TU | NM<br>100% Post | Sleep disturbances | - | - | 52.7 | - |
| | | | | | | | Muscle and joint pain | - | - | 48.4 | - |
| | | | | | | | Tiredness | - | - | 39.5 | - |
| | | | | | | | Headache | - | - | 21.2 | - |
| Rokhade, C.J. et al. 2013 ;<br>India*<br>†1, 2, 3, 4, 6, 7, 9, 10 | XS | Convenience<br>Community | 115 | 51-55 | QNV<br>VU/TU | NM<br>100% Post | Joint pain | - | - | 51.3 | - |
| | | | | | | | Knee pain | - | - | 66.1 | - |
| | | | | | | | Back pain | - | - | 48.7 | - |
| Singh A. et al. 2014 ;<br>India*, **<br>†1, 2, 4, 7 | XS | Random<br>Community | 252 | 40-54 | QNV<br>VU/T | NM<br>100% Post | Sleep disturbances | - | - | 62.7 | - |
| | | | | | | | Muscle and joint pain | - | - | 59.1 | - |
| | | | | | | | Tiredness | - | - | 40.1 | - |
| | | | | | | | Headache | - | - | 28.6 | - |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Subrahmanyam, N.et al. 2016; India** †1, 2, 3, 4, 6 | XS | Convenience Community | 120 | 40-55 | GCS V/TU | NM 48.3% Peri 51.7% Post | Muscle and joint pain | - | - | - | 95.0 |
| | | | | | | | Feeling tired | - | - | - | 78.3 |
| | | | | | | | Decrease in physical strength | - | - | - | 86.5 |
| Srivastava, M. Et al. 2015; India** 1, 2, 3, 4, 6, 10 | XS | Unknown Community | 117 | > 40 | MRS V/TU | NM Not classified | Fatigue and lack of energy | - | - | - | 72.9 |
| | | | | | | | Headache | - | - | - | 55.9 |
| | | | | | | | Weight gain | - | - | - | 43.1 |
| Yim, G. et al. 2015 Korea* †1, 2, 3 | XS | Convenience Health centres | 1,774 | 44-56 | MENQOL V/T | NM 42.6% Pre 16.9% early Peri 19.8% late Peri 20.7% Post | Feeling Tired | 81.4 | 86.1 | 81.2 | 83.1 |
| | | | | | | | Joint and muscular pain | 65.6 | 75.7 | 74.2 | 71.1 |
| | | | | | | | Decrease in physical strength | 77.2 | 83.6 | 80.8 | 80.3 |
| | | | | | | | Sleeping problems | 41.4 | 54.1 | 65.9 | 51.1 |
| Zhang, J. et al. 2016 China* †1, 4, 6 | XS | Convenience Community | 2429 | 40-59 | Modified KMI V/TU | NM 38.9% early Peri 31.5% late Peri 18.8% early Post 10.8 Late Post | Fatigue | - | - | - | 49.0 |
| | | | | | | | Arthralgia & mayalgia | - | - | - | 46.6 |
| | | | | | | | Insomnia | - | - | - | 40.0 |

* OCP use is unspecified; ** HRT use is unspecified; †Item under the risk of bias tool: 1 (National representativeness), 2 (Target population representativeness), 3 (Random selection or census undertaken), 4 (non-response bias), 6 (acceptable case definition), 7 (valid study instrument), 9 (prevalence period), 10 (appropriateness of numerator and denominator)

Note: XS= Cross-sectional; QNV= Questionnaire not validated; V/NV/VU= Validated/Not validated/Validated unknown; T/NT/TU= Translated/Not translated/ Translated unknown; NM= Natural Menopause; MENQOL= Menopause Specific Quality of Life; MRS= Menopause Rating Scale; GCS= Green Climacteric Scale.

## Table 5: Prevalence of psychological symptoms in Asia

| Author/ Year/ Country/ Risk-of-bias indicator (Items ranked high†) | Study Design | Sampling Method | Sample Size (n) | Age Group (yrs.) | Instrument Used/ (Validated/ Translated) | Menopause Type | Symptoms (%) in different menopause stages | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Symptoms | Pre | Peri | Post | Total |
| AlDughaither, A. et al. 2015; Saudi Arabia* †1, 2,3, 4 | XS | Convenience A primary care clinic | 119 | 45-60 | MRS V/T | NM 26.0% Pre 41.2% Peri 32.8% Post | Depression | 4.2 | 13.4 | 11.8 | 29.4 |
| | | | | | | | Irritability | 5.0 | 10.9 | 12.6 | 28.6 |
| | | | | | | | Anxiety | 5.0 | 14.3 | 11.8 | 31.1 |
| | | | | | | | Physical/mental exhaustion | 14.3 | 28.6 | 21.8 | 64.7 |
| Alizadeh, M. et al. 2014 ; Iran †1, 2, 3, 4 | XS | Convenience Health centres | 300 | 40-60 | MENQOL V/T | NM 21.6% Pre 31.9% Peri 46.5% Post | Feeling nervous or anxious | 57.9 | 70.7 | 72.7 | 65.0 |
| | | | | | | | Feeling depressed, down or blue | 49.2 | 69.5 | 61.8 | 58.0 |
| | | | | | | | Experiencing poor memory | 41.6 | 62.1 | 69.3 | 56.0 |
| Batool, S. F. et al. 2014; Pakistan*, ** †1, 2, 3, 4, 6, 10 | XS | Convenience 3 Hospitals | 200 | 45-55 | MRS VU/TU | Not clear | Depression | - | - | - | 67.0 |
| | | | | | | | Irritability | - | - | - | 50.0 |
| | | | | | | | Anxiety | - | - | - | 70.0 |
| | | | | | | | Physical/mental exhaustion | - | - | - | 59.0 |
| Bindhu, A. S. et al. 2014; India* †1, 2, 3, 4, 6 | XS | Convenience Community | 320 | 43-55 | GCS VU/TU | NM 50.0% Pre 50.0 Post | Irritability | 36.5 | - | 45.6 | 41.1 |
| | | | | | | | Feeling sad or down | 34.4 | - | 43.8 | 39.1- |
| | | | | | | | Crying spells | 30.8 | - | 35.0 | 32.9 |
| Chou, M. F. et al. 2014; China* †1, 2, 3 | XS | Convenience A clinic | 442 | 40-60 | MRS V/T | NM 37.8% Pre 28.1% Peri 34.2% Post | Depression | 58.7 | 79.8 | 79.5 | - |
| | | | | | | | Irritability | 63.5 | 88.7 | 85.4 | - |
| | | | | | | | Anxiety | 54.5 | 79.8 | 78.1 | - |
| | | | | | | | Physical/mental exhaustion | 85.6 | 92.7 | 93.4 | - |
| Ghazanfarpour, M. et al. 2015; Iran* †1, 2, 3 | XS | Convenience Health care centres | 349 | 38-78 | MENQOL V/T | NM 100.0% Post | Feeling nervous or anxious | - | - | - | 74.3 |
| | | | | | | | Feeling depressed, down or blue | - | - | - | 53.8 |
| | | | | | | | Experiencing poor memory | - | - | - | 61.8 |
| | | | | | | | Wanting to be alone | - | - | - | 41.0 |
| Ghimire, N. et al. 2015 Nepal*, ** | XS | Convenience Community | 924 | 40-60 | MRS V/T | Unknown 31.0% Pre 17.8% Peri | Depression | 55.4 | 50.7 | 63.7 | 58.7 |
| | | | | | | | Irritability | 65.5 | 65.5 | 66.0 | 64.7 |
| | | | | | | | Anxiety | 43.0 | 37.8 | 46.1 | 43.6 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| †1, 2, 4<br>Islam et al. 2016; Bangladesh | XS | Random Community | 1590 | 30-59 | MENQOL V/T | 51.2% Post<br>NM<br>59.3% Pre<br>8.4% Peri<br>32.3% Post | Physical/mental exhaustion<br>Feeling nervous or anxious<br>Feeling depressed, down or blue<br>Impatient with personal life<br>Wanting to be alone | 69.4<br>53.9<br>17.0<br>9.8<br>10.1 | 76.4<br>74.3<br>33.3<br>24.8<br>24.8 | 81.5<br>75.6<br>45.6<br>27.7<br>30.5 | 76.3<br>62.6<br>27.5<br>16.8<br>17.9 |
| Jayabharati, B. et al. 2016; India*<br>†1, 3, 4, 6, 10 | XS | Convenience Community | 130 | 45-55 | MRS V/TU | Unknown<br>100% Post | Forgetfulness<br>Poor self-esteem<br>Angry outburst<br>Frustration | -<br>-<br>-<br>- | -<br>-<br>-<br>- | 61.5<br>59.5<br>59.0<br>56.5 | -<br>-<br>-<br>- |
| Joseph, N. et al. 2014; India*<br>†1, 2, 3 | XS | Convenience Clinics | 110 | 40-65 | MRS V/T | NM<br>11.8% Pre<br>15.5% Peri<br>72.7% Post | Depression<br>Irritability<br>Anxiety<br>Physical/mental exhaustion | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | 50.9<br>69.1<br>63.6<br>85.4 |
| Joshi, M. et al. 2015; India*, **<br>†1, 3 | XS | Convenience Community | 1000 | 30-60 | MRS VU/TU | Unknown<br>58.7% Pre<br>14.6% Peri<br>26.7% Post | Depression<br>Irritability<br>Anxiety<br>Physical/mental exhaustion | -<br>-<br>-<br>- | -<br>-<br>-<br>- | -<br>-<br>-<br>- | 35.5<br>32.8<br>67.4<br>66.8 |
| Kolisetty, R. et al. 2015; India*<br>†1, 2, 3, 6, 7, 9 | XS | Convenience Hospital | 152 | 40-54 | QNV VU/TU | NM<br>100% Post | Depression<br>Irritability<br>Anxiety<br>Poor concentration | -<br>-<br>-<br>- | -<br>-<br>-<br>- | 26.5<br>37.3<br>18.8<br>30.5 | -<br>-<br>-<br>- |
| Rokhade, C.J. et al. 2013 ; India*<br>†1, 2, 3, 4, 6, 7, 9, 10 | XS | Convenience Community | 115 | 51-55 | QNV VU/TU | NM<br>100% Post | Insomnia | - | - | 61.7 | - |
| Singh A. et al. 2014 ; India*, **<br>†1, 2, 4, 7 | XS | Random Community | 252 | 40-54 | QNV VU/T | NM<br>100% Post | Poor concentration<br>Irritability | -<br>- | -<br>- | 44.8<br>41.7 | -<br>- |
| Srivastava, M. Et al. 2015; India**<br>†1, 2, 3, 4, 6, 10 | XS | Convenience Community | 117 | > 40 | MRS V/TU | NM<br>Not classified | Depression (>50 yrs)<br>Anxiety (40-44 yrs)<br>Nervousness (45-50 yrs) | -<br>-<br>- | -<br>-<br>- | -<br>-<br>- | 45.0<br>66.6<br>50.0 |
| Subrahmanyam, N.et al. 2016; | XS | Convenience | 120 | 40-55 | GCS V/TU | NM<br>48.3% Peri | Feeling nervous<br>Feeling depressed | -<br>- | -<br>- | -<br>- | 73.3<br>85.0 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| India** †1, 2, 3, 4, 6 | | Community | | | | 51.7% Post | Difficulty in concentrating | - | - | - | 32.5 |
| | | | | | | | Irritability | - | - | - | 85.8 |
| Yim, G. et al. 2015 Korea* †1, 2, 3 | XS | Convenience Health centres | 1,774 | 44-56 | MENQOL V/T | NM 42.6% Pre 16.9% early Peri 19.8% late Peri 20.7% Post | Feeling nervous or anxious | 48.7 | 61.0 | 65.6 | 56.8 |
| | | | | | | | Feeling depressed, down or blue | 49.1 | 60.3 | 64.1 | 56.3 |
| | | | | | | | Experiencing poor memory | 77.5 | 81.8 | 85.8 | 80.8 |
| | | | | | | | Wanting to be alone | 47.7 | 55.9 | 58.2 | 52.9 |
| Zhang, J. et al. 2016 China* †1, 4, 6 | XS | Convenience Community | 2429 | 40-59 | Modified KMI V/TU | NM 38.9% early Peri 31.5% late Peri 18.8% early Post 10.8 Late Post | Nervousness | - | - | - | 39.0 |
| | | | | | | | Insomnia | - | - | - | 40.0 |

* OCP use is unspecified; ** HRT use is unspecified; †Item under the risk of bias tool: 1 (National representativeness), 2 (Target population representativeness), 3 (Random selection or census undertaken), 4 (non-response bias), 6 (acceptable case definition), 7 (valid study instrument), 9 (prevalence period), 10 (appropriateness of numerator and denominator)

Note: XS= Cross-sectional; QNV= Questionnaire not validated; V/NV/VU= Validated/Not validated/Validated unknown; T/NT/TU= Translated/Not translated/ Translated unknown; NM= Natural Menopause; MENQOL= Menopause Specific Quality of Life; MRS= Menopause Rating Scale; GCS= Green Climacteric Scale.

## Table 6: Prevalence of sexual symptoms in Asia

| Author/ Year/ Country/ Risk-of-bias indicator (Items ranked high†) | Study Design | Sampling Method | Sample Size (n) | Age Group (yrs.) | Instrument Used/ (Validated/ Translated) | Menopause Type | Symptoms (%) in different menopause stages | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Symptoms | Pre | Peri | Post | Total |
| AlDughaither, A. et al. 2015; Saudi Arabia* †1, 2,3, 4 | XS | Convenience A primary care clinic | 119 | 45-60 | MRS V/T | NM 26.0% Pre 41.2% Peri 32.8% Post | Sexual problems | 6.7 | 7.6 | 10.1 | 24.4 |
| | | | | | | | Vaginal dryness | 7.6 | 13.4 | 10.1 | 31.1 |
| Alizadeh, M. et al. 2014 ; Iran †1, 2, 3, 4 | XS | Convenience Health centres | 300 | 40-60 | MENQOL V/T | NM 21.6% Pre 31.9% Peri 46.5% Post | Change in sexual desire | 31.9 | 48.0 | 70.8 | 37.0 |
| | | | | | | | Vaginal dryness | 28.1 | 40.0 | 50.0 | 47.0 |
| | | | | | | | Avoiding intimacy | 22.0 | 30.0 | 53.5 | 34.0 |
| Batool, S. F. et al. 2014; Pakistan*, ** †1, 2, 3, 4, 6, 10 | XS | Convenience 3 Hospitals | 200 | 45-55 | MRS VU/TU | Not clear | Sexual problems | - | - | - | 63.5 |
| | | | | | | | Vaginal dryness | - | - | - | 63.5 |
| Bindhu, A. S. et al. 2014; India* †1, 2, 3, 4, 6 | XS | Convenance Community | 320 | 43-55 | GCS VU/TU | NM 50.0% Pre 50.0 Post | No sexual interest | - | - | - | 48.0 |
| Chou, M. F. et al. 2014; China* †1, 2, 3 | XS | Convenience A clinic | 442 | 40-60 | MRS V/T | NM 37.8% Pre 28.1% Peri 34.2% Post | Sexual problems | 58.1 | 75.0 | 72.5 | - |
| | | | | | | | Vaginal dryness | 28.7 | 53.2 | 65.6 | - |
| Dasgupta, D. et al. 2015; India †1, 2, 7, 10 | XS | Multistage random Community | 1400 | 40-55 | QNV VU/T | NM 48.9% Peri 51.1% Post | Vaginal dryness | - | 5.0 | 14.2 | 9.9 |
| | | | | | | | Vaginal discharge | - | 28.4 | 10.0 | 18.9 |
| | | | | | | | Vaginal itching | - | 17.8 | 13.2 | 15.3 |
| Ghazanfarpour, M. et al. 2015; Iran* †1, 2, 3 | XS | Convenience Health care centres | 349 | 38-78 | MENQOL V/T | NM 100.0% Post | Vaginal dryness | - | - | 22.2 | - |
| | | | | | | | Avoiding intimacy | - | - | 24.6 | - |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ghimire, N. et al. 2015<br>Nepal*, **<br>†1, 2, 4 | XS | Convenience<br>Community | 924 | 40-60 | MRS<br>V/T | Unknown<br>31.0% Pre<br>17.8% Peri<br>51.2% Post | Sexual problems | 78.3 | 86.5 | 81.7 | 80.8 |
| | | | | | | | Vaginal dryness | 56.2 | 56.8 | 69.6 | 62.6 |
| Islam et al. 2016;<br>Bangladesh | XS | Random<br>Community | 1590 | 30-59 | MENQOL<br>V/T | NM<br>59.3% Pre<br>8.4% Peri<br>32.3% Post | Change in sexual desire | 46.8 | 89.7 | 91.4 | 62.8 |
| | | | | | | | Vaginal dryness | 26.2 | 71.7 | 83.9 | 45.1 |
| | | | | | | | Avoiding intimacy | 23.8 | 56.0 | 59.4 | 35.9 |
| Joseph, N. et al. 2014;<br>India*<br>†1, 2, 3 | XS | Convenience<br>Clinics | 110 | 40-65 | MRS<br>V/T | NM<br>11.8% Pre<br>15.5% Peri<br>72.7% Post | Sexual problems | - | - | - | 67.3 |
| | | | | | | | Vaginal dryness | - | - | - | 41.8 |
| Joshi, M. et al. 2015;<br>India*, **<br>†1, 3 | XS | Convenience<br>Community | 1000 | 30-60 | MRS<br>VU/TU | Unknown<br>58.7% Pre<br>14.6% Peri<br>26.7% Post | Sexual problems | - | - | - | 24.5 |
| | | | | | | | Vaginal dryness | - | - | - | 48.5 |
| Kolisetty, R. et al. 2015;<br>India*<br>†1, 2, 3, 6, 7, 9 | XS | Convenience<br>Hospital | 152 | 40-54 | QNV<br>VU/TU | NM<br>100% Post | Sexual problems | - | - | 31.8 | - |
| | | | | | | | Vaginal dryness and itching | - | - | 9.3 | - |
| Singh A. et al. 2014 ;<br>India*, **<br>†1, 2, 4, 7 | XS | Random<br>Community | 252 | 40-54 | QNV<br>VU/T | NM<br>100% Post | Vaginal dryness | - | - | 20.2 | - |
| | | | | | | | Decrease sexual desire | - | - | 33.7 | - |
| Subrahmanyam, N.et al. 2016;<br>India**<br>†1, 2, 3, 4, 6 | XS | Convenience<br>Community | 120 | 40-55 | GCS<br>V/TU | NM<br>48.3% Peri<br>51.7% Post | Loss of interest in sex | - | - | - | 82.5 |
| Yim, G. et al. 2015<br>Korea*<br>†1, 2, 3 | XS | Convenience<br>Health centres | 1,774 | 44-56 | MENQOL<br>V/T | NM<br>42.6% Pre<br>16.9% early Peri<br>19.8% late Peri<br>20.7% Post | Change in sexual desire | 54.8 | 65.5 | 74.6 | 62.8 |
| | | | | | | | Vaginal dryness | 52.5 | 61.9 | 78.9 | 61.5 |
| | | | | | | | Avoiding intimacy | 54.6 | 64.6 | 76.9 | 62.9 |
| Zhang, J. et al. 2016<br>China*<br>†1, 4, 6 | XS | Convenience<br>Community | 2429 | 40-59 | Modified KMI<br>V/TU | NM<br>38.9% early Peri<br>31.5% late Peri<br>18.8% early | Low sex drive | - | - | - | 42.0 |

* OCP use is unspecified; ** HRT use is unspecified; †Item under the risk of bias tool: 1 (National representativeness), 2 (Target population representativeness), 3 (Random selection or census undertaken), 4 (non-response bias), 6 (acceptable case definition), 7 (valid study instrument), 9 (prevalence period), 10 (appropriateness of numerator and denominator)

Note: XS= Cross-sectional; QNV= Questionnaire not validated; V/NV/VU= Validated/Not validated/Validated unknown; T/NT/TU= Translated/Not translated/ Translated unknown; NM= Natural Menopause; MENQOL= Menopause Specific Quality of Life; MRS= Menopause Rating Scale; GCS= Green Climacteric Scale.

# PART-III

## Chapter 5: Methods and Study Populations

### 5.1 Introduction

Conducting health survey research among women in a developing country is an immense challenge due to multiple issues. Being predominantly a Muslim country, we anticipated that the conduct of a women's health survey in Bangladesh would be complicated by social, cultural and religious sensitivities.

The aim of the first paper of the BMWHS was to describe, in detail, the method employed in conducting the survey and to describe the challenges and experiences encountered during data collection for the BMWHS. Our major challenges and experiences included difficulties in age determination, selection of and access to households, establishing interview privacy, lack of basic and health literacy, lack of transportation, political unrest and maintaining the security of the interviewers. By managing these challenges, we were able to comprehensively survey a representative sample of Bangladeshi women.

## Declaration for Thesis Chapter 5

**5.2 Manuscript:** Rakibul M. Islam, Robin J. Bell, Mohammad B. Hossain and Susan R. Davis. Bangladesh Midlife Women's Health Study (BMWHS): methods, challenges and experiences. *Maturitas*, Jan 2015; 80(1):89-94. DOI: 10.1016/j.maturitas.2014.10.005. Epub 2014 Oct 22.

**Declaration by candidate**
In the case of Chapter 5, the nature and extent of my contribution to the work was the following:

| Nature of contribution | Extent of contribution (%) |
|---|---|
| Study concept and design, data collection, analysis and interpretation, manuscript development and preparation | 65% |

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

| Name | Nature of contribution |
|---|---|
| Robin J. Bell | Study concept and design, data analysis and interpretation, supervision, critical revision of submitted manuscript |
| Baki Billah | Guidance for data analysis and interpretation, and manuscript editing |
| Mohammad B. Hossain | Guidance for data collection, data analysis and interpretation, and manuscript editing |
| Susan R. Davis | Study concept and design, study funding, data interpretation, supervision, critical revision of submitted manuscript |

The undersigned hereby certify that the above declaration correctly reflects the nature and extend o the candidate's and co-author' contributions to this work

| | | |
|---|---|---|
| **Candidate's Signature** | [redacted] | **Date 10/05/2016** |
| **Main Supervisor's Signature** | [redacted] | **Date 10/05/2016** |

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# Bangladesh Midlife Women's Health Study (BMWHS): Methods, challenges and experiences

Rakibul M. Islam[a,b,*], Robin J. Bell[a], Mohammad B. Hossain[b], Susan R. Davis[a]

[a] Women's Health Research Program, School of Public Health and Preventive Medicine, Monash University, Melbourne, Victoria, Australia
[b] Department of Population Sciences, University of Dhaka, Dhaka 1000, Bangladesh

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ABSTRACT

*Objectives:* To understand the challenges and experiences encountered during data collection for Bangladesh Midlife Women's Health Study (BMWHS) that investigated the low uptake of cervical cancer (CCa) screening barriers, understanding of breast cancer (BCa) knowledge and practices, the prevalence of urinary and fecal incontinence and menopausal symptoms.
*Methods:* A multistage cluster sampling technique was used to recruit women from the 32 districts of Bangladesh that had offered CCa screening. Female interviewers were trained to undertake structured face-to-face interviews that incorporated both non-validated and several validated questionnaires, such as Question for Urinary Incontinence Diagnosis, Pelvic Organ Prolapse Distress Inventory, Colorectal-Anal Distress Inventory and Menopause-Specific Quality of Life.
*Results:* We completed surveys of 1590 women, estimated age 30–59 years, between September 2013 and March 2014. We implemented several strategies to deal with low literacy and used the temporal relationship between marriage and childbirth, and the average age of onset of menarche, to estimate age. Cultural and religious sensitivities and personal security were managed by engaging community leaders, limiting activities to daylight hours, adopting local codes of dress, such as the wearing of head scarves. Our major challenges and experiences included difficulties in age determination, selection of and access to households, interview privacy, lack of basic and health literacy, transportation, political unrest and security of the interviewers.
*Conclusion:* By anticipating challenges, we have been able to comprehensively survey a representative sample of Bangladeshi women. Disseminating information about the field challenges and experiences from the BMWHS should assist other researchers planning to conduct surveys about women's health issues in similar context.

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## 1. Introduction

Cervical cancer (CCa) and breast cancer (BCa) are the leading cancers for women in Bangladesh, with current estimates that every year 17,686 Bangladeshi women are diagnosed, and 10,364 women die from CCa [1]. The annual crude incidence rate of invasive CCa in Bangladesh is the second highest (22.4 per 100,000) in the world followed by south Asia (21.0 per 100,000), with the global annual crude incidence rate being 15.8 per 100,000. Despite this, the uptake among women, aged 30–59 years, of a centralized CCa screening program was only 8.6% [2]. The annual crude incidence rate of BCa is also high (22.5 per 100,000), but data for BCa-related deaths in Bangladesh are lacking [3,4]. There is no national BCa screening in Bangladesh and CCa screening remains opportunistic.

Urinary incontinence (UI) and fecal incontinence (FI) are neglected and silent conditions amongst Bangladeshi women, particularly for Muslim women. Both forms of incontinence impede domestic and religious activities, interpersonal relationships, cause distress and reduce health related quality of life [5–7]. Menopause, another neglected health issue, has the potential to adversely impact the quality of life of Bangladeshi women.

The Bangladesh Midlife Women's Health Study (BMWHS) was undertaken to investigate women's knowledge of CCa and BCa; to understand the socio-economic, demographic and access issues which might act as barriers to early diagnosis of CCa and BCa; to document the prevalence of UI and FI, and the risk factors for these conditions; and to determine the prevalence and severity of symptoms of the menopause and achieve a best estimate of the

* Corresponding author at: Department of Epidemiology and Preventive Medicine, School of Public Health and Preventive Medicine, Monash University, 99 Commercial Road, Melbourne, 3004 VIC, Australia. [redacted] (R.M. Islam).

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average age of menopause, taking into account the limitation of rural women being uncertain of their age.

We anticipated the conduct of the BMWHS health survey would present challenges including lack of literacy and determination of women's ages. Being predominantly a Muslim country, the conduct of a women's health survey would be complicated by social, cultural and religious sensitivities. We expected working in remote rural areas with poor access due to lack of road infrastructure and limited public transport, political unrest, social insecurity and distrust of outsiders would be difficult [8–10]. This manuscript describes the methods employed to address the expected challenges to ensure full participation in our study, of a representative sample of women.

## 2. Methods

### 2.1. Study design, study sample and distribution

The BMWHS is a population-based, cross-sectional study utilizing a multistage cluster sampling technique (Fig. 1). The basis of the sample size calculation was the prevalence of CCa screening uptake in Bangladesh as described below. The 7 divisions of Bangladesh are made up of 64 administrative districts. Of 64 districts, 32 had offered an opportunistic CCa screening program. As our primary aim was to determine the barriers to uptake of CCa screening, our sampling was restricted to these 32 districts. We randomly selected one district that had offered CCa screening from each division. The included districts were Barisal, Tangail, Comilla, Sathkhira, Rajshahi, Rangpur and Habigonj. The number of women recruited in each of the 7 selected districts was determined by the distribution of the 3.24 million women aged 30–59 years in those districts [11]. We also took into account the ratio of urban–rural women in the target age group within each district. The selected districts contained between 18 and 72 enumeration areas (EAs) designated by the "Monitoring the Situation of Vital Statistics of Bangladesh" and provided by the Bangladesh Bureau of Statistics. Each EA includes, on average, 120 households [12]. EAs are categorized as either urban or rural. As shown in Fig. 1, when the total sample size of 1586 was distributed across the rural and urban areas of the 7 districts, the smallest number of women required to be recruited in any single area was 36. This was in the urban area of Habigonj where 36 women were recruited from one EA with a total of 101 households. This was used as the maximum sampling intensity for any one EA. For all other samples, more than one EA was required to recruit the desired number of women in any one district. The EAs were selected randomly, and within each, the first household was selected at random. Only one eligible woman was recruited from each household. If an index woman was not found in a selected household, the adjacent household was approached.

The sample size for the BMWHS was calculated based on the estimated prevalence of CCa screening uptake among women at midlife. A sample size of 755 allowed us to estimate the prevalence of CCa screening uptake to within ±2% of the estimate of 8.6%. As our study is a cluster sample, the sample size was multiplied by the design effect ($D$), which commonly ranges from 1.5 to 3.0 [13]. In this study, $D$ was given a value of 2, as the population characteristics were almost homogenous when urban and rural EAs were considered independently. The sample size was further increased by 5% to allow for contingencies. Thus, the final sample size was 1586 women.

### 2.2. Study population

The potential BMWHS study population consisted of all women (3,238,742), estimated age between 30 and 59 years, living in their respective households, in the 7 selected districts of Bangladesh [11]. To be eligible, women were required to be free of any serious illness that would limit their being interviewed and to be able to provide verbal informed consent.

### 2.3. Study instrument

The structured questionnaire was developed in English and then translated into Bengali. The accuracy of the translation was verified by an independent bilingual translator with women's health expertise (Dr. Roslin Botlero). The precision of the translation was further verified by back-translation. A pilot survey tested the questionnaire in 16 women, and this resulted in further questionnaire refinement.

The questionnaire comprised questions about identification, socio-demographic and household characteristics, and CCa and BCa knowledge and screening. It also included several validated questionnaires: the Questionnaire for Urinary Incontinence Diagnosis to assess different types of UI (stress, urge or mixed UI) [14]; the Pelvic Floor Distress Inventory to assess FI [15]; and the Menopause-Specific Quality of Life Questionnaire to assess the prevalence and severity of vasomotor, physical, psychosocial and sexual symptoms [16]. Menopausal status was assessed using an instrument developed by the Monash Women's Health Research Program [17]. This algorithm allows for the menopausal status classification of women, including those who have had a hysterectomy and/or are taking systematic hormones.

### 2.4. Training and data collection

Six female university graduates were trained in the administration of the study questionnaire. All had prior experience with surveys and were willing to commit up to six months to the study. They underwent a two-week intensive training program that included lectures on contents of the research, how to complete the questionnaires, mock study interviews and a field practice pre-test. Based on performance, four interviewers were selected.

We implemented several strategies to deal with low literacy in the study population. A verbal explanation of the objectives, general content, and time commitment involved in participating in the survey, and assurances of confidentiality, were provided. Then, each participant's verbal consent was obtained at the beginning of the interview. The data collection involved the interviewer reading and explaining each question, and then recording the responses. Each interview took approximately 40–50 min.

The data collection was supervised and monitored by the first author. Completed questionnaires were reviewed daily. Missing data points and ambiguous responses were discussed with the interviewers and households were revisited the next day if needed.

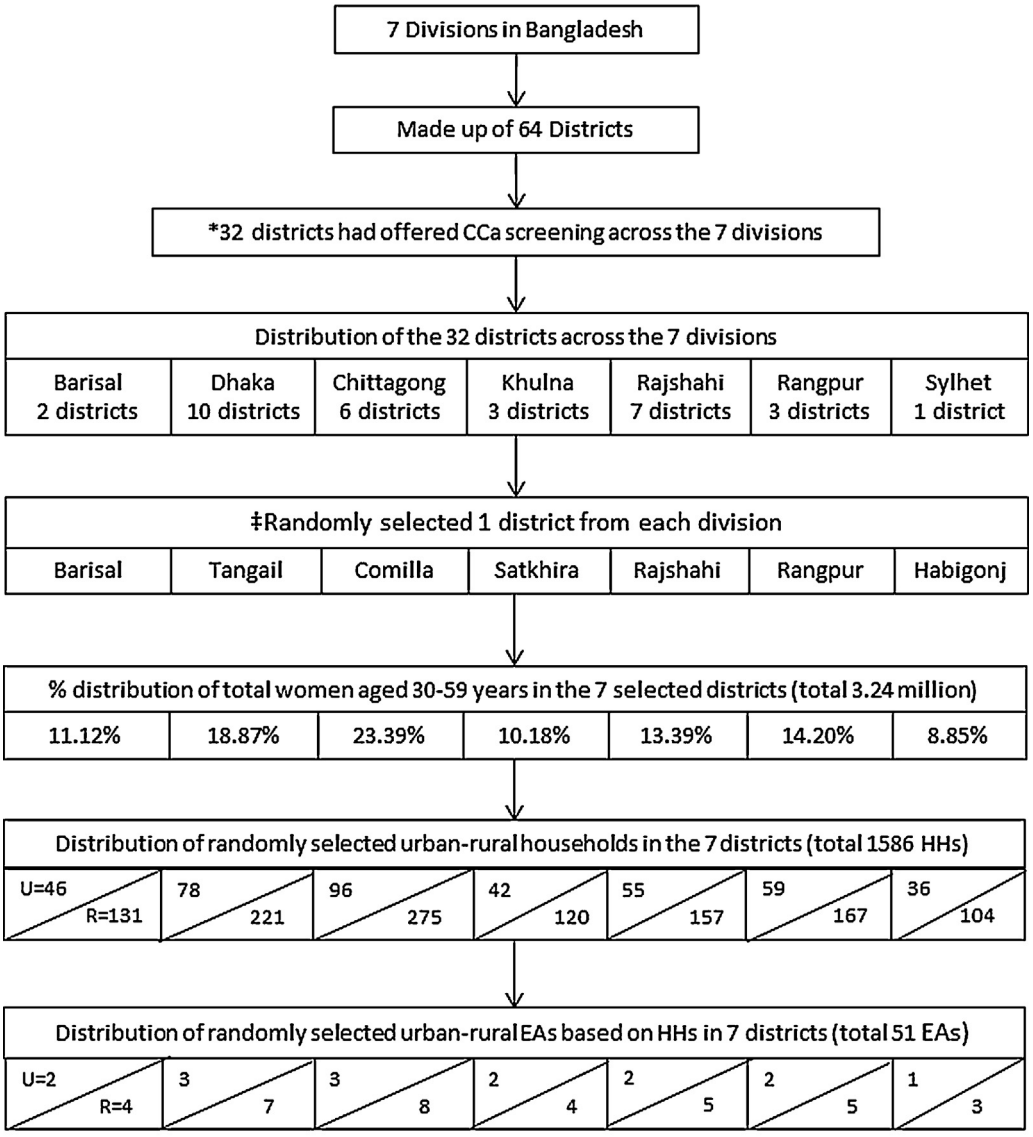
## 3. Results

Approximately 1700 households were approached and 1590 women agreed to participate. Reasons for non-participation were the questions pertaining to sexual function and men in the household not allowing a woman to be interviewed. In urban areas women occasionally declined the survey as it would interrupt their food preparation and other household duties. We faced serious difficulty with access to urban households, as some women would not open the main gates of their multi-story apartment block due to security concerns related to the political turmoil at the time. Only 19 participants did not provide responses to the questions pertaining to sexual health.

### 3.1. Distrust of outsiders

Due to extensive research undertaken in Bangladesh, people are distrusting of outside visitors. They tend to believe that researchers

**Flowchart 1 Sampling procedure of the BMWHS**




Note:
*List of 32 districts were collected from Directorate General of Family Planning (DGFP), Ministry of Health& Family Welfare, Bangladesh;
‡The single district from Sylhet was selected.
U = Urban
R = Rural

**Fig. 1.** Sampling procedure of the BMWHS.

are interested in their own gain and are not there to improve the circumstances of the local people. They also think that researchers are the recipients of government or non-government organization (NGO) money that is not passed on to the community. Consequently, people were occasionally suspicious of our survey. This distrust was minimized when we explained our research objectives and its potential enduring benefits to them. In some regions, people were very sensitive to our interviewers not wearing *Hijab*, the Islamic veil that covers a woman's head, mouth and part of her nose [18]. As a result our interviewers adopted headscarves in these areas.

### 3.2. Selection of households

Household numbers are not in any order in Bangladesh. We selected study households from each EA, not by the household number, but by our estimation based on the total number of households listed in each EA. In urban areas, our interviews started between 9:00 and 9:30 am. As women were often busy with food preparation and taking children to school, we often had to visit two to three households at this time to recruit one woman. The conduct of interviews at noon presented similar obstacles.

Prior to commencing interviews in a new village, we identified the locally elected leaders of local government to explain the reason for our presence, the study objectives and to gain an understanding of the distribution of households in the village. Women were mostly at home during the hours we conducted the surveys, although they continued their household chores while being interviewed. The rural women were friendly and well-mannered and most provided light refreshments, while some invited us to eat with them.

### 3.3. Interview privacy

The interconnectedness of the Bangladeshi households meant that establishing interview privacy was challenging. Furthermore, when an interviewer approached a household, other women in the vicinity expressed interest as it is common for NGOs undertaking research in Bangladesh to offer incentives in cash or in kind. It was often necessary to explain that we were not providing any benefit to the participants and to ask other women to leave to provide privacy for the interviewee.

The presence of the husband or a son in the household during the interview occasionally led to embarrassment for both the interviewers and study participants. There were incidents of harassment or teasing in some locations. One interviewer reported that "*while I was conducting one of the interviews, I found after some time the respondent's son turned on the music loudly just to harass me that made difficulties to continue the interview.*" Another interviewer stated that "*in one house, the respondent's elder son verbally abused me while I was leaving the respondents household after completion of interview.*"

### 3.4. Determination of age of the respondents

There was no mandatory and universal birth registration in Bangladesh until 2007 [19]. Although the use of life events (historical/political events e.g. year of the war of liberation, nationally memorable natural disasters and local events) is a valid process for age estimation [20,21], accurate determination of age was a challenge, particularly in rural areas where women are mostly illiterate; and for women who were born before independence in 1971. Therefore, we employed a method based on the average age of onset of menarche in Bangladesh (13 years) [22,23], as menarche is a significant life milestone [23,24]. Taking 13 years as the standard, we asked women about the onset of menarche in relation to their years of marriage, birth of their first child and the current age of their first child. For instance, if a women married two years after her first menstruation, gave birth to her first child 1 year after the marriage and the current age of the first child is 22 years, then we added all years (13 years for age of menarche plus 2 years to marriage plus 1 year to first childbirth plus 22 years that child's age) to estimate the age of the woman (38 years). Using both of these methods, ages of individual women were estimated and the mean age of the study participants was determined to be 42.27 (±8.02) years.

### 3.5. Language difficulties and health literacy

Language was a challenge in the remote villages where local dialect is spoken. The standard Bengali word for breast is *Ston*, but, we encountered various synonyms for *Ston*, such as ton, thon, thonko, buk, mye, dudh. When interviewers encountered the different dialects, they promptly adopted local words within their initial interviews. A woman's reproductive organs and diseases associated with them are not discussed within the family, or in educational or community settings. Thus, photos of a normal cervix and a cervix with cancer, as well as a normal breast and a breast with signs of cancer were shown to respondents when an understanding of cervical or breast disease was lacking. Many respondents struggled to distinguish uterus and cervix, even after being shown pictures of each. When the concept severity of menopausal symptoms was not understood, women were shown a scale and asked to mark which point on the scale they felt was appropriate.

### 3.6. Transportation and lack of vehicles

Many of the randomly selected study villages were in remote locations. For security reasons, we stayed in government accommodation in a main town of each district rather than in the remote villages. This meant daily travel to the remote villages using local buses, old jeeps in poor condition, three-wheeled compressed natural gas (CNG) autos, auto-rickshaws, paddle rickshaws, auto-vans, paddle vans, and occasionally boats. Commuting often involved roads that were poorly maintained, sandy and hilly, resulting in long, arduous journeys. In some instances access was only possible by foot. The local transportation was always risky as because approximately 12,000 people die each year as a result of road traffic injury in Bangladesh [25]. In rural areas travel was restricted to daylight hours, since some of the areas were unsafe. On one occasion, en route to a remote village, three teenage boys on a motor bike followed our three-wheeled CNG auto and spat on the interviewers.

### 3.7. Political unrest and social security

During our data collection Bangladesh underwent its worst and most prolonged political upheaval since its independence with hundreds of death [26,27]. The incumbent government refused to step down and the opposition party continued their strikes in favor of a neutral caretaker government. This period of political violence was sparked when the international crimes tribunal indicted 11 opposition leaders and executed a Jamaat-e-Islami leader for crimes committed during the war of independence with Pakistan [28]. During this time, strikes were common and pickets often resorted to brutal terrorism and vandalism. This impacted our ability to travel to cities where violence was widespread. Although we conducted some interviews in rural areas during the strikes, fieldwork was postponed from December 2013 until mid-January 2014 due to continuous strikes, blockades and violence.

## 4. Discussion

Despite the importance of cross-country collaborative health research little has been published about the "on-the-ground" field challenges and experiences, to assist in informing and guiding fieldwork plans and processes [8,10,29,30]. There is no published information pertaining to the challenges and experiences of conducting women's health survey research in Bangladesh. The conduct of our population-based health survey of women at midlife in Bangladesh presented multiple challenges. The challenges encountered, and experiences in the field can be classified into two broad categories; practical and cultural issues. The practical problems were difficulties in age determination, lack of basic and health literacy, establishing interview privacy, selection of and access to households, transportation, political unrest and the security of interviewers. Life events along with mean age of onset of menarche enabled us to best estimate of age of illiterate women. Despite the lack of health literacy, the use of pictures of the cervix and breast enabled us to complete the questions that dealt with cervical and breast cancer.

We anticipated that being primarily a Muslim country, the participation rate might be low. However, the women were highly receptive to our invitations to participate. It is possible that their enthusiasm was a spill-over effect of the health achievements, as well as social transformation, including women's empowerment

and education, since the independence of Bangladesh [31]. We also anticipated that the religious and cultural context would influence the success of our data collection, such that data collection might be more difficult in rural areas. By approaching community leaders in remote villages and being sensitive to the local customs, including dress codes, we were able to gain acceptance and complete our study. In the end, however, only 19 women did not answer questions about sexual function.

The major strengths of the BMWHS are that it is population based using a robust sampling procedure and validated instruments. The main study limitation is that we needed to estimate the mean age at menopause based on the women's estimated year of birth. Nonetheless, the BMWHS provides a rich data base which will enable us to estimate the age-specific prevalence of UI, FI, menopausal symptoms and their severity, and explore women's knowledge about, attitudes toward, and uptake of cervical and breast cancer screening in Bangladesh. Moreover, identification of the field challenges and experiences from the BMWHS provides information for other researchers planning to conduct surveys about women's health issues in developing countries.

## Contributors

MRI: design the study, collection, analysis and interpretation of data, and writing of the manuscript; RJB: design the study, analysis and interpretation of data, and editing the paper; MBH: providing logistics, organizing the study and editing the paper; SRD: design the study, analysis and interpretation of data, and editing the paper.

## Competing interest

SRD is a consultant and investigator for Trimel Pharmaceuticals Canada and has received research funding support from Lawley Pharmaceuticals and Besins Healthcare. The other authors have no competing interests to declare or the publication of this article.

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## Ethics

The BMWHS was approved by the Monash University Human Research Ethics Committee (MUHREC), Melbourne, Australia and Bangladesh Medical Research Council (BMRC), Dhaka, Bangladesh.

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# Chapter 6: Knowledge about Cervical Cancer and Barriers to Cervical Cancer Screening in Bangladesh

## 6.1 Introduction

Although cervical cancer (CCa) is the second most common cancer among women in Bangladesh, the uptake of CCa screening is very low. Barriers to CCa screening uptake are unknown. This chapter consists of a peer-reviewed paper that investigated awareness of CCa and CCa screening, and factors associated with women's preparedness to be screened.

This paper showed that lack of awareness of CCa and of understanding of the concept of screening are the key barriers to screening uptake in women at mid-life in Bangladesh, not cultural and religious beliefs. This paper also indicated that health education programs are needed to increase screening in Bangladesh, with the view to reducing mortality. This paper has been published in *The Oncologist*, the official journal of the Society for Translational Oncology. The journal identified this paper for Continuing Medical Education (CME) accreditation.

## Declaration for Thesis Chapter 6

**6.2 Manuscript:** Rakibul M. Islam, Robin J. Bell, Baki Billah, Mohammad B. Hossain and Susan R. Davis. Lack of understanding of cervical cancer and screening is the leading barrier to screening uptake in women at mid-life in Bangladesh: population-based cross-sectional survey. *The Oncologist,* Dec 2015; 20(12):1386-92. DOI: 10.1634/theoncologist.2015-0235. Epub 2015 Nov 20.

**Declaration by candidate**

In the case of Chapter 6, the nature and extent of my contribution to the work was the following:

| **Nature of contribution** | **Extent of contribution (%)** |
|---|---|
| Study concept and design, data collection, data entry, analysis and interpretation of the data, manuscript development and preparation | 65% |

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

| **Name** | **Nature of contribution** |
|---|---|
| Robin J. Bell | Study concept and design, study funding, data analysis and interpretation, supervision, critical revision of submitted manuscript |
| Baki Billah | Guidance for data analysis and interpretation, and manuscript editing |
| Mohammad B. Hossain | Guidance for data collection, data analysis and interpretation, and manuscript editing |
| Susan R. Davis | Study concept and design, study funding, data analysis and interpretation, supervision, critical revision of submitted manuscript |

The undersigned hereby certify that the above declaration correctly reflects the nature and extend o the candidate's and co-author' contributions to this work

| | | |
|---|---|---|
| **Candidate's Signature** | [redacted] | **Date 10/05/2016** |
| **Main Supervisor's Signature** | [redacted] | **Date 10/05/2016** |

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# Lack of Understanding of Cervical Cancer and Screening Is the Leading Barrier to Screening Uptake in Women at Midlife in Bangladesh: Population-Based Cross-Sectional Survey

RAKIBUL M. ISLAM,[a,c] ROBIN J. BELL,[a] BAKI BILLAH,[b] MOHAMMAD B. HOSSAIN,[c] SUSAN R. DAVIS[a]

[a]Women's Health Research Program and [b]Biostatistics Unit, School of Public Health and Preventive Medicine, Monash University, Melbourne, Victoria, Australia; [c]Department of Population Sciences, University of Dhaka, Dhaka, Bangladesh

*Disclosures of potential conflicts of interest may be found at the end of this article.*

**Key Words.** Awareness • Barriers • Cervical cancer • Screening • Bangladesh

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## ABSTRACT

***Background.*** Cervical cancer (CCa) is the second most common cancer among women in Bangladesh. The uptake of CCa screening was less than 10% in areas where screening has been offered, so we investigated the awareness of CCa and CCa screening, and factors associated with women's preparedness to be screened.

***Methods.*** A nationally representative, cross-sectional survey of women aged 30–59 years was conducted in 7 districts of the 7 divisions in Bangladesh, using a multistage cluster sampling technique. Factors associated with the awareness of CCa and screening uptake were investigated separately, using multivariable logistic regression.

***Results.*** On systematic questioning, 81.3% and 48.6% of the 1,590 participants, whose mean age was 42.3 (±8.0) years, had ever heard of CCa and CCa screening, respectively. Having heard of CCa was associated with living in a rural area (adjusted odds ratio [OR]: 0.42; 95% confidence interval [CI]: 0.26–0.67), being 40–49 years old (OR: 1.59; 95% CI: 1.15–2.0), having no education (OR: 0.25; 95% CI: 0.16–0.38), and being obese (OR: 2.04; 95% CI: 1.23–3.36). Of the 773 women who had ever heard of CCa screening, 86% reported that they had not been screened because they had no symptoms and 37% did not know screening was needed. Only 8.3% had ever been screened. Having been screened was associated with being 40–49 years old (OR: 2.17; 95% CI: 1.19–3.94) and employed outside the home (OR: 3.83; 95% CI: 1.65–8.9), and inversely associated with rural dwelling (OR: 0.54; 95% CI: 0.30–0.98) and having no education (OR: 0.29; 95% CI: 0.10–0.85).

***Conclusion.*** Lack of awareness of CCa and of understanding of the concept of screening are the key barriers to screening uptake in women at midlife in Bangladesh. Targeted educational health programs are needed to increase screening in Bangladesh with the view to reducing mortality. ***The Oncologist*** 2015; 20:1386–1392

**Implications for Practice:** This is the first nationwide and population-based study in Bangladesh to collect detailed information pertaining to the awareness of cervical cancer and cervical cancer screening, and factors associated with women's preparedness to undergo screening. Rather than cultural and religious barriers, lack of awareness and knowledge of cervical cancer and screening present the primary barriers to screening uptake. The results highlight the urgent need for health education programs that have the potential to increase cervical cancer awareness and screening uptake, and reduce cervical cancer mortality.

## INTRODUCTION

Cervical cancer (CCa), a highly preventable disease, is the second most common cancer in women in Bangladesh, with approximately 54.4 million women aged 15 years and older potentially at risk [1]. Current estimates reveal that 17,686 Bangladeshi women are diagnosed and 10,364 women in the country die of CCa each year [2]. The annual crude incidence rate of invasive CCa in Bangladesh is lower (15.9 per 100,000) than the annual overall incidence rate in South Asia (17.1 per 100,000); however, it is higher than the global annual crude incidence rate of 15.1 per 100,000 [1, 3].

To reduce the burden of this disease, Bangladesh launched in 2004 a national, opportunistic CCa screening program of visual inspection after application of acetic acid for women over the age of 29 years. This is now available at 252 facilities, from tertiary to primary care levels [4]. The screening uptake among women aged 30–59 years has been low (8.6%), resulting

Correspondence: Susan R. Davis, M.B.B.S., Ph.D., Department of Epidemiology and Preventive Medicine, School of Public Health and Preventive Medicine, Monash University, 99 Commercial Road, Melbourne 3004, Victoria, Australia. [redacted]

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in low coverage of the target population [5]. Furthermore, poor compliance with colposcopy, when indicated, has been reported [4, 5].

The Bangladesh Midlife Women's Health Study (BMWHS) was a population-based survey undertaken between September 2013 and March 2014 to determine women's awareness of CCa and uptake of CCa screening, and to identify socioeconomic, cultural, and religious barriers to screening uptake.

## Materials and Methods

### Study Setting and Participants

We used a multistage cluster sampling method to obtain a representative sample of women, aged 30–59 years, living in each of the 7 major administrative divisions that comprise the 64 administrative districts of Bangladesh. The 7 selected districts (Barisal, Tangail, Comilla, Sathkhira, Rajshahi, Rangpur, and Habigonj) were randomly selected from the 32 districts offering opportunistic CCa screening, as described in detail elsewhere [6]. The number of women recruited in each of the 7 districts was determined by the distribution of the 3.24 million women of the target age group in these districts in the 2011 population and housing census, taking into account the ratio of urban to rural women in each district [7]. Within each district, there are enumeration areas (EAs) that are the smallest units with a defined area that include, on average, 120 households [8].

When the total sample size of 1,590 women was distributed across the rural and urban areas of the 7 districts, the smallest number of women required in any single EA was 36 [6]. Thus, the household selection was an unequal probability systematic selection with 36 households per EA. The EAs within each district were selected randomly, and within each EA, the first household was selected at random. Subsequent households (whether second, third, or fourth) were selected by using systematic sampling. Only one eligible woman was recruited from each household. If an index woman was not found in a selected household, the adjacent household was approached. In line with the multistage cluster design, sampling weight ensured representativeness of the sample at all stages. The calculation details and description of sample weight are provided in the supplemental online Appendix.

### Sample Size

The sample size calculation was based on the estimated prevalence of CCa screening uptake (8.6%) [4], with a margin of error of ±2%, among women at midlife, resulting in a minimum sample size of 755. This was then multiplied by the design effect of 2, as the urban and rural EAs were considered independently. The sample size was further increased by 5% to allow for nonsampling error, particularly nonresponse error. Thus, the final estimated sample size was 1,590 women.

### Data Collection

Literacy in Bangladesh is low; thus, participation involved a structured interview during which the interviewer completed the study questionnaire. Interviews were conducted by 4 female university graduates who underwent a 2-week

**Table 1.** Characteristics of women in the Bangladesh Midlife Women's Health Study ($n = 1,590$)

| Characteristic | *n* (%) |
|---|---|
| Place of residence | |
| Rural | 1,174 (73.8) |
| Urban | 416 (26.2) |
| Age (years) | |
| 30–39 | 653 (41.1) |
| 40–49 | 591 (37.2) |
| 50–59 | 346 (21.7) |
| Marital status | |
| Married | 1,413 (88.9) |
| Widowed, divorced, or separated | 177 (11.1) |
| Years of education | |
| Higher secondary and above | 190 (12.0) |
| Secondary | 411 (25.9) |
| Primary | 349 (21.9) |
| Illiterate | 640 (40.2) |
| Occupation | |
| Household duties | 1,498 (94.2) |
| Other (employed outside household) | 92 (5.8) |
| Religion | |
| Islam | 1,467 (92.2) |
| Hindu | 122 (7.6) |
| Christian | 1 (0.1) |
| Husband's years of education | |
| Higher secondary and above | 379 (23.8) |
| Secondary | 460 (29.0) |
| Primary | 288 (18.1) |
| Illiterate | 463 (29.1) |
| Husband's occupation | |
| Service[a] | 496 (31.3) |
| Business | 431 (27.2) |
| Agriculture | 389 (24.5) |
| Day laborer | 126 (8.0) |
| Other | 144 (9.1) |
| BMI category (kg/m$^2$) ($n = 1,588$) | |
| Underweight (<17.5) | 86 (5.4) |
| Normal weight (17.5–23) | 626 (39.4) |
| Overweight (23.00–28) | 609 (38.4) |
| Obese (≥28.00) | 267 (16.8) |
| Wealth quintiles | |
| Lowest | 318 (20.0) |
| Second | 313 (19.7) |
| Middle | 323 (20.3) |
| Fourth | 318 (20.0) |
| Highest | 318 (20.0) |
| Parity ($n = 1,571$) | |
| No child | 5 (0.3) |
| 1 child | 114 (7.3) |
| 2 children | 448 (28.5) |
| 3 children | 461 (29.3) |
| ≥4 children | 542 (34.5) |

[a]Service includes both government and nongovernment jobs.

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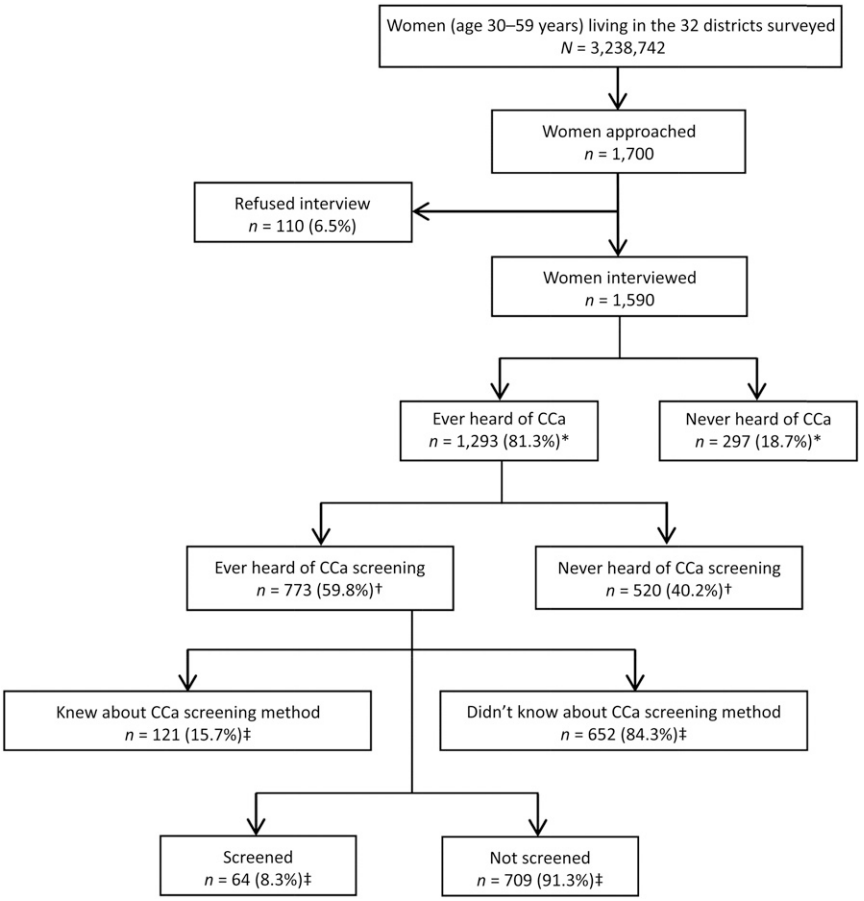


**Figure 1.** Flowchart of women who had ever heard of cervical cancer and cervical cancer screening in the Bangladesh Midlife Women's Health Study population. ∗, percentage of those interviewed; †, percentage of those who had ever heard of CCa; ‡, percentage of those who had ever heard of CCa screening.

Abbreviation: CCa, cervical cancer.

intensive training program that included mock interviews and field practice to ensure interview consistency. A verbal explanation of the objectives, general content, and time commitment involved in participation was provided, as was assurance of confidentiality. Verbal consent was then obtained. Completed questionnaires were reviewed daily and, if necessary, households were revisited the next day to resolve any ambiguities or to collect missing data.

The study questionnaire captured personal, sociodemographic and household characteristics, and knowledge and awareness of CCa and CCa screening. The latter were assessed by five questions: have you ever heard of CCa; have you or a member of your family had cervical cancer; can you please tell me any symptoms that would indicate a woman has CCa; have you ever heard about women having screening to find cervical cancer, and do you know of any methods of cervical cancer screening? The questionnaire also included a series of questions about potential barriers to screening. Based on the Bangladesh Demographic and Health Survey, each household's "wealth index" was derived from variables such as housing materials, furniture and other assets, sources of water, and sanitation [9]. The questionnaire was first developed in English and translated into Bengali. Translation accuracy was verified by an independent bilingual translator and further verified by back-translation. The questionnaire was finally piloted in 16 women, after which minor refinements were made.

The BMWHS was approved by the Monash University Human Research Ethics Committee, Melbourne, Australia, and the Bangladesh Medical Research Council, Dhaka, Bangladesh.

## Statistical Analysis

CCa awareness (ever heard of CCa) and CCa screening uptake were considered as two outcome variables. CCa awareness was investigated for all study participants, whereas CCa screening uptake was investigated only for those who ever heard of CCa screening. Univariate and multivariable logistic regressions were used to evaluate the association between each of the outcomes and participants' socioeconomic and demographic characteristics. Each household's wealth index was ascertained using a principal component analysis and was presented as wealth quintiles [9, 10]. We considered 11 variables as potential predictors for both outcomes; however, husband's education and wealth quintiles were excluded from the multivariable logistic regression models because of multicolinearity with women's education and place of residence, respectively. A variable with a $p$ value of less than or equal to 0.05 was considered significant. The area under the receiver operating characteristics curve (ROC) and the Hosmer and Lemeshow (H-L) $p$ value were used to assess the model's discrimination and calibration performances. The first-degree interaction effect between independent variables was also investigated. All analyses were performed using statistical

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**Table 2.** Univariate and multivariable analyses of factors associated with having ever heard of cervical cancer ($n = 1,590$)

| | Ever heard of CCa | | Unadjusted | | Adjusted | |
|---|---|---|---|---|---|---|
| **Variables** | **Yes ($n = 1,288$), *n* (%)** | **No ($n = 302$), *n* (%)** | **OR (95% CI)** | ***p* value** | **OR (95% CI)** | ***p* value** |
| Place of residence | | | | | | |
| Urban | 413 (92.8) | 32 (7.2) | 1.0 | | 1.0 | |
| Rural | 880 (76.9) | 265 (23.1) | 0.26 (0.18–0.38) | <.0001 | 0.42 (0.26–0.67) | <.0001 |
| Age (years) | | | | | | |
| 30–39 | 541 (82.1) | 118 (17.9) | 1.0 | | 1.0 | |
| 40–49 | 485 (84.3) | 90 (15.7) | 1.17 (0.87–1.6) | .300 | 1.59 (1.15–2.0) | .005 |
| 50–59 | 268 (75.1) | 89 (24.9) | 0.65 (0.48–0.89) | .007 | 1.30 (0.89–1.90) | .178 |
| Marital status | | | | | | |
| Married | 1,156 (82.0) | 253 (18.0) | 1.0 | | 1.0 | |
| Widow, divorced, separated | 137 (75.7) | 44 (24.3) | 0.67 (0.47–0.97) | .035 | 0.97 (0.33–1.49) | .903 |
| Education | | | | | | |
| Secondary and higher | 564 (92.3) | 47 (7.7) | 1.0 | | 1.0 | |
| Primary | 287 (83.7) | 56 (16.3) | 0.19 (0.14–0.27) | <.0001 | 0.50 (0.32–0.80) | .003 |
| No education | 442 (69.5) | 194 (30.5) | 0.43 (0.28–0.65) | <.0001 | 0.25 (0.16–0.38) | <.0001 |
| Occupation | | | | | | |
| Household duties | 1,213 (81.0) | 284 (19.0) | 1.0 | | 1.0 | |
| Other | 80 (86.0) | 13 (14.0) | 1.47 (0.81–2.69) | .209 | 1.21 (0.59–2.52) | .596 |
| Religion | | | | | | |
| Islam | 1,187 (81.1) | 277 (18.9) | 1.0 | | 1.0 | |
| Hindu | 106 (84.1) | 20 (15.9) | 1.21 (0.74–1.98) | .451 | 1.41 (0.82–2.45) | .211 |
| Husband's occupation | | | | | | |
| Service | 448 (90.1) | 49 (9.9) | 1.0 | | 1.0 | |
| Business | 365 (84.7) | 66 (15.3) | 0.60 (0.40–0.89) | .011 | 0.93 (0.60–1.42) | .744 |
| Agriculture and other | 477 (72.4) | 182 (27.6) | 0.42 (0.20–0.40) | <.0001 | 0.72 (0.49–1.06) | .095 |
| BMI category | | | | | | |
| Normal weight | 469 (74.9) | 157 (25.1) | 1.0 | | 1.0 | |
| Underweight | 63 (75.9) | 20 (24.1) | 1.07 (0.63–1.84) | .802 | 1.11 (0.65–1.91) | .683 |
| Overweight | 515 (84.3) | 96 (15.7) | 1.79 (1.35–2.37) | <.0001 | 1.12 (0.83–1.52) | .448 |
| Obese | 245 (91.1) | 24 (8.9) | 3.46 (1.19–5.48) | <.0001 | 2.04 (1.23–3.36) | .005 |
| Parity | | | | | | |
| ≤2 children | 487 (86.7) | 75 (13.3) | 1.0 | | 1.0 | |
| ≥3 children or more | 786 (78.4) | 217 (21.6) | 0.56 (0.42–0.75) | <.0001 | 0.90 (0.65–1.91) | .512 |

Abbreviations: BMI, body mass index; CCa, cervical cancer; CI, confidence interval; OR, odds ratio.

software packages Stata version 12.0 (StataCorp, College Station, TX, http://www.stata.com) and SPSS version 20.0 (IBM Corp., Chicago, IL, http://www-01.ibm.com).

## Results

We approached 1,700 households and 1,590 women agreed to be interviewed in the study. The mean age of the participants was 42.3 (±8.0) years (Table 1). Of the 1,590 participants, 73.8% resided in rural areas. The majority (94.2%) were not employed outside the home, 88.9% were married, and 92.2% reported their religion as Islam. Having had no formal education was reported by 40.2% of the women and 12.0% had more than 10 years of education; 29.1% of the women reported that their husband had no education, and 32.5% of the women's husbands worked in agriculture or as day laborers. Findings also showed that 16.8% of participants were obese and 5.4% were underweight, and 34.5% of the women had 4 or more children and 0.3% were nulliparous.

### Knowledge and Awareness of Cervical Cancer and Screening

Systematic questioning revealed that 81.3% of the women had ever heard of CCa (Fig. 1). Of these, 59.8% had heard of CCa screening. Of the 773 women who had ever heard of CCa screening, 15.7% were able to report at least 1 method of CCa screening, 8.3% had been screened, 2.9% reported that a member of their family had had CCa, and 21.7% identified at least 1 correct CCa symptom from a list of symptoms provided (data not shown).

We recorded 11 potential predictors of CCa awareness, of which 9 were retained in the multivariable logistic regression model (Table 2). Women were less likely to have heard of CCa if they were living in a rural area (adjusted odds ratio [OR]: 0.42;

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95% confidence interval [CI]: 0.26–0.67), and had primary (OR: 0.50; 95% CI: 0.32–0.80) or no education (OR: 0.25; 95% CI: 0.16–0.38). Women aged 40–49 years were more likely to know about CCa compared with women aged 30–39 years (OR: 1.59; 95% CI: 1.15–2.0), and obese women were more likely to be aware of CCa compared with women of normal body mass index (OR: 2.04; 95% CI: 1.23–3.36). The ROC and H-L *p* values for the model were .736 and .085, respectively.

### Barriers and Screening Uptake

Of the 709 women who had ever heard of CCa screening but had not been screened, the reasons given for not undergoing screening included having no symptoms (86.1%), not knowing screening was needed (37.5%), and possible expense associated with screening (11.5%) (Table 3). Modesty issues and religious barriers were reported by 1.9% and 0.5% of women, respectively.

In the multivariable logistic regression model of potential predictors of uptake of CCa screening, being employed outside the home was strongly associated with screening (OR: 3.83; 95% CI: 1.65–8.92) (Table 4). Women aged 40–49 years were more likely to have been screened than women aged 30–39 years (OR: 2.17; 95% CI: 1.19–3.94). Women were less likely to have been screened if they lived in a rural area (OR: 0.54; 95% CI: 0.30–0.98) and had no education (OR: 0.29; 95% CI: 0.10–0.85). The ROC and H-L *p* values for the model were .744 and .241, respectively.

**Table 3.** Women's reasons for not being screened for cervical cancer ($n = 709$)

| Barriers[a,b] | Frequency (%) |
|---|---|
| I had no symptoms | 611 (86.1) |
| I didn't know screening was needed | 266 (37.5) |
| Screening was expensive (accommodation, treatment, medicine) | 82 (11.5) |
| Lack of information about CCa and treatment | 16 (2.2) |
| Undressing/embarrassing or awkward nature of diagnosis | 14 (1.9) |
| Lack of time for screening | 13 (1.8) |
| I didn't know where to go | 13 (1.8) |
| My family didn't allow me to go | 11 (1.6) |
| Health-care service center was too far | 4 (0.6) |
| Chronic disabling conditions | 4 (0.6) |
| Religious reason | 3 (0.5) |
| Painful instrument used for screening | 3 (0.5) |
| Attitude of service providers | 2 (0.3) |
| Lack of government financial support | 2 (0.3) |
| Poor road communication and transportation | 1 (0.1) |

[a]All barriers listed in the questionnaire are not provided here.
[b]Multiple responses allowed.

## Discussion

In this representative sample of Bangladeshi women aged 30–59 years, the primary barrier to CCa screening was lack of knowledge. Although greater than 80% of women reported they had heard of CCa, nearly 40% of these women said they were unaware of a screening test for this condition, despite residing in areas where opportunistic screening had been offered. Similar findings have been reported in a recent study in Tanzania [11]. Furthermore, greater than 90% of the women who said they were aware of screening did not take up screening because they reported that either they had no symptoms or did not know screening was needed, or both. Contrary to our expectations, few women offered cultural or religious beliefs as barriers to screening. Accurate knowledge of symptoms of CCa was limited, consistent with the findings of a previous qualitative study of community perceptions of CCa and screening in Bangladesh [12]. The lower level of awareness of CCa in rural communities most likely reflects low media exposure, poor literacy, poverty, and women not undertaking employment outside the home. Also associated with awareness of CCa were age, level of education, and obesity. That middle-aged women were more likely than younger women to have ever heard of CCa might be because of their greater exposure to maternal and child health services implemented in Bangladesh after the country's independence in 1971 [13]. Studies in India have reported that prior exposure to reproductive health services was influential in creating awareness of CCa screening [14, 15]. In addition to older women having had greater exposure to health services, younger women may well have the perception that, being in good health, they are not at risk. The association between education and knowledge of CCa is not surprising. In our study, obesity was associated with urban living and high socioeconomic status, which may explain why obese women were more likely to have ever heard of CCa.

We hypothesized that cultural and religious beliefs, as well as access to screening facilities, might be operating as barriers to CCa screening uptake, as reported in other countries [16–23]. To address this issue, we asked a separate question about possible reasons for not attending for CCa screening. The minimal influence of cultural and religious beliefs on the decision to be screened is a positive finding because these factors can be challenging to modify. Our most important finding was that the majority of women who had heard of CCa screening did not understand the concept of "screening" but rather thought this should only be undertaken if symptoms were present. The variables positively associated with CCa screening in our study—namely, level of education, urban living, employment outside the home, and age—are all indices of opportunity for knowledge acquisition. The impact of age is in agreement with studies undertaken in rural Malaysia, Tanzania, and New Zealand [24–26].

Our data strongly support the proposal that a broad, community-based awareness program is likely to improve CCa screening uptake in Bangladesh [5]. But our findings also demonstrate that the development of an awareness program in Bangladesh must take into account both the low level of literacy and that few women work outside their homes. Therefore, to be effective, an awareness campaign would need to incorporate visual and verbal communication, and be able to reach women in their immediate domestic environment. A model piloted in Bangladesh for breast health promotion has involved the use of smartphone technology by community workers [27]. This model could be adapted to improve knowledge of CCa screening, treatment, and, ultimately, vaccination.

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**Table 4.** Univariate and multivariable analyses of factors associated with cervical cancer screening among women who had ever heard of screening ($n = 773$)

| | CCa screening uptake | | Unadjusted | | Adjusted | |
|---|---|---|---|---|---|---|
| **Variables** | **Yes ($n = 66$), *n* (%)** | **No ($n = 700$), *n* (%)** | **OR (95% CI)** | ***p* value** | **OR (95% CI)** | ***p* value** |
| Place of residence | | | | | | |
| Urban | 38 (14.1) | 232 (85.9) | 1.0 | | 1.0 | |
| Rural | 28 (5.6) | 468 (94.4) | 0.40 (0.24–0.66) | <.0001 | 0.54 (0.30–0.98) | .045 |
| Age (years) | | | | | | |
| 30–39 | 24 (7.2) | 309 (92.8) | 1.0 | | 1.0 | |
| 40–49 | 34 (11.8) | 253 (88.2) | 1.51 (0.87–2.65) | .141 | 2.17 (1.19–3.94) | .011 |
| 50–59 | 8 (5.5) | 138 (94.5) | 0.77 (0.34–1.74) | .532 | 1.06 (0.42–2.67) | .894 |
| Marital status | | | | | | |
| Married | 63 (9.0) | 636 (91.0) | 1.0 | | 1.0 | |
| Widow, divorced, separated | 3 (4.5) | 64 (95.5) | 0.62 (0.21–1.84) | .386 | 0.56 (0.16–2.04) | .383 |
| Education | | | | | | |
| Secondary and above | 49 (12.0) | 193 (88.0) | 1.0 | | 1.0 | |
| Primary | 12 (7.5) | 147 (92.5) | 0.24 (0.10–0.57) | .001 | 0.75 (0.36–1.59) | .456 |
| No education | 5 (2.5) | 360 (97.5) | 0.74 (0.38–1.40) | .352 | 0.29 (0.10–0.85) | .024 |
| Occupation | | | | | | |
| Household duties | 56 (7.8) | 662 (92.2) | 1.0 | | 1.0 | |
| Other | 10 (20.8) | 38 (79.2) | 3.06 (1.44–6.53) | .004 | 3.83 (1.65–8.92) | .002 |
| Religion | | | | | | |
| Islam | 61 (8.6) | 646 (91.4) | 1.0 | | 1.0 | |
| Hindu | 5 (8.5) | 54 (91.5) | 1.30 (0.53–3.20) | .572 | 0.97 (0.36–2.65) | .960 |
| Husband's occupation | | | | | | |
| Service | 35 (11.9) | 258 (88.1) | 1.0 | | 1.0 | |
| Business | 22 (9.9) | 201 (90.1) | 0.63 (0.35–1.14) | .127 | 1.04 (0.57–1.90) | .900 |
| Agriculture and other | 9 (3.6) | 239 (96.4) | 0.28 (0.14–0.59) | .001 | 0.57 (0.24–1.33) | .194 |
| BMI category | | | | | | |
| Normal weight | 15 (5.8) | 244 (94.2) | 1.0 | | 1.0 | |
| Underweight | 2 (7.4) | 25 (92.6) | 0.77 (0.12–4.96) | .787 | 1.86 (0.38–9.10) | .446 |
| Overweight | 30 (9.4) | 288 (90.6) | 1.29 (0.68–2.45) | .434 | 1.22 (0.61–2.42) | .576 |
| Obese | 19 (11.8) | 142 (88.2) | 2.10 (1.06–4.16) | .034 | 1.42 (0.66–3.05) | .367 |
| Parity | | | | | | |
| ≤2 children | 29 (9.3) | 284 (90.7) | 1.0 | | 1.0 | |
| ≥3 children | 36 (8.1) | 407 (91.9) | 0.92 (0.55–1.55) | .761 | 1.50 (0.82–2.73) | .185 |

Abbreviations: BMI, body mass index; CCa, cervical cancer; CI, confidence interval; OR, odds ratio.

A major strength of the BMWHS is the robust sampling of a socioeconomically heterogeneous group of women living in regions where CCa screening has been available for some years. This unique data set has enabled us to explore the impact on CCa screening of a range of demographic variables. Careful questionnaire development, interviewer training, and quality control of interviews ensured the credibility of the results. That the level of screening uptake in our study is identical to an independent report of uptake [4] provides strong evidence of external validity. Recall and reporting bias with respect to some questions pertaining to awareness, knowledge, and barriers to screening uptake might have occurred. Although 80% of the participants in our study said they had heard of CCa, this figure may be an overestimate, as many of the women had difficulty distinguishing between CCa and cancer of other reproductive organs, or other conditions such as genital prolapse or fistula.

## Conclusion

Awareness of the role of screening is the key barrier to CCa screening uptake in Bangladesh. Health education programs, appropriately adapted to the target population, particularly women confined to their homes and who are illiterate, younger, and living in rural areas, have the potential to increase CCa screening uptake and reduce CCa mortality.

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## Author Contributions

**Conception and Design:** Rakibul M. Islam, Robin J. Bell, Susan R. Davis
**Provision of study material or patients:** Rakibul M. Islam, Mohammad B. Hossain
**Collection and/or assembly of data:** Rakibul M. Islam
**Data analysis and interpretation:** Rakibul M. Islam, Robin J. Bell, Baki Billah, Mohammad B. Hossain, Susan R. Davis
**Manuscript writing:** Rakibul M. Islam, Robin J. Bell, Susan R. Davis
**Final approval of manuscript:** Rakibul M. Islam, Robin J. Bell, Baki Billah, Mohammad B. Hossain, Susan R. Davis

## Disclosures

**Susan R. Davis:** Trimel Pharmaceuticals Canada (C/A), Lawley Pharmaceuticals (RF), Abbott Australia, Pfizer Pharmaceuticals (H); **Robin J. Bell:** Lawley Pharmaceuticals (RF). The other authors indicated no financial relationships.

(C/A) Consulting/advisory relationship; (RF) Research funding; (E) Employment; (ET) Expert testimony; (H) Honoraria received; (OI) Ownership interests; (IP) Intellectual property rights/inventor/patent holder; (SAB) Scientific advisory board

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# Chapter 7: Awareness of Breast Cancer and Barriers to Breast Screening in Bangladesh

## 7.1 Introduction

Breast cancer is the leading cancer among women in Bangladesh, a lower-middle income country. However, data pertaining to the total number of deaths from breast cancer, the number of women living with a diagnosis of breast cancer, and awareness of and delivery of breast cancer screening are lacking.

The aim of this paper was to report on awareness of breast cancer, practices of breast cancer screening and barriers to the utilization of methods for early detection among women at mid-life in Bangladesh. In conclusion, this paper provided evidence that participation in breast cancer screening is low in women in Bangladesh and lack of understanding of the role of the assessment of asymptomatic women is the key barrier to breast cancer screening uptake. This paper also recommended that health education programs, especially breast cancer awareness programs, have the potential to result in down-staging of disease in Bangladesh.

## Declaration for Thesis Chapter 7

**7.2 Manuscript:** Rakibul M. Islam, Robin J. Bell, Baki Billah, Mohammad B. Hossain and Susan R. Davis. Awareness of breast cancer and barriers to breast screening uptake in Bangladesh: a population-based survey. *Maturitas*, Feb 2016; (84):68-74. DOI:10.1016/j.maturitas.2015.11.002

**Declaration by candidate**

In the case of Chapter 7, the nature and extent of my contribution to the work was the following:

| Nature of contribution | Extent of contribution (%) |
|---|---|
| Study concept and design, data collection, data entry, analysis and interpretation of the data, manuscript development and preparation | 65% |

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

| Name | Nature of contribution |
|---|---|
| Robin J. Bell | Study concept and design, study funding, data analysis and interpretation, supervision, critical revision of submitted manuscript |
| Baki Billah | Guidance for data analysis and interpretation, and manuscript editing |
| Mohammad B. Hossain | Guidance for data collection, data analysis and interpretation, and manuscript editing |
| Susan R. Davis | Study concept and design, study funding, data analysis and interpretation, supervision, critical revision of submitted manuscript |

The undersigned hereby certify that the above declaration correctly reflects the nature and extend o the candidate's and co-author' contributions to this work

| | | |
|---|---|---|
| **Candidate's Signature** | [redacted] | **Date 10/05/2016** |
| **Main Supervisor's Signature** | [redacted] | **Date 10/05/2016** |

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# Awareness of breast cancer and barriers to breast screening uptake in Bangladesh: A population based survey

Rakibul M. Islam[a,c], Robin J. Bell[a], Baki Billah[b], Mohammad B. Hossain[c], Susan R. Davis[a,*]

[a] Women's Health Research Program, School of Public Health and Preventive Medicine, Monash University, Melbourne, Victoria, Australia
[b] Biostatistics Unit, School of Public Health and Preventive Medicine, Monash University, Melbourne, Victoria, Australia
[c] Department of Population Sciences, University of Dhaka, Dhaka 1000, Bangladesh

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ABSTRACT

*Objectives:* To investigate the awareness of breast cancer (BCa) and BCa screening amongst women at midlife in Bangladesh.
*Methods:* A nationally representative cross-sectional survey of women aged 30–59 years was conducted in 7 districts of the 7 divisions in Bangladesh, using a multistage cluster sampling technique. The factors associated with the awareness of BCa and breast assessment of asymptomatic women were investigated separately, using multivariable logistic regression.
*Results:* Of the 1590 participants, mean age 42.3 (±8.0) years, 81.9% had ever heard of BCa and 64.2% of any methods of BCa screening, respectively. Awareness of BCa was associated with being aged 40–49 years (adjusted OR 2.04, 95% CI 1.46–2.84), aged 49–59 years (1.96, 1.32–2.91), being overweight (1.46, 1.07–2.01) and obesity (1.62, 1.01–2.62), while inversely associated with rural dwelling (0.37, 0.22–0.61), primary education (0.44, 0.27–0.70), having no education (0.23, 0.14–0.36) and parity (0.62, 0.44–0.87). Of the 750 women who were aware of clinical breast examination (CBE) or mammography, reasons provided for not undergoing screening included that they had no symptoms (92%) and that they did not know screening was needed (40%). 8% of women reported CBE. Women with no education were less likely to have undergone CBE (0.38, 0.14 1.04; $p = 0.059$).
*Conclusion:* Lack of understanding of the assessment of asymptomatic women is the key obstacle to BCa screening uptake in Bangladesh. Health education programs, especially BCa awareness programs, have the potential to increase BCa awareness and down-staging of the disease.
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## 1. Introduction

Breast cancer (BCa) is the leading incident cancer amongst women in Bangladesh [1,2]. There is no national cancer registry in Bangladesh. Using data from India and Pakistan, it has been estimated that 30,000 Bangladeshi women are newly diagnosed with BCa annually [3]. Over 40% of women diagnosed with BCa in Bangladesh are premenopausal and most women present with locally advanced or disseminated disease [4]. Hence, in contrast to what is seen in developed countries, in Bangladesh, BCa is a disease of young women which conveys high morbidity and mortality due to presentation at a late stage. Access to breast surgery and radiotherapy is increasing across Bangladesh [5] such that morbidity and mortality could be significantly reduced if BCa was to be diagnosed at an earlier stage (clinical down-staging). Recognising this, BCa has been identified as a major target for early disease diagnosis by the Bangladesh Ministry of Health and Family Welfare [6]. Campaigns to educate women about the symptoms and signs of BCa have been proposed [6]. It has been reported that a breast health awareness program would be ineffective because of entrenched complex socio-cultural, economic, and health systems barriers that include gender inequity and human rights issues [3].

The Bangladesh Midlife Women's Health Study (BMWHS) is a population-based study to which 1590 women, aged 30–59 years, were recruited between September 2013 and March 2014, to better understand the health needs of Bangladeshi women at midlife [7]. This study has revealed that the major barrier to cervical cancer in

* Corresponding author at: Women's Health Research Program, School of Public Health and Preventive Medicine, Monash University, 99 Commercial Rd, Melbourne, 3004 VIC, Australia. Fax: +61 3 99030828.

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Bangladesh is a lack of understanding of the concept of screening asymptomatic people [8]. We now report on the knowledge and awareness of BCa and barriers to the utilization of methods for the early detection of BCa, using data from the BMWHS.

## 2. Methods

### 2.1. Study setting and participants

We recruited women from seven districts in Bangladesh, namely Barisal, Tangail, Comilla, Sathkhira, Rajshahi, Rangpur and Habigonj, using a multistage cluster sampling method to ensure a representative study sample. Seven main administrative divisions comprise the 64 administrative districts of Bangladesh. Women, aged 30–59 years were recruited from each of 7 districts randomly selected from the 32 districts offering opportunistic cervical cancer screening, as described in detail elsewhere [7]. We used the distribution of the 3.24 million women of the target age group in these districts in the 2011 housing and population census to determine the number of women to be recruited in each district, taking into account the ratio of urban to rural women in each district [9]. Within each district, there are enumeration areas (EAs) that are the smallest units with a defined area, and each includes on average 120 households [10]. The least number of women required in any single EA was 36 [7]. As a result, the household selection was an unequal probability systematic selection with 36 households per EA. The EAs within each district were selected randomly, and within each EA, the first household was selected randomly. Systematic sampling was then used to select the second, third or fourth household, depending on the number of eligible women in the EA. Only one eligible woman was recruited from each household. If a participant was not identified in a selected household, the adjacent household was approached. In accordance with multistage cluster design, sampling weight ensured representativeness of the sample at all stages [7,8].

The BMWHS was approved by the Monash University Human Research Ethics Committee, Melbourne, Australia and the Bangladesh Medical Research Council, Dhaka, Bangladesh.

### 2.2. Sample size

The sample size calculation was based on the previously reported prevalence of cervical cancer screening uptake (8.6%) [11], with a margin of error of ±2%, amongst women at midlife. This gave a minimum sample size of 755. This figure was multiplied by the design effect of 2, as the urban and rural EAs were considered independently. The sample size was further increased by 5% to allow for non-sampling error, particularly non-response error. The final a priori sample size estimation was 1586 women. Given that the prevalence of uptake of clinical breast examination (CBE) 8%, we are appropriately powered for this study outcome [12].

### 2.3. Study questionnaire

The study questionnaire developed in English was first translated into Bengali after which translation accuracy was verified by an independent bilingual translator and further verified by back-translation. The questionnaire was piloted in 16 women, which led to minor refinement. Questions pertaining to personal, socio–demographic and household characteristics were obtained from the Bangladesh Demographic Health Survey questionnaire [13]. Questions about knowledge and awareness of BCa, and practices of BCa screening were formulated on the basis of an extensive review of the published literature. Nine questions pertained to BCa awareness and knowledge, and screening of BCa: have you ever heard of BCa? Have you or a member of your family had BCa? Can you please tell me any symptoms which would indicate a woman has BCa? Have you ever heard about women having screening to find BCa? Do you know of any methods of BCa screening? Do you know how to check your breasts for lumps or other abnormalities (breast self-examination [BSE])? Did you ever check your own breasts for possible lumps (chaka), distortions or swelling? Have you ever had your breasts examined by a doctor, nurse, or other health professional (CBE)? Have you ever had a mammogram? The questionnaire also included a series of questions about potential barriers to screening of BCa. A household 'wealth index' was derived from variables such as housing materials, households assets and amenities, sources of water and type of toilet facilities used [13].

### 2.4. Data collection

Data collection was by structured interview as literacy in Bangladesh is low. Four female university graduates were trained to conduct the interviews. Training involved a two-week intensive program, mock interviews and field practice to ensure interview consistency. Participants were first given a verbal explanation of the objectives, general content and time commitment involved in participation, and assurance of confidentiality. Once verbal consent was obtained, the interviewer completed the study questionnaire based on participants' responses. Each day all the completed questionnaires were reviewed. When necessary, households were revisited the following day to clarify any ambiguities or to collect missing data.

### 2.5. Statistical analysis

BCa awareness (ever heard of BCa) and screening of BCa (CBE) were considered as two outcome variables. BCa awareness was investigated for all study participants, whereas screening of BCa was investigated only for those who had ever heard of CBE. We did not model for BSE and mammography due to small numbers in the cells. Simple and multivariable logistic regression analyses were used to evaluate the association between each of the outcomes and participants' socio-economic and demographic characteristics. Each household's 'wealth index' was ascertained using a principal component analysis and was presented as wealth quintiles [13,14]. Parity was treated as dichotomous for regression analyses, two or fewer children and more than two children, since "Boy or Girl, two-children are enough" as a significant slogan played vital role to reduce population growth rate in Bangladesh [15]. We considered 11 variables as potential predictors for both outcomes, however, husband's education and wealth quintiles were excluded from the multivariable logistic regression models due to multi-colinearity with women's education and place of residence respectively. A variable with a $P$ value of less than or equal to 0.05 was considered significant. The area under the receiver operating characteristic curve (ROC) and the Hosmer and Lemeshow (H–L) $P$ value were used to assess the models' discrimination and calibration performances. The first-degree interaction effect between independent variables was also investigated. All analyses were performed using statistical software packages STATA (version 12.0; StataCorp LP, College Station, Texas) and SPSS (version 20.0; SPSS Inc. Chicago, Illinois, USA).

## 3. Results

Of 1700 approached households, 1590 women agreed to participate in the study. Their mean age was 42.3 (±8.0) years and 73.8% resided in rural areas (Table 1). The majority (94.2%) were not employed outside the home, 88.9% were married, and 92.2% reported their religion as Islam. 40.2% of the women had no formal education and 12.0% had more than 10 years of education. 29.1%

**Table 1**
Characteristics of women in the BMWHS ($n = 1590$).

| Characteristics | *N* (%) |
|---|---|
| Place of residence | |
| Rural | 1174 (73.8) |
| Urban | 416 (26.2) |
| Age (in years) | |
| 30–39 | 653 (41.1) |
| 40–49 | 591 (37..2) |
| 50–59 | 346 (21.7) |
| Marital status | |
| Married | 1413 (88.9) |
| Widow, divorced and separated | 177 (11.1) |
| Years of education | |
| Higher secondary and above | 190 (12.0) |
| Secondary | 411 (25.9) |
| Primary | 349 (21.9) |
| Illiterate | 640 (40.2) |
| Occupation | |
| Household duties | 1498 (94.2) |
| Other (employed outside household) | 92 (5.8) |
| Religion | |
| Islam | 1467 (92.2) |
| Hindu | 122 (7.6) |
| Christian | 1 (0.06) |
| Husband's years of education | |
| Higher secondary and above | 379 (23.8) |
| Secondary | 460 (29.0) |
| Primary | 288 (18.1) |
| Illiterate | 463 (29.1) |
| Husband's occupation | |
| Service[a] | 496 (31.3) |
| Business | 431 (27.2) |
| Agriculture | 389 (24.5) |
| Day labourer | 126 (8.0) |
| Other | 144 (9.1) |
| BMI (kg/m$^2$)[b] | |
| Underweight (<17.5) | 86 (5.4) |
| Normal weight (17.5–23) | 626 (39.4) |
| Overweight (23.00–28) | 609 (38.4) |
| Obese (≥28.00) | 267 (16.8) |
| Parity[c] | |
| No child | 5 (0.3) |
| One child | 114 (7.3) |
| Two children | 448 (28.5) |
| Three children | 461 (29.3) |
| Four children and above | 542 (34.5) |

[a] Service includes both government and non-government job.
[b] $n = 1588$ for BMI.
[c] $n = 1571$ for parity.

of the women reported that their husband had no education and 32.5% of the women's husbands worked in agriculture or as day labourers. 16.8% were obese and 5.4% were underweight. 34.5% of the women had 4 or more children and 0.3% were nulliparous.

### 3.1. Knowledge, awareness and utilization of women's breast cancer and breast cancer screening

Systematic questioning revealed that 81.9% of the women had ever heard of BCa (Fig. 1). Of 1302 women who had ever heard of BCa, 42.6% identified at least one correct symptom from a list provided and 4% ($n = 51$) reported that a member of their family had been diagnosed with BCa (data not shown). Of the women who had ever heard of BCa, 64.2% ($n = 836$) had ever heard of a BCa screening method, 11.4% ($n = 95$) knew of BSE, 97.6% ($n = 816$) had ever heard of CBE and 5.6% ($n = 47$) had ever heard of mammography. 87.8% ($n = 79$) of the women who knew about BSE said they performed it. Of those who had ever heard of mammography, 23 women (49%) had ever had a mammogram. The corresponding figure for women who had ever heard of CBE was 8% ($n = 66$).

We recorded 11 potential predictors of BCa awareness of which 9 were retained in the multivariable logistic regression model (Table 2). Women were less likely to have heard of BCa if they lived in a rural area (adjusted odds ratio [OR], 0.37; 95% confidence interval [CI], 0.22–0.61), and had only primary (OR, 0.44; 95%CI, 0.27–0.70), or no education (OR, 0.23; 95%CI, 0.14–0.36). Women aged 40–49 years (OR, 2.04; 95%CI, 1.46–2.84,) and 49–59 years (OR, 1.96; 95%CI, 1.32–2.91) were more likely to be aware of BCa, compared with women aged 30–39 years, and women who were overweight (OR, 1.46; 95%CI, 1.07–2.01) or obese (OR, 1.62; 95%CI, 1.01–2.62) were more likely to be aware of BCa compared with women of normal body mass index (BMI). Women who had three or more children were less likely to be aware of BCa (OR, 0.62; 95%CI, 0.44–0.87), compared with women who had fewer than three children. The ROC and H–L $p$ value for the model were 0.750 and 0.166, respectively.

### 3.2. Barriers to screening of breast cancer

The reasons women, who knew of CBE or mammography, gave for not undergoing screening included having no symptoms (92.4%), not knowing screening was needed (40.1%) and possible expense associated with screening (7.2%) (Table 3). Modesty issues and religious barriers were reported by 4.7% and 1.7% of women, respectively.

In the multivariable logistic regression model for CBE uptake, 9 of 11 potential predictors were retained in the final model (Table 4). From the multivariable analysis, there was a trend towards an effect of education that women were less likely to undergo for CBE if they had no education (OR, 0.38; 95%CI, 0.14–1.04; $p = 0.059$). The ROC and H–L $p$ value for the model were 0.667 and 0.562, respectively.

## 4. Discussion

This population-based study demonstrates that the primary impediment to the early diagnosis of BCa in Bangladeshi women is lack of understanding of the role of screening to detect early stage disease. Most women in our study had heard of BCa, and two-thirds of these women said that they were aware of screening for breast cancer. Despite this, over 90% said they had never been assessed as they thought breast checks were only for women who had symptoms. Although most of our study participants were aware of BCa, only a minority had an accurate knowledge of the symptoms of BCa. This is consistent with recent studies conducted in India and Malaysia [16,17]. As in our study, a low level of screening, despite a high level of BCa awareness, has been reported in other low and middle income countries [18–20]. Again, the reasons women gave in these studies for not undergoing breast assessment were either lack of symptoms, or not understanding the concept of the assessment of asymptotic women or both [18].

Studies conducted in Turkey and in China identified significant associations between location of residence and BCa awareness [21,22]. The lower level of awareness of BCa in rural Bangladesh might reflect low literacy, little mass–media exposure, poverty, and women's position within households. Age, education, BMI and parity were also associated with awareness of BCa in our study. In many countries younger women have been found to have greater BCa awareness, attributed to their being better educated and having more interest in health than older women [22,23]. In contrast, in Bangladesh as in Malaysia [17] and in Qatar [24], older women are more BCa aware which might be that they are more likely to have heard of others having BCa in the community.

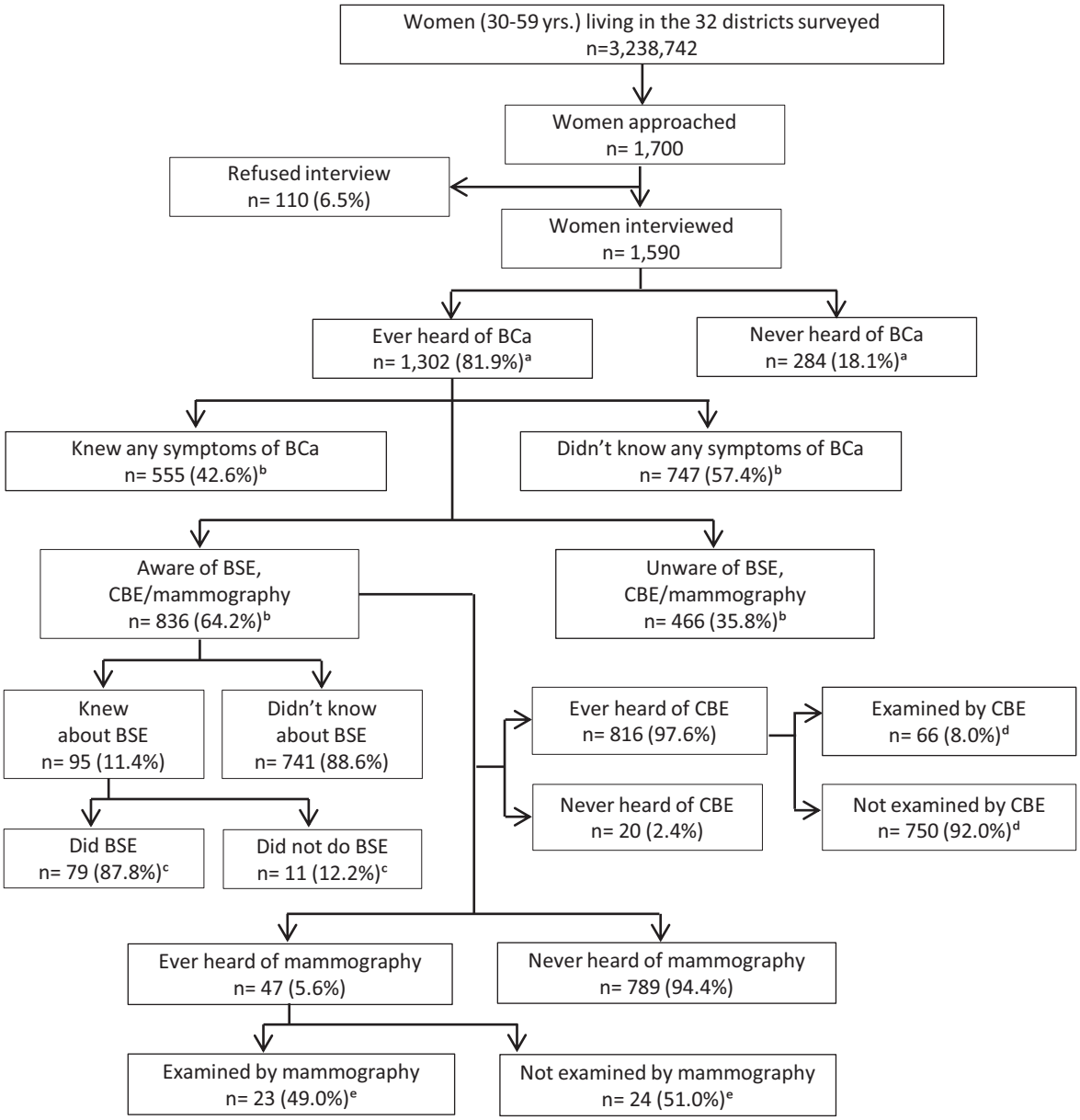


**Fig. 1.** Knowledge and practices of breast cancer and breast cancer screening in the BMWHS population.
BCa, Breast cancer; BSE, Breast self-examination; CBE, Clinical breast examination; [a]% of those interviewed; [b]% of those who had ever heard of BCa; [c]% of those who knew about BSE; [d]% of those who had ever heard of CBE; [e]% of those who had ever heard of mammography.

The positive association between education and BCa awareness is not unexpected and is in agreement with recent studies in India and Malaysia [25,26]. Compared with women of normal BMI, better awareness amongst overweight and obese women might be explained by an association between higher BMI and urban dwelling, as well as higher BMI and higher socio-economic status. That woman with ≥3 children were less likely to have ever heard of BCa, compared with those with fewer children, may be due to the former being more socially isolated as they are mostly older, live in rural areas and are not in paid employment.

The Consensus Statement from the Breast Health Global Initiative highlights the importance of public awareness in the early detection of BCa in low resource countries [27]. Our findings refute previous reports that gender inequity, modesty, wanting only to see a female doctor and cultural and religious beliefs are significant barriers to Bangladeshi women undergoing any form of breast assessment [3,28–30]. Small studies in Bangladesh and in Palestine have reported similar findings to ours [31,32]. Women who had no education were less likely to undergo BCa assessment which is in agreement with another small study of working women in Dhaka where highly educated women are more likely to practice BSE compared with less educated women [31].

Our findings suggest that educating the community about assessment of asymptomatic women has the potential to increase the proportion of BCa detected at an early stage (disease down-staging). Although increased awareness is likely to initially increase the incidence of BCa, the hope is that disease down-staging will reduce BCa morbidity and mortality [5]. A pilot mobile intervention program in Bangladesh has shown that regardless of socio-economic and educational status, women exposed to an educational intervention were more likely to attend a follow up clinic for abnormal breast examination findings compared with a control group [33]. This reinforces the crucial role of education in reducing delayed presentation.

**Table 2**
Univariate and multivariable analyses of factors associated with having ever heard of breast cancer ($n = 1590$).

| Variables | Ever heard of BCa | | Unadjusted | | Adjusted | |
|---|---|---|---|---|---|---|
| | Yes ($n = 1306$) $n$ (%) | No ($n = 284$) $n$ (%) | OR (CI) | $P$ value | OR (CI) | $P$ value |
| Place of residence | | | | | | |
| Urban | 417 (93.7) | 28 (6.3) | 1.0 | | 1.0 | |
| Rural | 889 (77.6) | 256 (22.4) | 0.24 (0.16–0.35) | <0.0001 | 0.37 (0.22–0.61) | <0.0001 |
| Age (in years) | | | | | | |
| 30–39 | 543 (82.5) | 115 (17.5) | 1.0 | | 1.0 | |
| 40–49 | 482 (83.8) | 93 (16.2) | 1.10 (0.82–1.86) | 0.531 | 2.04 (1.46–2.84) | <0.0001 |
| 50–59 | 280 (78.4) | 89 (21.6) | 0.78 (0.56–1.07) | 0.123 | 1.96 (1.32–2.91) | 0.001 |
| Marital status | | | | | | |
| Married | 1171 (83.1) | 238 (16.9) | 1.0 | | 1.0 | |
| Widow, divorced and separated | 135 (74.6) | 46 (25.4) | 0.59 (0.41–0.85) | 0.005 | 0.78 (0.51–1.20) | 0.252 |
| Education | | | | | | |
| Secondary and above | 574 (93.8) | 38 (6.2) | 1.0 | | 1.0 | |
| Primary | 289 (84.5) | 53 (15.5) | 0.15 (0.10–0.22) | <0.0001 | 0.44 (0.27–0.70) | 0.001 |
| No education | 443 (69.5) | 194 (30.5) | 0.36 (0.23–0.56) | <0.0001 | 0.23 (0.14–0.36) | <0.0001 |
| Occupation | | | | | | |
| Household duties | 1213 (81.0) | 284 (19.0) | 1.0 | | 1.0 | |
| Other | 80 (86.0) | 13 (14.0) | 1.11 (0.63–1.95) | 0.715 | 0.97 (0.47–2.00) | 0.936 |
| Religion | | | | | | |
| Islam | 1187 (81.1) | 277 (18.9) | 1.0 | | 1.0 | |
| Hindu | 106 (84.1) | 20 (15.9) | 1.27 (0.77–2.12) | 0.351 | 1.61 (0.91–2.86) | 0.104 |
| Husband's occupation | | | | | | |
| *Service | 448 (90.1) | 49 (9.9) | 1.0 | | 1.0 | |
| Business | 365 (84.7) | 66 (15.3) | 0.56 (0.38–0.84) | 0.005 | 0.91 (0.59–1.40) | 0.666 |
| Agriculture and other | 477 (72.4) | 182 (27.6) | 0.28 (0.20–0.40) | <0.0001 | 0.80 (0.54–1.18) | 0.263 |
| ±BMI (kg/m$^2$) | | | | | | |
| Normal weight | 469 (74.9) | 157 (25.1) | 1.0 | | 1.0 | |
| Underweight | 63 (75.9) | 20 (24.1) | 0.70 (0.42–1.15) | 0.161 | 0.84 (0.50–1.41) | 0.505 |
| Overweight | 515 (84.3) | 96 (15.7) | 2.11 (1.57–2.85) | <0.0001 | 1.46 (1.07–2.01) | 0.018 |
| Obese | 245 (91.1) | 24 (8.9) | 2.72 (1.77–4.19) | <0.0001 | 1.62 (1.01–2.62) | 0.047 |
| Parity | | | | | | |
| Two children or less | 487 (86.7) | 75 (13.3) | 1.0 | | 1.0 | |
| Three children or more | 786 (78.4) | 217 (21.6) | 0.36 (0.42–0.65) | <0.0001 | 0.62 (0.44–0.87) | 0.006 |

OR: odds ratio, CI: confidence interval. The area under the receiver operating characteristic curve and the Hosmer and Lemeshow $p$ value for breast cancer awareness were 0.750 and 0.166, respectively.

**Table 3**
If you have never had any breast cancer screening/diagnosis (either by clinical breast examination or by mammography) can you please explain the reasons? ($n = 750$).

| Barriers | Frequency (%) |
|---|---|
| I had no symptoms | 696 (92.4) |
| I did not know screening was needed[a] | 302 (40.1) |
| Expensive (accommodation, treatment, medicine) | 54 (7.2) |
| Undressing/embarrassing or awkward nature of diagnosis | 35 (4.7) |
| Religious reason | 13 (1.7) |
| Lack of information about BCa and treatment | 12 (1.6) |
| I did not know where to go | 12 (1.6) |
| Lack of time for screening | 7 (0.9) |
| Health care service centre was too far | 6 (0.8) |
| Fear of diagnostic test and result | 4 (0.5) |
| My family did not allow me to go | 3 (0.4) |
| No accompany to go for screening | 2 (0.3) |
| Poor read communication and transportation | 2 (0.3) |

[a] Only 11 did not also say "I had no symptoms"; of 302 women, 291 also said "I had no symptoms".

Strength of the BMWHS is the robust sampling of a socio-economically heterogeneous group of women living across the country. This unique data set has enabled us to explore knowledge, awareness and utilization of BCa screening, taking into account a range of socio-economic and demographic variables. Careful questionnaire development, interviewer training and quality control of interviews ensured the validity of the results. Recall and reporting bias, with respect to some questions pertaining to awareness, knowledge and barriers to screening might have occurred. With respect to awareness of methods of diagnosis for BCa, there was a large difference between the proportion of women who reported knowing about CBE (97%) compared with the proportions reporting that they knew about BSE (11.4%) and mammographic diagnosis (5.6%). Despite our explanations, some of the women may have confused attending clinic visits for other health issues, such as gynaecological problems, with CBE. Hence, we may have over-estimated the prevalence of awareness of CBE as a method of early diagnosis for breast cancer.

**Table 4**
Univariate and multivariable analyses of factors associated with clinical breast examination (CBE) amongst women who had ever heard of CBE ($n = 816$).

| Variables | CBE | | Unadjusted | | Adjusted | |
|---|---|---|---|---|---|---|
| | Yes ($n = 66$) $n$ (%) | No ($n = 750$) $n$ (%) | OR (CI) | $P$ value | OR (CI) | $P$ value |
| Place of residence | | | | | | |
| Urban | 31 (11.4) | 241 (88.6) | 1.0 | | 1.0 | |
| Rural | 35 (6.6) | 509 (93.6) | 0.53 (0.32–0.89) | 0.015 | 0.72 (0.41–1.28) | 0.265 |
| Age (in years) | | | | | | |
| 30–39 | 34 (9.8) | 313 (90.2) | 1.0 | | 1.0 | |
| 40–49 | 24 (7.7) | 289 (92.3) | 0.76 (0.44–1.32) | 0.335 | 0.91 (0.51–1.64) | 0.766 |
| 50–59 | 6 (5.1) | 148 (94.8) | 0.50 (0.22–1.10) | 0.085 | 0.67 (0.28–1.59) | 0.366 |
| Marital status | | | | | | |
| Married | 64 (8.6) | 679 (91.4) | 1.0 | | 1.0 | |
| Widow, divorced and separated | 2 (2.7) | 71 (97.3) | 0.30 (0.07–1.25) | 0.097 | 0.40 (0.09–1.75) | 0.222 |
| Education | | | | | | |
| Secondary and above | 44 (10.5) | 376 (89.5) | 1.0 | | 1.0 | |
| Primary | 16 (9.1) | 159 (90.9) | 0.86 (0.47–1.57) | 0.623 | 1.10 (0.56–2.16) | 0.782 |
| No education | 6 (2.7) | 215 (97.3) | 0.24 (0.10–0.57) | 0.001 | 0.38 (0.14–1.04) | 0.059 |
| Occupation | | | | | | |
| Household duties | 65 (8.4) | 705 (91.6) | 1.0 | | 1.0 | |
| Other | 10 (18.2) | 45 (81.8) | 1.86 (0.80–4.30) | 0.148 | 1.56 (0.61–3.99) | 0.357 |
| Religion | | | | | | |
| Islam | 59 (7.7) | 705 (92.3) | 1.0 | | 1.0 | |
| Hindu | 7 (13.5) | 45 (86.5) | 0.94 (0.36–2.44) | 0.903 | 0.96 (0.36–2.58) | 0.942 |
| Husband's occupation | | | | | | |
| *Service | 31 (10.4) | 267 (89.6) | 1.0 | | 1.0 | |
| Business | 22 (9.3) | 215 (90.7) | 0.88 (0.50–1.57) | 0.667 | 0.96 (0.53–1.75) | 0.896 |
| Agriculture and other | 13 (4.7) | 265 (95.3) | 0.42 (0.22–0.82) | 0.012 | 0.63 (0.30–1.34) | 0.233 |
| ±BMI (kg/m$^2$) | | | | | | |
| Normal weight | 17 (6.1) | 263 (93.9) | 1.0 | | 1.0 | |
| Underweight | 4 (11.8) | 30 (88.2) | 2.06 (0.65–6.53) | 0.218 | 2.74 (0.82–9.20) | 0.102 |
| Overweight | 30 (8.7) | 314 (91.3) | 1.48 (0.80–2.74) | 0.215 | 1.19 (0.62–2.29) | 0.605 |
| Obese | 115 (9.5) | 142 (90.5) | 1.63 (0.80–3.37) | 0.183 | 1.17 (0.54–2.53) | 0.685 |
| Parity | | | | | | |
| Two children or less | 31 (9.3) | 301 (90.7) | 1.0 | | 1.0 | |
| Three children or more | 34 (7.2) | 437 (92.8) | 0.75 (0.45–1.26) | 0.280 | 1.10 (0.62–1.94) | 0.753 |

OR: odds ratio. CI: confidence interval. The area under the receiver operating characteristic curve and the Hosmer and Lemeshow $p$ value for early diagnosis of breast cancer were 0.667 and 0.562, respectively.

In conclusion, early BCa detection and disease down-staging remains the cornerstone of BCa control to improve BCa outcome and survival in low income countries [34–36]. This study provides evidence that lack of understanding of the role of assessment of asymptomatic women is the key obstacle to BCa screening uptake in Bangladesh, not cultural and religious barriers.

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## Author's contributions

RMI: study design, collection, analysis and interpretation of data, and manuscript preparation; RJB: study design, analysis and interpretation of data, and manuscript preparation; MBH: providing logistics, organizing the study and manuscript preparation; BB: analysis and interpretation of data, and manuscript preparation; SRD: study design, analysis and interpretation of data, and manuscript preparation.

## Conflict of interest

SRD is a consultant and investigator for Trimel Pharmaceuticals Canada. SRD and RJB have received research funding support from Lawley Pharmaceuticals. SRD has received honoraria from Abbott Pharmaceuticals. For the remaining authors none were declared.

## Ethical approval

The BMWHS was approved by the Monash University Human Research Ethics committee, Melbourne, Australia and Bangladesh Medical Research Council, Dhaka, Bangladesh.

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# Chapter 8: The Prevalence and Severity of Menopausal Symptoms in Bangladesh

## 8.1 Introduction

This chapter is a peer-reviewed paper that reported the prevalence and severity of mmenopausal symptoms in women at midlife in Bangladesh.

This paper demonstrated that many women in Bangladesh experience VMS and joint pain in association with menopause, and that a considerable proportion of the women reported these symptoms to be bothersome. Despite the substantial symptom prevalence, no women reported prescription therapy, suggesting that menopause remains neglected in Bangladesh.

## Declaration for Thesis Chapter 8

**8.2 Manuscript:** Rakibul M. Islam, Robin J. Bell, Baki Billah, Mohammad B. Hossain and Susan R. Davis. Prevalence and severity of vasomotor symptoms and joint pain in women at mid-life in Bangladesh: a population-based survey. *Menopause: The North American Menopause Society*, Feb 2016; 23 (7): [Epub ahead of print]. DOI: 10.1097/GME.0000000000000615

**Declaration by candidate**

In the case of Chapter 8, the nature and extent of my contribution to the work was the following:

| Nature of contribution | Extent of contribution (%) |
|---|---|
| Study concept and design, data collection, data entry, analysis and interpretation of the data, manuscript development and preparation | 70% |

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

| Name | Nature of contribution |
|---|---|
| Robin J. Bell | Study concept and design, study funding, data analysis and interpretation, supervision, critical revision of submitted manuscript |
| Baki Billah | Guidance for data analysis and interpretation, and manuscript editing |
| Mohammad B. Hossain | Guidance for data collection, data analysis and interpretation, and manuscript editing |
| Susan R. Davis | Study concept and design, study funding, data analysis and interpretation, supervision, critical revision of submitted manuscript |

The undersigned hereby certify that the above declaration correctly reflects the nature and extend o the candidate's and co-author' contributions to this work

| | | |
|---|---|---|
| **Candidate's Signature** | [redacted] | **Date 10/05/2016** |
| **Main Supervisor's Signature** | [redacted] | **Date 10/05/2016** |

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# Prevalence and severity of vasomotor symptoms and joint pain in women at midlife in Bangladesh: a population-based survey

*Rakibul M. Islam, MPhil, MPH,[1,3] Robin J. Bell, MBBS, PhD,[1] Baki Billah, MSc, PhD,[2] Mohammad B. Hossain, MSc, PhD,[3] and Susan R. Davis, MBBS, FRACP, PhD[1]*

**Abstract**

***Objective:*** The aim of the study was to document the prevalence of menopausal symptoms and the extent to which women are bothered by vasomotor symptoms (VMS) and joint pain in Bangladesh.

***Methods:*** A total of 1,590 women, aged 30 to 59 years, participated in a cross-sectional, questionnaire-based study between September 2013 and March 2014. The main outcome measures were moderate to severely bothersome VMS and joint pain, measured by the Menopause-Specific Quality of Life questionnaire.

***Results:*** Of participants, 59.4% were premenopausal, 8.4% perimenopausal, and 32.3% postmenopausal. Approximately all women reached menopause by the age of 50 years. The prevalence of moderate to severely bothersome VMS was 4.1% in premenopausal, 33.3% in perimenopausal, and 28.2% in postmenopausal women. Factors associated with moderate to severely bothersome VMS were being perimenopausal (odds ratio [OR] 46.34, 95% CI 13.29-161.56; $P < 0.001$) or postmenopausal (OR 19.15, 95% CI 5.63-65.11; $P < 0.001$) and obesity (OR 2.20, 95% CI 1.03-4.71; $P = 0.042$). The prevalence of moderate to severely bothersome joint pain was 40.3% in postmenopausal, 36.2% in perimenopausal, and 15.3% in premenopausal women. Moderate to severely bothersome joint pain was more likely both in perimenopausal (OR 2.64, 95% CI 1.63-4.29; $P < 0.001$) and postmenopausal women (OR 2.96, 95% CI 2.06-4.24; $P < 0.001$). Moderate to severely bothersome joint pain was also more likely in women with no education compared with women having education beyond secondary school (OR 2.38, 95% CI 1.02-2.32; $P < 0.001$). No women reported prescription therapy for menopausal symptoms.

***Conclusions:*** This study demonstrates that a high proportion of Bangladeshi women experience moderate to severely bothersome VMS and joint pain. Despite the considerable symptom prevalence, no women reported treatment, suggesting that menopause remains neglected in Bangladesh.

***Key Words:*** Arthralgia – Menopause – Vasomotor symptoms.

Our systematic review of studies reporting on menopausal symptoms in Asian countries revealed substantial heterogeneity in the reported prevalence of vasomotor symptoms (VMS) and considerable overlap of the prevalence of VMS across premenopausal, perimenopausal, and postmenopausal women.[1] Studies conducted in South Asian countries such as Bangladesh, India, Pakistan, and Sri Lanka have reported a higher prevalence of VMS than studies conducted in other Asian countries.[1] None of the studies included in our systematic review, however, reported on the degree to which women are bothered by their symptoms and most were limited by a high risk of bias.[1] Arthralgia is considered to be a characteristic of menopausal symptoms of women in Asia,[2,3] so we considered arthralgia to be an outcome of interest.

The Bangladesh Midlife Women's Health Study (BMWHS) provided the opportunity to investigate menopausal symptoms experienced by women aged 30 to 59 years, randomly recruited from the seven districts of Bangladesh, using validated questionnaires.[4] Inclusion of the Menopause-Specific Quality of Life questionnaire (MENQOL) in the BMWHS enabled us to document the prevalence of a range of menopausal symptoms and the extent to which women are bothered by these symptoms. Our specific focus was on moderate to severely bothersome VMS and joint pain.

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From the [1]Women's Health Research Program, School of Public Health and Preventive Medicine, Monash University, Melbourne, Victoria, Australia; [2]Biostatistics Unit, School of Public Health and Preventive Medicine, Monash University, Melbourne, Victoria, Australia; and [3]Department of Population Sciences, University of Dhaka, Dhaka, Bangladesh.

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Address correspondence to: Susan R. Davis, MBBS, FRACP, PhD, Women's Health Research Program, School of Public Health and Preventive Medicine, Monash University, Melbourne, Victoria 3004, Australia. [redacted]



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## METHODS

### Study setting and participants

Recruitment was undertaken using multistage cluster sampling to obtain a nationally representative study sample. Seven main administrative divisions comprise the 64 administrative districts of Bangladesh. Women, aged 30 to 59 years, were recruited from each of the seven districts (Barisal, Tangail, Comilla, Sathkhira, Rajshahi, Rangpur, and Habigonj) randomly selected from 32 districts that had previously offered opportunistic cervical cancer screening, as described in detail elsewhere.[4] According to the 2011 Housing and Population Census, 3.24 million women of the target age group reside in these districts.[5] The Census also provides data for the proportion of women living in urban and rural parts of each district and divides each district into enumeration areas (EAs). The EAs are the smallest geographical units which include, on average, 120 households.[6] The total sample size was recruited from randomly selected EAs across the seven districts, taking into account the ratio of urban-rural women of the target age in each district. As the smallest number of women living in any single EA included in our study was 36, this was set as the sample size for each EA.[4] The household selection was an unequal probability systematic selection with 36 households per EA, and we selected the first household randomly. Systematic sampling was then used to select the subsequent households, with only one woman recruited per household. If there was no eligible participant at a selected household, the study interviewer approached the adjacent household. In the multistage cluster design, the sample weights adjusted for unequal probabilities of selection throughout this process.[4] All the analyses have included these sampling weights.

The BMWHS was approved by the Monash University Human Research Ethics Committee, Clayton, Australia and the Bangladesh Medical Research Council, Dhaka, Bangladesh.

### Data collection

Literacy in Bangladesh is low. Four female university graduates were trained to collect the data by structured interviews. The interviewers underwent intensive training that included mock interviews and field practice to maximize interview consistency. When women were invited to participate in the study, they were provided with an oral explanation of the study objectives, the type of questions to be asked, the time involved, and assurance of confidentiality. Once verbal consent was given, the study questionnaire was administered orally, with the interviewer recording all the responses. All completed questionnaires were reviewed at the end of each day, and if there were ambiguities or missing data households were revisited the following day.

The study questionnaire was initially developed in English and then translated into Bengali, after which translation accuracy was verified by an independent bilingual translator. For further verification it was then back-translated.[4] Individual identification, sociodemographic, and household characteristics were documented. Each household's "wealth index" was estimated using variables such as housing materials, household assets and amenities, sources of water, and available toilet facilities.[7] The prevalence and severity of menopausal symptoms were documented by the MENQOL.[8]

### Sample size

The BMWHS is a comprehensive study of the health of women at midlife in Bangladesh. Calculation of sample size for the BMWHS was based on the previously reported prevalence of cervical cancer screening uptake (8.6%),[9] with a margin of error of ±2%, among women at midlife. This provided a minimum sample size of 755. This number was multiplied by the design effect of 2, as the urban and rural EAs were considered independently. The sample size was further increased by 5% to allow for nonsampling error. The final sample size was 1,586 women. Even though the largest subgroup in this study was that of premenopausal women and they had a relatively low prevalence of VMS, we are still adequately powered for the logistic regression analyses having considerably more than the required 10 participants for every explanatory variable included in the model.[10]

### Estimation of age of the respondents and menopause status

Because there was no requirement for birth registration in Bangladesh until 2007,[11] accurate determination of the age of participants was a challenge, particularly for rural and older women. We used a combination of a method based on the average age of onset of menarche in Bangladesh,[12] and one utilizing life events, a valid process for age estimation.[13,14] The process of age determination has been previously described in detail.[4]

The menopause status of women was established using published algorithms,[15,16] derived from the Stages of Reproductive Aging Workshop +10 classification.[17,18] Each woman's menopause status was assessed using age, knowledge of bilateral oophorectomy, hysterectomy, menstrual bleeding, use of systemic hormonal contraception or hormone therapy (HT), and VMS.

### Assessment of menopausal symptoms

Menopausal symptoms were assessed using the MENQOL,[8] which comprises four symptom domains. Each of the domains, VMS, physical, psychological, and sexual, includes several symptoms, and women report whether they have experienced each symptom in the last 4 weeks (yes/no). If yes, the extent to which a woman was bothered (0, *no bother*; 6, *extreme bother*) resulted in a symptom score from 1 to 8 (1, *no symptom*). The VMS domain comprises hot flashes, night sweats, and sweating. For hot flashes, night sweats, and sweating, the degree of bother of each symptom was scored from 1 to 8. Women who ranked their degree of bother as more than the midpoint of the item (>5 to 8) were considered to have moderate to severely bothersome symptoms ("moderate-severe symptoms"). Therefore, the overall VMS symptom severity was categorized as none (1), mild (≥2 to ≤5),


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and moderate-severe (>5 to 8).[19] We have reported the prevalence and severity of joint pain, which was assessed by a single question in the physical domain, in the same manner.

### Statistical analysis

Descriptive data were presented using numbers (percentage and 95% CI) for categorical data and mean (SD) for continuous data. The MENQOL domain scores by menopause status were tested using one-way analysis of variance, with the Bonferroni test performed if analysis of variance was significant at an $\alpha$ of 0.05. For comparing two categorical variables, a test for equality of two proportions was used. Univariate and multivariable logistic regression were used to assess factors associated with any VMS, moderate-severe VMS, any joint pain, and moderate-severe joint pain, with the outcomes defined as "any VMS" versus "no VMS," "none or mild VMS" versus "moderate-severe VMS," "any joint pain" versus "no joint pain," and "none or mild joint pain" versus "moderate-severe joint pain," respectively. Women using systemic hormonal contraception (combined hormonal contraception or systemic progestogen) were excluded from analyses. The single Christian woman was also excluded from the logistic regression analyses. Each household's "wealth index" was determined using a principal component analysis and was expressed as wealth quintiles.[7,20] Parity was treated as dichotomous for regression analyses, "two or fewer children" and "more than two children," as "the Boy or Girl, two-children are enough" campaign has played a vital role in reducing population growth over the last couple of decades in Bangladesh.[21] We considered 13 variables as potential predictors for all outcomes; however, there were three pairs of variables where collinearity was an issue: age/menopause status, women's education/husband's education, and the place of residence/wealth quintile. The collinearity between age and menopause status was strong and the inclusion of both variables created instability in the model, so only menopause status was included. For the other two pairs of variables, the inclusion of both variables did not affect the performance of the model. So to report the more parsimonious option, only one of each pair of the variables was included. A variable with a $P \leq 0.05$ was considered significant. The Hosmer and Lemeshow (H-L) $P$ value was used to assess the models' goodness-of-fit. The first-degree interaction effect between independent variables was also investigated. All analyses were performed using statistical software packages Stata (version 12.0; StataCorp LP, College Station, TX) and Statistical Package for the Social Sciences (version 20.0; SPSS Inc, Chicago, IL).

## RESULTS

### Characteristics of the study population

A total of 1,590 women were recruited to the study between September 2013 and March 2014 from 1,700 households. Women declined to participate because of the inclusion of questions pertaining to sexual health (n = 21), men being present who did not permit the interview to proceed or interruption of food preparation (n = 89). The mean (SD) age of the participants was 42.3 (±8.0) years, 73.8% (95% CI 71.7%-76.0%) lived in rural areas, 88.9% (95% CI 87.3%-90.4%) were married, 92.2% (95% CI 91.0%-93.6%) reported their religion as Islam, and 5.8% (95% CI 4.6%-6.9%) were employed outside the home (Table 1). No formal education was reported by 40.2% (95% CI 37.8%-42.7%) of the women,

**TABLE 1.** *Sociodemographic data*

| Characteristics | N (%, 95% CI) |
|---|---|
| Place of residence | |
| Rural | 1,174 (73.8, 71.7-76.0) |
| Urban | 416 (26.2, 24.0-28.3) |
| Age, y | |
| 30-39 | 653 (41.1, 38.6-43.5) |
| 40-49 | 591 (37.2, 34.8-39.5) |
| 50-59 | 346 (21.7, 19.7-23.8) |
| Menopause status | |
| Premenopause | 944 (59.3, 56.9-61.8) |
| Perimenopause | 133 (8.4, 7.0-9.7) |
| Postmenopause | 513 (32.3, 30.0-34.6) |
| Marital status | |
| Married | 1,413 (88.9, 87.3-90.4) |
| Widow, divorced, and separated | 177 (11.1, 9.6-12.8) |
| Years of education | |
| Higher secondary and above | 190 (12.0, 10.4-13.5) |
| Secondary | 411 (25.9, 23.7-28.0) |
| Primary | 349 (21.9, 19.9-24.0) |
| Illiterate | 640 (40.2, 37.8-42.7) |
| Occupation | |
| Household duties | 1,498 (94.2, 93.1-95.4) |
| Other (employed outside household) | 92 (5.8, 4.6-6.9) |
| Religion | |
| Islam | 1,467 (92.3, 91.0-93.6) |
| Hindu | 122 (7.6, 6.4-9.0) |
| Christian | 1 (0.1, −0.1 to 0.2) |
| Husband's years of education | |
| Higher secondary and above | 379 (23.8, 21.7-25.9) |
| Secondary | 460 (29.0, 26.7-31.2) |
| Primary | 288 (18.1, 16.2-20.0) |
| Illiterate | 463 (29.1, 26.9-31.4) |
| Husband's occupation | |
| Service[a] | 496 (31.3, 28.9-33.5) |
| Business | 431 (27.2, 24.9-29.3) |
| Agriculture | 389 (24.5, 22.4-26.6) |
| Day laborer | 126 (8.0, 6.6-9.3) |
| Other | 144 (9.1, 7.6-10.5) |
| BMI, kg/m$^2$[b] | |
| Underweight (<17.5) | 86 (5.4, 4.3-6.5) |
| Normal weight (17.5-23) | 626 (39.4, 37.0-41.8) |
| Overweight (23.00-28) | 609 (38.4, 36.0-40.7) |
| Obese (≥28.00) | 267 (16.8, 15.0-18.6) |
| Parity[c] | |
| No child | 5 (0.3, 0.1-0.7) |
| One child | 114 (7.3, 5.9-8.5) |
| Two children | 448 (28.5, 26.1-30.6) |
| Three children | 461 (29.3, 26.4-30.9) |
| Four or more children | 542 (34.5, 33.0-37.8) |
| Systemic hormonal contraception use[d] | |
| Yes | 358 (22.7, 20.6-24.7) |
| No | 1,220 (77.3, 75.2-79.4) |
| Hysterectomy[e] | |
| Yes | 89 (7.3, 5.9-8.8) |
| No | 1,127 (92.7, 91.2-94.1) |

BMI, body mass index.
[a]Service includes both government and nongovernment job.
[b]n = 1,588 for BMI.
[c]n = 1,571 for parity.
[d]n = 1,578 for systemic hormonal contraception use.
[e]n = 1,216 for hysterectomy, and no women reported oophorectomy.



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and 29.1% (95% CI 26.9%-31.4%) said their husband had no education. Obesity (body mass index [BMI] $\geq$28 kg/m$^2$) was recorded for 16.8% (95% CI 15.0%-18.6%) of the participants and 5.4% (95% CI 4.3%-6.5%) were underweight (BMI $<$17.5 kg/m$^2$). Approximately two-thirds had more than two children and 0.3% (95% CI 0.1%-0.7%) were nulliparous. Hysterectomy was reported by 89 (7.3%, 95% CI 5.9%-8.5%) women, and no women reported having had a bilateral oophorectomy. Systemic hormonal contraception use was reported by 358 (22.7%, 95% CI 20.6%-24.7%) women. No women reported using HT (estrogen therapy, estrogen-progestogen therapy, tibolone or "bioidentical" estrogen), or nonhormonal prescription medication specifically for VMS (gabapentin, sertraline, clonidine, and venlafaxine).

Based on the information obtained at interview, 59.3% (95% CI 56.9%-0.61.8%) women were classified as premenopausal, 8.4% (95% CI 7.0%-9.7%) as perimenopausal, and 32.3% (95% CI 30.0%-34.6%) as postmenopausal. By the age of 47, half of the women were postmenopausal, whereas all, except four women, had reached the menopausal transition by the age of 50 years. The distribution of menopause status by age is shown in Figure 1A.

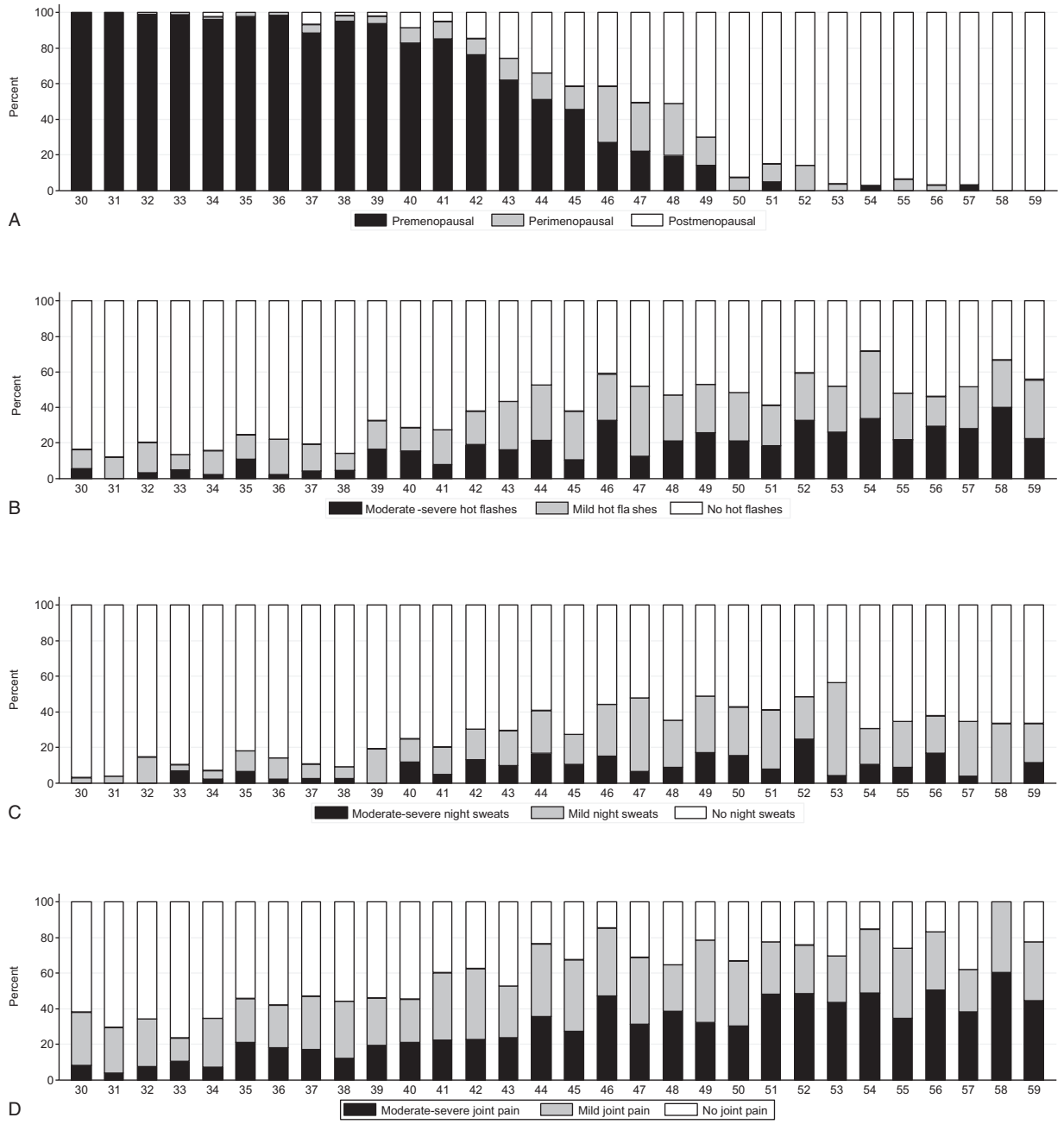


**FIG. 1.** Bar charts representing the percentages of women in each category by age: (**A**) menopause status (n = 1,590); (**B**) severity of hot flashes (n = 1,220); (**C**) severity of night sweats (n = 1,220); and (**D**) severity of joint pain (n = 1,220), by age in years.


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**Menopausal symptoms assessed by the MENQOL and missing data**

There were no missing data for the VMS domain of the MENQOL. Complete data were not available for two women (physical domain) and one woman (psychological domain), and these women were excluded from the analyses of these domains. Complete responses for the sexual domain were not provided by 14% of the participants. Most of these women were unmarried, separated, divorced, or widowed, so they were reluctant to answer these questions for cultural and religious reasons. These women were excluded from the analysis of this domain.

The prevalence of any VMS in perimenopausal (79.1%, 95% CI 71.3%-86.8%) was not significantly different from that in postmenopausal women (68.5%, 95% CI 63.8%-73.1%; $P = 0.482$) and both were greater than that for premenopausal women (22.5, 95% CI 19.4%-25.5%; $P < 0.001$ for both). The mean VMS domain score was highest for the perimenopausal women ($3.4 \pm 1.8$; $P < 0.001$) compared with postmenopausal ($2.7 \pm 1.6$; $P < 0.001$) and premenopausal women ($1.4 \pm 0.9$; $P < 0.001$). The prevalence of moderate-severe hot flashes was significantly higher in perimenopausal (33.3%, 95% CI 24.3%-42.4%; $P < 0.001$) and postmenopausal women (28.2%, 95% CI 23.7%-32.7%; $P < 0.001$) compared with premenopausal women (4.1%, 95% CI 2.7%-5.6%), with no significant difference between perimenopausal and postmenopausal women (data not shown). Moderate-severe hot flashes persisted in postmenopausal women into their late 50s. The patterns of hot flashes and night sweats by age are shown in Figure 1B, C, respectively.

Physical symptoms were highly prevalent. The mean (±SD) physical domain scores for postmenopausal and perimenopausal women were not different ($2.9 \pm 0.8$ for both), but both were significantly higher than that for premenopausal women ($2.9 \pm 0.8$ vs $2.1 \pm 0.8$; $P < 0.001$).

The prevalence of any joint pain was significantly higher in perimenopausal (76.2%, 95% CI 68.0%-84.3%; $P < 0.001$) and postmenopausal women (75.1%, 95% CI 70.8%-79.4%; $P < 0.001$) compared with premenopausal women (42.5%, 95% CI 38.9%-46.1%). The prevalence of moderate-severe joint pain was significantly higher in postmenopausal (40.3%, 95% CI 35.4%-45.1%; $P < 0.001$) and perimenopausal women (36.2%, 95% CI 27.0%-45.4%; $P < 0.001$) compared with premenopausal women (15.3%, 95% CI 12.7%-17.9%), with no difference between perimenopausal and postmenopausal women (data not shown). The pattern of reporting of joint pain by age is shown in Figure 1D.

Psychological symptoms were significantly more prevalent in both perimenopausal (98.1%, 95% CI 95.5%-100%; $P < 0.001$) and postmenopausal women (97.9%, 95% CI 96.5%-99.4%; $P < 0.001$) compared with premenopausal women (79%, 95% CI 76.0%-82.0%). The mean (±SD) psychological domain score for postmenopausal women was significantly higher than that for premenopausal women ($2.8 \pm 1.0$ vs $1.9 \pm 0.8$; $P < 0.001$), but was not significantly different from that of perimenopausal women ($2.8 \pm 1.0$ vs $2.7 \pm 0.9$; $P = 0.485$).

A total of 1,056 women provided responses for the sexual domain questions. The prevalence of any sexual symptoms was 52.3% (95% CI 48.6%-56.0%) in premenopausal women, which was significantly lower than the prevalence in both perimenopausal (94.5%, 95% CI 89.8%-99.2%; $P < 0.001$) and postmenopausal women (95.2%, 95% CI 92.7%-97.8%; $P < 0.001$). The mean (±SD) sexual domain score for postmenopausal and perimenopausal women did not differ, and both were significantly higher than that for premenopausal women ($2.4 \pm 1.0$ for both vs $1.6 \pm 0.9$; $P < 0.001$).

The mean (±SD) MENQOL total score for perimenopausal women was significantly higher than that for premenopausal women ($2.8 \pm 0.9$ vs $1.8 \pm 0.6$; $P < 0.001$), but was not

**TABLE 2.** *MENQOL scores by menopause status*

| MENQOL domain | Menopause status | n | MENQOL domain score mean (SD) | One-way ANOVA for MENQOL mean score | Statistical difference in domain scores between menopause status groups | | With any symptoms (%, 95% CI) | Statistical difference in any symptoms between menopause status groups | |
|---|---|---|---|---|---|---|---|---|---|
| Vasomotor | Premenopausal | 725 | 1.4 (0.9) | $P < 0.001$ | Reference | | 22.5, 19.4-25.5 | Reference | |
| | Perimenopausal | 105 | 3.4 (1.8) | | <0.001 | Reference | 79.1, 71.3-86.8 | <0.001 | Reference |
| | Postmenopausal | 390 | 2.7 (1.6) | | <0.001 | <0.001 | 68.5, 64.1-73.3 | <0.001 | 0.482 |
| Physical | Premenopausal | 723 | 2.1 (0.8) | $P < 0.001$ | Reference | | 95.6, 94.1-97.1 | Reference | |
| | Perimenopausal | 105 | 2.9 (0.8) | | <0.001 | Reference | 100.0, 96.5-100[a] | 0.486 | Reference |
| | Postmenopausal | 390 | 2.9 (0.8) | | <0.001 | 1.000 | 99.5, 98.8-100 | <0.001 | 0.267 |
| Psychological | Premenopausal | 724 | 1.9 (0.8) | $P < 0.001$ | Reference | | 79.0, 76.0-82.0 | Reference | |
| | Perimenopausal | 105 | 2.7 (0.9) | | <0.001 | Reference | 98.1, 95.5-100 | <0.001 | Reference |
| | Postmenopausal | 390 | 2.8 (1.0) | | <0.001 | 0.485 | 97.9, 96.5-99.4 | <0.001 | 0.052 |
| Sexual | Premenopausal | 694 | 1.6 (0.9) | $P < 0.001$ | Reference | | 52.3, 48.6-56.0 | Reference | |
| | Perimenopausal | 91 | 2.4 (1.0) | | <0.001 | Reference | 94.5, 89.8-99.2 | <0.001 | Reference |
| | Postmenopausal | 273 | 2.4 (1.0) | | <0.001 | 1.000 | 95.2, 92.7-97.8 | <0.001 | 0.103 |
| MENQOL total score | Premenopausal | 692 | 1.8 (0.6) | $P < 0.001$ | Reference | | 96.4, 95.0-97.8 | Reference | |
| | Perimenopausal | 91 | 2.8 (0.9) | | <0.001 | Reference | 100.0, 96.0-100[a] | 0.466 | Reference |
| | Postmenopausal | 273 | 2.7 (0.8) | | <0.001 | 0.335 | 99.6, 98.9-100 | 0.497 | 0.226 |

ANOVA, analysis of variance; MENQOL, Menopause-Specific Quality of Life Questionnaire.
[a]Exact Binomial (Clopper-Pearson) method used for 95% CI. For other percentages, asymptotic (Wald) method used for 95% CI.



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significantly different from that of postmenopausal women ($2.8 \pm 0.9$ vs $2.7 \pm 0.8$; $P = 0.335$) (Table 2).

**Factors associated with VMS and joint pain**

In the multivariable logistic regression analyses, for the outcomes of any VMS, moderate-severe VMS, any joint pain, and moderate-severe joint pain, we retained 10 variables in the adjusted models including place of residence, menopause status, marital status, education, occupation, religion, husband's occupation, BMI, parity, and hysterectomy. Compared with premenopausal women, the likelihood of having any VMS was greater for perimenopausal (adjusted odds ratio [OR] 14.68, 95% CI 8.16-25.03; $P < 0.001$) and postmenopausal women (OR 8.67, 95% CI 6.07-12.38; $P < 0.001$) (Table 3). Compared with being Muslim, being Hindu was associated with a lower likelihood of reporting any VMS (OR 0.52, 95% CI 0.29-0.93; $P = 0.028$). The likelihood of moderate-severe VMS was greater for perimenopausal (OR 46.34, 95% CI 13.29-161.56; $P < 0.001$) and postmenopausal women (OR 19.15, 95% CI 5.63-65.11; $P < 0.001$) than premenopausal women. Obesity was significantly associated with moderate-severe VMS (OR 2.20, 95% CI 1.03-4.71; $P = 0.042$). The H-L $P$ values for any VMS and moderate-severe VMS were 0.113 and 0.366, respectively.

When compared with premenopausal women, perimenopausal women (OR 3.70, 95% CI 2.26-6.09; $P < 0.001$) and postmenopausal women (OR 3.23, 95% CI 2.31-4.51; $P < 0.001$) had a greater likelihood of any joint pain (Table 4). Women were more likely to report any joint pain if they had no education compared with women having education beyond secondary school (OR 1.54, 95% CI 1.02-2.32; $P = 0.041$). Women who had had a hysterectomy were more likely to report any joint pain compared with women who had not had a hysterectomy (OR 1.89, 95% CI 1.02-3.52; $P = 0.044$). The likelihood of moderate-severe joint pain was greater for perimenopausal (OR 2.64, 95% CI 1.63-4.29; $P < 0.001$) and postmenopausal women (OR 2.96, 95% CI 2.06-4.24; $P < 0.001$) than premenopausal women.

**TABLE 3.** *Univariate and multivariable logistic regression for predictors of any VMS and moderate-to-severe VMS*

| | | Any VMS | | Moderate-to-severe VMS | |
|---|---|---|---|---|---|
| Variables | n | Unadjusted OR (95% CI) | Adjusted OR (95% CI) | Unadjusted OR (95% CI) | Adjusted OR (95% CI) |
| Place of residence | | | | | |
| Urban | 330 | 1.0 | 1.0 | 1.0 | 1.0 |
| Rural | 890 | 1.26 (1.00-1.59)[b] | 1.10 (0.74-1.65) | 1.31 (0.74-2.33) | 1.44 (0.66-3.12) |
| Menopause status | | | | | |
| Premenopause | 725 | 1.0 | 1.0 | 1.0 | 1.0 |
| Perimenopause | 105 | 13.01 (7.88-21.47)[a] | 14.68 (8.16-25.03)[a] | 33.61 (13.30-84.94)[a] | 46.34 (13.29-161.56)[a] |
| Postmenopause | 390 | 7.48 (5.68-9.86)[a] | 8.67 (6.07-12.38)[a] | 14.85 (6.26-35.22)[a] | 19.15 (5.63-65.11)[a] |
| Marital status | | | | | |
| Married | 1,090 | 1.0 | 1.0 | 1.0 | 1.0 |
| Widow, divorced, and separated | 130 | 2.17 (1.58-2.98)[a] | 0.81 (0.52-1.27) | 1.94 (1.03-3.65)[b] | 1.02 (0.50-2.08) |
| Education | | | | | |
| Secondary and above | 465 | 1.0 | 1.0 | 1.0 | 1.0 |
| Primary | 263 | 1.27 (1.18-2.02)[b] | 1.28 (0.80-2.02) | 1.34 (0.68-2.68) | 1.25 (0.53-2.93) |
| No education | 492 | 1.96 (1.56-2.46)[a] | 1.31 (0.84-2.05) | 1.81 (1.03-3.16)[b] | 1.16 (0.50-2.69) |
| Occupation | | | | | |
| Household duties | 1,142 | 1.0 | 1.0 | 1.0 | 1.0 |
| Other | 78 | 0.99 (0.52-1.24) | 1.04 (0.54-2.02) | 1.36 (0.57-3.24) | 1.44 (0.44-4.76) |
| Religion | | | | | |
| Islam | 1,120 | 1.0 | 1.0 | 1.0 | 1.0 |
| Hindu | 100 | 0.69 (0.44-1.06) | 0.52 (0.29-0.93)[b] | 0.83 (0.32-2.10) | 1.05 (0.38-2.88) |
| Husband's occupation | | | | | |
| Service | 375 | 1.0 | 1.0 | 1.0 | 1.0 |
| Business | 330 | 0.88 (0.68-1.16) | 0.84 (0.56-1.28) | 0.71 (0.36-1.41) | 0.74 (0.34-1.65) |
| Agriculture and other | 513 | 1.25 (0.99-1.59)[c] | 0.75 (0.50-1.14) | 1.21 (0.70-2.09) | 1.08 (0.52-2.29) |
| ±BMI, kg/m$^2$ | | | | | |
| Normal weight | 473 | 1.0 | 1.0 | 1.0 | 1.0 |
| Underweight | 72 | 1.04 (0.66-1.63) | 0.83 (0.45-1.56) | 0.23 (0.03-1.74) | 0.19 (0.02-1.46) |
| Overweight | 467 | 0.81 (0.65-1.02)[c] | 0.96 (0.68-1.38) | 1.09 (0.64-1.88) | 1.40 (0.75-2.60) |
| Obese | 207 | 0.84 (0.63-1.12) | 1.22 (0.77-1.94) | 1.29 (0.67-2.48) | 2.20 (1.03-4.71)[b] |
| Parity | | | | | |
| Two children or less | 437 | 1.0 | 1.0 | 1.0 | 1.0 |
| Three children or more | 767 | 2.22 (1.79-2.76)[a] | 1.09 (0.78-1.55) | 1.23 (0.44-1.31) | 0.78 (0.42-1.48) |
| Hysterectomy | | | | | |
| No | 889 | 1.0 | 1.0 | 1.0 | 1.0 |
| Yes | 66 | 1.80 (1.16-2.80)[b] | 1.11 (0.62-1.98) | 1.90 (0.87-4.18) | 1.45 (0.62-3.40) |

The Hosmer and Lemeshow $P$ value for any VMS and moderate-to-severe VMS are 0.113 and 0.366, respectively.
BMI, body mass index; OR, odds ratio; VMS, vasomotor symptoms.
[a] $P < 0.001$.
[b] $P < 0.05$.
[c] $P < 0.07$.


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**TABLE 4.** *Univariate and multivariable logistic regression for predictors of any joint pain and moderate-to-severe joint pain*

| | | Any joint pain | | Moderate-to-severe joint pain | |
|---|---|---|---|---|---|
| Variables | n | Unadjusted OR (95% CI) | Adjusted OR (95% CI) | Unadjusted OR (95% CI) | Adjusted OR (95% CI) |
| Place of residence | | | | | |
| Urban | 330 | 1.0 | 1.0 | 1.0 | 1.0 |
| Rural | 890 | 1.26 (1.01-1.59)[b] | 0.86 (0.60-1.25) | 1.30 (0.96-1.77) | 0.87 (0.58-1.32) |
| Menopause status | | | | | |
| Premenopause | 725 | 1.0 | 1.0 | 1.0 | 1.0 |
| Perimenopause | 105 | 4.33 (2.70-6.95)[a] | 3.70 (2.26-6.09)[a] | 3.14 (2.00-4.90)[a] | 2.64 (1.63-4.29)[a] |
| Postmenopause | 390 | 4.09 (3.11-5.37)[a] | 3.23 (2.31-4.51)[a] | 3.73 (2.80-4.96)[a] | 2.96 (2.06-4.24)[a] |
| Marital status | | | | | |
| Married | 1,090 | 1.0 | 1.0 | 1.0 | 1.0 |
| Widow, divorced, and separated | 130 | 2.13 (1.50-3.01)[a] | 1.06 (0.67-1.68) | 2.04 (1.39-2.98)[a] | 1.07 (0.70-1.65) |
| Education | | | | | |
| Secondary and above | 465 | 1.0 | 1.0 | 1.0 | 1.0 |
| Primary | 263 | 1.47 (1.08-1.99)[b] | 1.52 (0.99-2.33)[c] | 1.15 (0.78-1.69) | 1.40 (0.99-2.33) |
| No education | 492 | 2.05 (1.58-2.66)[a] | 1.54 (1.02-2.32)[b] | 2.51 (1.86-3.40)[a] | 2.38 (1.02-2.32)[a] |
| Occupation | | | | | |
| Household duties | 1,142 | 1.0 | 1.0 | 1.0 | 1.0 |
| Other | 78 | 0.71 (0.46-1.08) | 1.05 (0.59-1.88) | 1.03 (0.61-1.74) | 1.38 (0.72-2.63) |
| Religion | | | | | |
| Islam | 1,120 | 1.0 | 1.0 | 1.0 | 1.0 |
| Hindu | 100 | 0.65 (0.45-0.94)[b] | 0.69 (0.41-1.17) | 0.68 (0.40-1.14) | 0.64 (0.35-1.19) |
| Husband's occupation | | | | | |
| Service | 375 | 1.0 | 1.0 | 1.0 | 1.0 |
| Business | 330 | 0.86 (0.66-1.12) | 0.80 (0.55-1.16) | 0.87 (0.60-1.25) | 0.82 (0.54-1.26) |
| Agriculture and other | 513 | 1.38 (1.05-1.70)[b] | 1.02 (0.69-1.49) | 1.45 (1.07-1.97)[b] | 0.96 (0.64-1.45) |
| ±BMI, kg/m$^2$ | | | | | |
| Normal weight | 473 | 1.0 | 1.0 | 1.0 | 1.0 |
| Underweight | 72 | 1.00 (0.63-1.57) | 0.64 (0.36-1.14) | 1.03 (0.58-1.81) | 0.85 (0.45-1.60) |
| Overweight | 467 | 1.01 (0.80-1.27) | 1.27 (0.91-1.77) | 0.95 (0.71-1.27) | 1.14 (0.80-1.62) |
| Obese | 207 | 0.95 (0.71-1.27) | 1.23 (0.80-1.89) | 0.89 (0.61-1.30) | 1.36 (0.86-2.15) |
| Parity | | | | | |
| Two children or less | 437 | 1.0 | 1.0 | 1.0 | 1.0 |
| Three children or more | 767 | 1.98 (1.56-2.51)[a] | 1.35 (0.98-1.86)[c] | 1.57 (1.18-2.08)[b] | 0.93 (0.65-1.33) |
| Hysterectomy | | | | | |
| No | 889 | 1.0 | 1.0 | 1.0 | 1.0 |
| Yes | 66 | 2.40 (1.33-4.34)[b] | 1.89 (1.02-3.52)[b] | 1.13 (0.65-1.95) | 0.87 (0.49-1.54) |

The Hosmer and Lemeshow $P$ value for any joint pain and moderate-to-severe joint pain are 0.572 and 0.552, respectively.
BMI, body mass index; OR, odds ratio.
[a] $P < 0.001$.
[b] $P < 0.05$.
[c] $P < 0.07$.

Women were more likely to report moderate-severe joint pain if they had no education compared with women having education beyond secondary school (OR 2.38, 95% CI 1.02-2.32; $P < 0.001$). The H-L $P$ values for any joint pain and moderate-severe joint pain were 0.572 and 0.552, respectively.

## DISCUSSION

This is the first nationally representative, population-based study to report the prevalence and severity of menopausal symptoms among women at midlife in Bangladesh. The key findings are that approximately 80% of perimenopausal women and 70 % of postmenopausal women reported any VMS, and one-third of perimenopausal women and more than one-quarter of postmenopausal women reported their VMS to be moderate to severely bothersome. Joint pain was more prevalent in perimenopausal and postmenopausal women, with three-quarters of these women reporting any joint pain and about half moderate to severely bothersome joint pain. Despite the high prevalence and severity of symptoms, none of the participants reported the use of any prescription therapy for menopausal symptoms.

Approximately all the women in our study had reached menopause by the age of 50 years. This is consistent with the findings of other studies of women in Asia, and earlier than seen in developed countries.[22] This may reflect poorer health and nutrition, and lower socioeconomic status, as prior studies have observed that lower social class, identified either by a woman's educational attainment or by her own or her husband's occupation, is associated with an earlier age at natural menopause.[22-24]

Compared with our study, three studies conducted in India, Pakistan, and Sri Lanka using validated instruments reported a lower prevalence of VMS and joint pain.[25-27] Although Nisar and Sohoo[28] reported a higher prevalence of both VMS and joint pain in Pakistani women, they did not find any difference in prevalence according to menopause status. Overall, these studies, except that of Nisar and Sohoo,[28] are limited by small sample size.



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There were no Asian studies with which to compare our findings for the severity of VMS. The reporting of any VMS and moderate-severe VMS by women in this study is, however, strikingly similar to that recently reported by Australian women in a study that also used the MENQOL.[19] As in the recent Australian study and other studies,[29-32] we observed a significant association between moderate-severe VMS and obesity; however, we did not find an association between the reporting of VMS and level of education. Previous studies have reported a lower prevalence of VMS in well-educated women[19,33,34]; however, only 12% of the women in our study were educated beyond high school.

Muslim women were twice as likely to report any VMS compared with Hindu women. Sievert et al[35] reported hot flashes, measured by sternal skin conductance during the daytime, were more common among Muslim than Hindu women in Bangladesh, and attributed this to differences in clothing. As the VMS domain includes night sweats, it is, however, possible that factors beyond clothing contribute to this difference.

To our knowledge, this is the first study to report the severity of any joint pain and the associated factors. That joint pain was associated with being less educated may be explained by uneducated women being more likely to perform more physically demanding domestic duties. Although hysterectomy was associated with any joint pain, it was not associated with moderate-severe joint pain. We suspect some of our study participants who reported hysterectomy may also have had a bilateral oophorectomy, and were unware of it.

As in other studies,[3,27,28,36,37] the prevalence of physical symptoms was high and did not vary greatly according to menopause status. Psychological symptoms, although slightly less prevalent in premenopausal women, were still highly prevalent in all groups. These findings are in line with previous studies in Asia[26,28,37] and Australia.[19] Sexual symptoms were more prevalent in perimenopausal and postmenopausal groups compared with other studies in Asia and Australia.[3,19,25,27,28,36,37] Any sexual symptoms were reported by half of the premenopausal women and 95% of the perimenopausal and postmenopausal women. These proportions are much greater than recently reported for Australian premenopausal (44%), perimenopausal (59%), and postmenopausal women aged less than 55 years (69%) using the same questionnaire.[19] This difference may reflect the sex inequity that persists in Bangladesh, exemplified by over 53% of married Bangladeshi women reporting intimate partner physical and/or sexual violence in a large national survey that used structured face-to-face interviews.[38]

Strengths of the BMWHS include the robust sampling of a socioeconomically heterogeneous group of women recruited across the country and the use of a validated measure of menopausal symptoms and objective measures of height and weight. Careful questionnaire development, interviewer training, and quality control of interviews ensured the validity and completeness of the results. Recall and reporting bias may have occurred with respect to the estimation of age and women's knowledge of oophorectomy. Another potential limitation is that we did not ask women about natural remedies used for menopausal symptoms.

## CONCLUSIONS

This large population-based study of women aged 30 to 59 years indicates that menopausal symptoms, especially VMS and joint pain, are a considerable problem in Bangladesh, with many women having bothersome symptoms. Despite this, no women reported prescription therapy, suggesting that menopause remains neglected in Bangladesh.

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# Chapter 9: Pelvic Floor Disorders in Women in Bangladesh

## 9.1 Introduction

Pelvic floor disorders (PFDs) including urinary incontinence (UI), faecal incontinence (FI) and pelvic organ prolapse (POP) are neglected health conditions in women in Bangladesh which again are not adequately understood due to lack of research. This chapter is a manuscript which is currently under review in a peer-reviewed journal, *Obstetrics & Gynecology*, for publication. This paper investigated the prevalence of, and risk factors for, pelvic floor disorders in women at midlife in Bangladesh.

This paper reports that PFDs, particularly UI and POP, affect a concerningly high proportion of women at midlife in Bangladesh and become more common with age and parity. This paper recommended that increased attention is needed to the diagnosis, treatment, and ultimately prevention of PFDs to reduce the health burden of these conditions for Bangladeshi women.

## Declaration for Thesis Chapter 9

**9.2 Manuscript:** Rakibul M. Islam, Robin J. Bell, Baki Billah, Mohammad B. Hossain and Susan R. Davis. Prevalence of symptomatic pelvic floor disorders in women in Bangladesh. *Climacteric: International Menopause Society,* Oct 2016; http://dx.doi.org/10.1080/13697137.2016.1240771

**Declaration by candidate**

In the case of Chapter 9, the nature and extent of my contribution to the work was the following:

| Nature of contribution | Extent of contribution (%) |
|---|---|
| Study concept and design, data collection, data entry, analysis and interpretation of the data, manuscript development and preparation | 70% |

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

| Name | Nature of contribution |
|---|---|
| Robin J. Bell | Study concept and design, study funding, data analysis and interpretation, supervision, critical revision of submitted manuscript |
| Baki Billah | Guidance for data analysis and interpretation, and manuscript editing |
| Mohammad B. Hossain | Guidance for data collection, data analysis and interpretation, and manuscript editing |
| Susan R. Davis | Study concept and design, study funding, data analysis and interpretation, supervision, critical revision of submitted manuscript |

The undersigned hereby certify that the above declaration correctly reflects the nature and extend o the candidate's and co-author' contributions to this work

| | | |
|---|---|---|
| **Candidate's Signature** | [redacted] | **Date 10/05/2016** |
| **Main Supervisor's Signature** | [redacted] | **Date 10/05/2016** |

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ORIGINAL ARTICLE

# The prevalence of symptomatic pelvic floor disorders in women in Bangladesh

R. M. Islam[a,b], R. J. Bell[a], B. Billah[c], M. B. Hossain[b] and S. R. Davis[a]

[a]Women's Health Research Program, School of Public Health and Preventive Medicine, Monash University, Melbourne, Victoria, Australia; [b]Department of Population Sciences, University of Dhaka, Dhaka, Bangladesh; [c]Biostatistics Unit, School of Public Health and Preventive Medicine, Monash University, Melbourne, Victoria, Australia

**ABSTRACT**

**Objective:** To investigate the prevalence of, and risk factors for, pelvic floor disorders (PFDs) in women in Bangladesh.

**Methods:** A nationally representative sample of 1590 Bangladeshi women, aged 30–59 years, was recruited using a multistage cluster sampling technique, between September 2013 and March 2014. Urinary incontinence (UI), fecal incontinence (FI) and pelvic organ prolapse (POP) were assessed using validated questionnaires. The weighted prevalence and the factors associated with each PFD were investigated using multivariable weighted logistic regression.

**Results**: The weighted prevalence of UI was 23.7% (95% confidence interval (CI) 21.3–26.0%), FI 5.3% (95% CI 4.0–6.6%), POP 16.2% (95% CI 14.2–18.2%), and having at least one PFD 35.3% (95% CI 32.6–37.9%). Women were more likely to have at least one PFD if aged 40–49 years (adjusted odds ratio (AOR) 1.46, 95% CI 1.02–2.08; $p = 0.040$) or 50–59 years (AOR 2.39, 95% CI 1.59–3.58; $p < 0.0001$), compared with women aged 30–39 years. Having at least one PFD was positively associated with having three or more versus fewer children (AOR 1.61, 95% CI 1.14–2.27; $p = 0.007$), being in the middle (AOR 3.05, 95% CI 1.72–5.41; $p < 0.0001$), second lowest (AOR 2.49, 95% CI 1.39–4.47; $p = 0.002$) or lowest (AOR 3.13, 95% CI 1.68–5.86; $p < 0.0001$) wealth quintile compared with the highest, and self-reporting diabetes (AOR 2.55, 95% CI 1.54–4.23; $p < 0.0001$).

**Conclusions**: One-third of Bangladeshi women aged 30–59 years had at least one symptomatic PFD. Risk factors included greater age, higher parity, lower wealth status and self-reported diabetes. The diagnosis, treatment, and prevention of PFDs in Bangladesh need greater attention, as the prevalence of these disabling conditions is likely to increase with the aging of the population.

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Prevalence; pelvic floor disorders; urinary incontinence; fecal incontinence; pelvic organ prolapse; Bangladesh

## Introduction

Pelvic floor disorders (PFDs), namely urinary incontinence (UI), fecal incontinence (FI), and pelvic organ prolapse (POP), are major causes of morbidity in women. The limited available data suggest that age, parity, obesity and vaginal delivery are risk factors for PFDs in developing countries, as in developed countries[1–3]. However, in developing countries, women marry and reproduce at a young age, have high parity and commonly have lifestyles that require frequent heavy lifting, increasing the risk of PFD[1,4]. With increasing life expectancy in developing countries, such as Bangladesh, more women are likely to live with the socioeconomic, psychological and physical consequences of pelvic floor dysfunction for several decades[1]. The prevalence data for PFDs, diagnosed by validated questionnaires, in representative community-based samples in developing countries are inadequate. The Bangladesh Midlife Women's Health Study (BMWHS) is a comprehensive study of the health of women at midlife in Bangladesh[5]. This study has provided the opportunity to investigate, using validated questionnaires, the weighted prevalence estimates of symptomatic PFDs and their risk factors in a randomly recruited, nationally representative sample of women at midlife.

## Methods

### *Study design and participants*

Bangladesh has a total female population of 70 million and they live in seven divisions which are further divided into 64 districts[6]. The primary outcomes of the BMWHS were the knowledge, awareness and uptake of cervical cancer and breast cancer screening to investigate why the uptake of screening has been low[7,8], with the prevalence of, and risk factors for, UI, FI and POP stipulated as secondary outcomes in the study protocol. The BMWHS was a cross-sectional study of women aged 30–59 years. Therefore, using a multistage cluster sampling method, a district from each of the seven divisions was selected at random from the 32 districts where opportunistic cervical cancer screening had been offered[5]. Study participants were then randomly recruited,

CONTACT Professor S. R. Davis [redacted] Professor of Women's Health and NHMRC Principal Research Fellow, School of Public Health and Preventive Medicine, Monash University, 99 Commercial Road, Melbourne 3004, Victoria, Australia

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between September 2013 and March 2014, from the districts of Barisal, Tangail, Comilla, Sathkhira, Rajshahi, Rangpur, and Habigonj. Based on the Population and Housing Census 2011, the number of women recruited in each district was determined by the distribution of the 3.24 million women of the target age group in these districts, taking into account the ratio of urban to rural women in each district. The smallest defined unit (enumeration area; EA) within each of the seven districts included, on average, 120 households[6]. When the total sample size was distributed across the rural and urban areas, the smallest number of women required in any single EA was 36[5]. Within each district, the EAs were selected randomly, and within each EA, the first household was selected at random. Subsequent households were selected using systematic sampling, with only one woman included from each household. If an eligible woman was not found in a selected household, the neighboring household was approached. Sampling weight was adjusted for unequal probabilities of selection and ensured representativeness of the sample at all stages, as previously described[7].

### Sample size

The BMWHS was undertaken to explore several neglected women's health issues, including the PFDs described in this manuscript. The sample size was based on the previously reported prevalence of cervical cancer screening uptake (8.6%)[9], with a margin of error of ±2%, among women at midlife. This provided a minimum sample size of 755. This was multiplied by the design effect of 2 to adjust the sampling variance resulting from the multistage study design. The sample size was further increased by 5% to allow for non-sampling error. The final sample size was 1586 women. Given the prevalence of UI (23.7%), POP (16.2%), and FI (5.3%), we were appropriately powered for the study outcomes of UI, POP and FI at 4%, 3% and 2% levels of precision, respectively[10]. In relation to the logistic regression analyses, considerably more than the required 10 participants for every explanatory variable have been included[11].

### Study questionnaires

The study questionnaire had two components: one component that comprised questions about personal, sociodemographic, and household characteristics. Each household 'wealth index' was derived from variables including housing materials, household assets and amenities, sources of water and toilet facilities. Height and weight, in light clothing, were measured by the interviewers. Women were considered to have probable diabetes mellitus if they reported having been diagnosed with high 'blood sugar' or diabetes by a health-care provider within the past 3 years. The other component was comprised of validated PFDs questionnaires. The presence and type of UI were assessed by the Questionnaire for Urinary Incontinence Diagnosis (QUID)[12]. The first three questions of QUID pertain to stress incontinence, while the last three to urge incontinence, over the past month. Each question includes six frequency-based response options, ranging from 'none of the time = 0' to 'all of the time = 5' (score 1 = rarely, 2 = once in a while, 3 = often and 4 = most of the time), which are scored from 0 to 5 points. Scores are summed, resulting in separate stress and urge scores, each ranging from 0 to 15 points. A score of $\geq$4 out of 15 for questions 1–3 identified stress UI and a score of $\geq$6 out of 15 for questions 4–6 identified urge UI[13]. Women with both stress and urge UI were classified as having mixed UI.

POP and FI were assessed by the Pelvic Organ Prolapse Distress Inventory-6 (POPDI-6), and the Colorectal-Anal Distress Inventory-8 (CRADI-8), respectively. These are two of the three subscales of the Pelvic Floor Distress Inventory-20 (PFDI-20), a condition-specific validated questionnaire[14]. This questionnaire provides a symptom inventory and a measure of the degree of bother and distress over a 3-month recall.

Symptomatic POP was defined as a positive response to one of the POPDI-6 symptom questions 'Do you experience bulging or something falling out you can see or feel in the vaginal area?'. This was in accordance with prior reports of the prevalence of symptomatic POP[15]. An affirmative response to this question correlates well with the presence of a vaginal bulge on examination[16].

The CRADI-8 scale assesses the presence of well-formed, loose, or flatus incontinence. We defined FI as uncontrolled loss/leakage of well-formed or loose stool, expressed as a dichotomous variable (yes/no). Flatus incontinence was not included when categorizing women as having 'any FI'.

### Procedures

The study questionnaire was developed in English and then translated into Bengali. It was then back-translated into English by a bilingual translator with women's health expertise to verify validity. The questionnaire was piloted in 16 women, and underwent minor refinement prior to implementation. As literacy is low in Bangladesh, all data were collected by structured interview. Four female interviewers underwent a 2-week intensive training program, including mock interviews and field practice to ensure interview consistency and reliability. Each participant was given a verbal explanation of the study objectives and the anticipated interview time required, and of confidentiality. Since about 40% of women are illiterate, verbal consent was obtained for all participants by the interviewers. All questionnaires were checked daily. Households were revisited the following day if response clarification was required, or to collect missing data. Since there was no formal birth registration in Bangladesh until 2007, accurate estimation of the age of women was a challenge, particularly for illiterate and/or older women. We used a combined method of age estimation based on the average age of onset of menarche in Bangladesh as well as life events which has been described in detail elsewhere[5].

The BMWHS was approved by the Monash University Human Research Ethics Committee, Melbourne, Australia (CF13/1280-2013000646), and the Bangladesh Medical Research Council, Dhaka, Bangladesh (BMRC/ERC/2013-2014/1336).

### Statistical analysis

The weighted prevalence estimates and 95% confidence intervals (95% CIs) for each PFD, incorporating the design effect, appropriate sample weights, and sample design, are presented. Estimates with relative standard errors of more than 25% were not considered statistically reliable[17]. Simple and multivariable weighted logistic regression analyses were used to calculate the adjusted odds ratios (AORs) and 95% CIs controlling for the potential and known risk factors for each PFD. 'The wealth index' of each household was constructed using principal component analysis and is expressed as wealth quintiles[18]. Since 'the Boy or Girl, two-children are enough' campaign has played a vital role in reducing population growth over the last 25 years in Bangladesh, parity was treated as dichotomous for regression analyses, 'two or fewer children' versus 'more than two children'[19]. We considered 12 variables as potential predictors for all outcomes; however, place of residence and menopausal status were excluded from the multivariable logistic regression models due to collinearity with wealth quintile and age, respectively. Marital status, occupation, religion, and body mass index (BMI) were not included in the model, as they were either not statistically significant in simple logistic regression analyses, or did not affect the performance of the model. Hysterectomized women were excluded from the regression analyses as this was a small sub-group of women and the reasons for hysterectomy were not known. Data regarding mode of delivery was not collected. However, from the Bangladesh Demographic Health Survey, for women of this age in Bangladesh, over 93% would have had home births, with about 10% delivered by skilled birth attendants, and less than 2% delivered by Cesarean section[20]. Thus the number of births was considered as indicative of the number of vaginal deliveries. All statistical tests were two-sided, and a $p$ value $<0.05$ was considered statistically significant. The Hosmer and Lemeshow (H-L) $p$ values were used to assess the models' goodness-of-fit. The first-degree interaction effect between independent variables was also investigated. All analyses were performed using statistical software packages Stata (version 12.0; StataCorp LP, College Station, Texas, USA), and the Statistical Package for the Social Sciences (SPSS) (version 20.0; SPSS Inc. Chicago, Illinois, USA).

## Results

### Characteristics of the study population

A total of 1700 households were approached and 1590 women were interviewed between September 2013 and March 2014. Eighty-nine (5.2%) women were unable to participate either because a male household member refused permission, or because of pressure of household duties. Twenty-one (1.2%) women declined to be interviewed because the survey included sexual health questions. The characteristics of the study participants and the weighted prevalence of each of the PFDs are presented in Table 1. The mean (standard deviation) age of the participants was 42.3 (±8.1) years; 1174 (73.8%) women lived in rural areas, 1498 (94.2%) were not in paid employment, and 1413 (88.9%) were married (Table 1). Six hundred and forty (40.2%) women had no formal education, and 1467 (92.3%) reported their religion as Islam. The prevalences of being underweight (body mass index (BMI) $<17.5\,kg/m^2$), and being obese (BMI $\geq 28\,kg/m^2$) were 5.4% and 16.8%, respectively. One thousand and eight (64.3%) women had three or more children, and 138 (8.7%) women reported having been diagnosed with diabetes. Hysterectomy was reported by 89 (7.3%) women.

Overall, 558 (35.3%; 95% CI 32.6–37.9%) women were classified as having at least one symptomatic PFD. Of these, 376 (23.7%; 95% CI 21.3–26.0%) had UI, including 86 (5.4%; 95% CI 4.2–6.6%), 178 (11.2%; 95% CI 9.5–12.9%) and 111 (7.0%; 95% CI 5.6–8.4%) with stress UI only, urge UI only and mixed UI, respectively, 83 (5.3%; 95% CI 4.0–6.6%) had FI, and 258 (16.2%; 95% CI 14.2–18.2%) had symptomatic POP.

### Risk factors for symptomatic pelvic floor disorder

#### At least one pelvic floor disorder

Women aged 40–49 years (AOR 1.46, 95% CI 1.02–2.08; $p=0.040$) and 50–59 years (AOR 2.39, 95% CI 1.59–3.58; $p<0.0001$) were more likely to have at least one PFD compared with women aged 30–39 years (Table 2). Having three or more children was associated with having at least one PFD compared with having fewer children (AOR 1.61, 95% CI 1.14–2.27; $p=0.007$). Compared with women in the highest wealth quintile, the proportion of women with at least one PFD was greater for those in the middle (AOR 3.05, 95% CI 1.72–5.41; $p<0.0001$), second lowest (AOR 2.49, 95% CI 1.39–4.47; $p=0.002$), and lowest (AOR 3.13, 95% CI 1.68–5.86; $p<0.0001$) wealth quintiles. Reporting of a diagnosis of diabetes was associated with having at least one PFD (AOR 2.55, 95% CI 1.54–4.23; $p<0.0001$).

#### Urinary incontinence

UI was more prevalent amongst women aged 40–49 years (AOR 1.85, 95% CI 1.19–2.88; $p=0.006$) and 50–59 years (AOR 3.40, 95% CI 2.10–5.51; $p<0.0001$) compared with women aged 30–39 years. Women with three or more children were more likely to have UI (AOR 1.99, 95% CI 1.31–3.04; $p=0.001$) compared with women who had fewer children. Compared with women in the highest wealth quintile, the proportion of women with UI was greater for those in the middle (AOR 2.11, 95% CI 1.10–4.09; $p=0.025$), second lowest (AOR 2.24, 95% CI 1.15–4.39; $p=0.018$), and lowest (AOR 2.27, 95% CI 1.24–5.29; $p=0.011$) wealth quintiles. Reporting a diagnosis of diabetes was significantly associated with having UI (AOR 1.87, 95% CI 1.31–3.04; $p=0.0261$). Women with POP were more likely to have UI (AOR 2.46, 95% CI 1.67–3.61; $p<0.0001$), but not more likely to have FI.

#### Pelvic organ prolapse

The prevalence of POP was greater amongst women in the middle (AOR 2.46, 95% CI 1.35–4.49; $p=0.003$), second

Table 1. Weighted prevalence rates of urinary incontinence, fecal incontinence, pelvic organ prolapse and one or more pelvic floor disorders by demographic profile of all participants. Data are given as % (95% confidence interval) or mean ± standard deviation.

| *Characteristics* | *Number of women (%)* | *Urinary incontinence (n = 376)* | *Fecal incontinence (n = 83)* | *Pelvic organ prolapse (n = 258)* | *One or more pelvic floor disorders (n = 558)* |
|---|---|---|---|---|---|
| Overall | 1590 | 23.7 (21.3–26.0) | 5.3 (4.0–6.6) | 16.2 (14.2–18.2) | 35.3 (32.6–37.9) |
| *Place of residence* | | | | | |
| Urban | 416 (26.2) | 15.3 (11.9–18.6) | 4.0 (2.1–5.6) | 10.5 (7.7–13.4) | 24.3 (20.4–28.4) |
| Rural | 1174 (73.8) | 26.9 (24.4–29.5) | 5.8 (4.4–7.1) | 18.5 (16.2–20.7) | 39.5 (36.7–42.4) |
| *Age* (years) | 42.3 ± 8.1 | 45.5 ± 8.3 | 44.4 ± 8.8 | 42.8 ± 8.4 | 44.4 ± 8.5 |
| 30–39 | 653 (41.1) | 14.5 (11.9–17.3) | 4.6 (3.0–6.2) | 15.6 (12.9–18.4) | 27.1 (23.6–30.4) |
| 40–49 | 591 (37.2) | 23.4 (20.0–27.0) | 4.3 (2.5–5.8) | 15.4 (12.4–18.3) | 34.6 (30.7–38.4) |
| 50–59 | 346 (21.7) | 40.9 (35.8–46.0) | 8.1 (5.3–11.0) | 18.8 (14.7–22.8) | 51.5 (46.4–56.7) |
| *Menopause status* | | | | | |
| Premenopause | 944 (59.3) | 16.1 (13.8–18.5) | 3.6 (2.4–4.8) | 15.3 (13.1–17.7) | 27.5 (24.7–30.4) |
| Perimenopause | 133 (8.4) | 27.3 (19.5–34.8) | 7.9 (3.2–12.5)[b] | 22.7 (15.4–29.7) | 40.9 (32.3–49.1) |
| Postmenopause | 513 (32.3) | 36.7 (32.5–40.9) | 7.7 (5.4–10.0) | 16.3 (13.0–19.4) | 48.3 (44.0–52.7) |
| *Marital status* | | | | | |
| Married | 1413 (88.9) | 22.1 (19.9–24.2) | 4.8 (3.7–6.0) | 15.7 (13.8–17.6) | 33.4 (30.9–35.9) |
| Widow, divorced or separated | 177 (11.1) | 36.2 (29.5–43.5) | 8.5 (4.3–12.4) | 20.3 (14.6–26.3) | 49.7 (42.4–57.0) |
| *Years of education* | | | | | |
| Secondary and above | 601 (37.8) | 15.4 (12.5–18.2) | 3.0 (1.6–4.3) | 12.8 (10.1–15.4) | 25.8 (22.3–29.3) |
| Primary | 349 (22.0) | 30.1 (25.3–35.0) | 7.8 (5.0–10.8) | 17.8 (13.8–21.9) | 42.3 (37.0–47.5) |
| Illiterate | 640 (40.2) | 28.1 (24.6–31.6) | 6.1 (4.2–7.9) | 18.6 (15.7–21.7) | 40.5 (36.6–44.3) |
| *Occupation* | | | | | |
| Household duties | 1498 (94.2) | 23.3 (21.2–25.5) | 5.0 (3.9–6.1) | 16.4 (14.6–18.3) | 35.3 (32.9–37.7) |
| Work outside the home | 92 (5.8) | 28.9 (19.8–38.3) | 9.3 (3.2–14.6)[b] | 13.5 (6.9–21.0)[b] | 34.6 (25.1–44.5) |
| *Religion* | | | | | |
| Islam | 1467 (92.3) | 23.3 (21.1–25.5) | 5.4 (4.3–6.6) | 16.4 (14.6–18.4) | 35.2 (32.8–37.7) |
| Hindu | 122 (7.7) | 28.3 (20.7–36.5) | 3.6 (1.0–7.4)[b] | 13.8 (8.0–20.2) | 36.0 (27.3–44.1) |
| *Wealth quintile* | | | | | |
| Highest | 318 (20.0) | 16.1 (12.1–20.1) | 2.3 (0.8–4.2)[b] | 11.4 (8.4–15.5) | 24.4 (19.8–29.3) |
| Fourth | 318 (20.0) | 19.3 (15.1–23.9) | 3.7 (1.5–5.5)[b] | 15.0 (11.2–19.0) | 28.8 (23.7–33.6) |
| Middle | 323 (20.3) | 24.6 (19.8–29.1) | 4.0 (1.9–6.2)[b] | 19.1 (14.9–23.5) | 40.3 (35.0–45.6) |
| Second | 313 (19.7) | 27.9 (22.9–32.8) | 8.0 (5.0–11.0) | 19.3 (15.1–23.9) | 40.6 (35.1–46.0) |
| Lowest | 318 (20.0) | 30.8 (25.7–35.9) | 8.4 (5.3–11.6) | 19.1 (14.9–23.6) | 42.2 (36.5–47.6) |
| *Body mass index category* (kg/m$^2$)[c] | | | | | |
| Underweight (< 17.5) | 86 (5.4) | 24.1 (14.9–33.3) | 3.9 (0.5–7.7)[b] | 22.7 (13.0–30.9) | 38.1 (27.7–48.5) |
| Normal weight (17.5–23) | 626 (39.4) | 23.8 (20.5–27.2) | 6.3 (4.4–8.2) | 18.7 (15.7–21.8) | 37.2 (33.3–40.9) |
| Overweight (23.00–28) | 609 (38.4) | 23.5 (20.2–26.9) | 4.7 (3.0–6.3) | 15.5 (12.7–18.4) | 34.9 (31.1–38.7) |
| Obese (≥ 28.00) | 267 (16.8) | 22.9 (18.0–28.1) | 4.7 (2.3–7.4)[b] | 10.0 (6.4–13.6) | 30.5 (25.1–36.1) |
| *Parity*[d] | | | | | |
| Two children or less | 559 (35.7) | 13.3 (10.8–16.5) | 3.6 (2.0–5.1) | 12.1 (9.3–14.6) | 24.6 (21.1–28.2) |
| Three children or more | 1008 (64.3) | 29.3 (26.5–32.1) | 6.0 (4.5–7.5) | 18.8 (16.4–21.3) | 41.4 (38.4–46.6) |
| *Diabetes mellitus* | | | | | |
| Yes | 138 (8.7) | 35.0 (27.5–43.5) | 8.1 (3.5–12.5)[b] | 15.7 (9.8–22.0) | 49.6 (41.3–58.0) |
| No | 1452 (91.3) | 22.6 (20.4–24.7) | 5.0 (3.9–6.1) | 16.3 (14.4–18.2) | 33.9 (31.5–36.4) |
| *Hysterectomy*[e] | | | | | |
| Yes | 89 (7.3) | 35.2 (25.4–45.0) | 8.7 (3.0–14.6)[b] | 4.3 (0.2–8.7) | 44.4 (34.2–54.7) |
| No | 1127 (92.7) | 24.4 (21.8–26.9) | 5.2 (3.9–6.5) | 17.1 (15.0–19.4) | 36.1 (33.3–38.9) |

[a], $n = 1583$ for fecal incontinence and pelvic floor disorder; [b], relative standard errors of more than 25% were considered unreliable estimates; [c], $n = 1588$ for body mass index; [d], $n = 1567$ for parity; [e], $n = 1216$ for hysterectomy

lowest (AOR 2.22, 95% CI 1.19–4.14; $p = 0.012$), and lowest (AOR 2.17, 95% CI 1.13–4.16; $p = 0.019$) wealth quintiles compared with those in the highest wealth quintile. Having three or more children was associated with a greater likelihood of POP (AOR 1.48, 95% CI 1.02–2.16; $p = 0.040$).

### *Fecal incontinence*

Women in the lowest wealth quintile were more likely to experience FI (AOR 5.74, 95% CI 1.14–28.82; $p = 0.028$) compared with women in the highest wealth quintile. FI was also associated with self-reported of diabetes (AOR 4.18, 95% CI 1.77–9.86; $p < 0.0001$). Age and parity were not significantly associated with FI.

## Discussion

This national, population-based study of PFDs in women at midlife in Bangladesh demonstrates that PFDs are highly prevalent amongst women aged 30–59 years. More than one-third of all the participants and more than half of the women aged 50–59 years had at least one PFD. In addition to age, the main factors associated with having any PFD were higher parity, lower wealth status and having reported diabetes as diagnosed by a health professional.

PFDs appear to affect Bangladeshi women at a relatively young age. The prevalence of at least one PFD was higher across all age groups than reported for women in the US by the National Health and Nutritional Examination Survey

Table 2. Weighted logistic regression for predictors of urinary incontinence, fecal incontinence, pelvic organ prolapse and one or more pelvic floor disorders. Data are given as odds ratio (95% confidence interval).

| | *Urinary incontinence* | | *Fecal incontinence* | | *Pelvic organ prolapse* | | *One or more pelvic floor disorders* | |
|---|---|---|---|---|---|---|---|---|
| *Characteristics* | *Unadjusted* | *Adjusted* | *Unadjusted* | *Adjusted* | *Unadjusted* | *Adjusted* | *Unadjusted* | *Adjusted* |
| *Place of residence* | | | | | | | | |
| Urban | 1.0 | – | 1.0 | – | 1.0 | – | 1.0 | – |
| Rural | 2.21 (1.47–3.32)[a] | – | 1.56 (0.72–3.41) | – | 1.53 (1.00–2.37)[b] | – | 2.03 (1.44–2.86) | – |
| *Age* (years) | | | | | | | | |
| 30–39 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 40–49 | 2.22 (1.45–3.39)[a] | 1.85 (1.19–2.88)[b] | 0.93 (0.42–2.08) | 0.73 (0.29–1.85) | 1.18 (0.77–1.80) | 1.26 (0.84–1.88) | 1.74 (1.08–1.86)[b] | 1.46 (1.02–2.08)[b] |
| 50–59 | 4.68 (3.03–7.23)[a] | 3.40 (2.10–5.51)[a] | 1.96 (0.91–4.21) | 1.38 (0.67–3.56) | 1.59(1.01–2.50)[b] | 1.45 (0.92–2.26) | 3.18 (2.11–3.90)[a] | 2.39 (1.59–3.58)[a] |
| *Menopause status* | | | | | | | | |
| Premenopause | 1.0 | – | 1.0 | – | 1.0 | – | 1.0 | – |
| Perimenopause | 2.06 (1.20–3.51)[b] | – | 3.16 (1.22–8.23)[b] | – | 1.74 (1.09–2.77)[b] | – | 1.95 (1.23–3.09)[b] | – |
| Postmenopause | 3.06 (2.18–4.29)[a] | – | 2.67 (1.30–5.48)[b] | – | 1.92 (0.86–1.66) | – | 2.42 (1.80–3.26)[a] | – |
| *Marital status* | | | | | | | | |
| Married | 1.0 | – | 1.0 | – | 1.0 | – | 1.0 | – |
| Widow, divorced or separated | 1.91 (1.28–2.85)[b] | – | 1.98 (0.92–4.24) | – | 1.37 (0.84–2.22) | – | 1.88 (1.28–2.75)[b] | – |
| *Years of education* | | | | | | | | |
| Secondary and above | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Primary | 2.84 (1.81–4.45)[a] | 1.55 (0.92–2.60) | 3.50 (1.31–5.57)[b] | 2.60 (0.73–9.31) | 1.60 (0.99–2.58) | 0.99 (0.61–1.60) | 2.39 (1.54–2.89)[a] | 1.34 (0.85–2.11) |
| Illiterate | 2.63 (1.79–3.87)[a] | 1.06 (0.61–1.86) | 3.04 (1.04–4.11)[b] | 1.65 (0.40–6.81) | 1.53 (1.02–2.28)[b] | 0.87 (0.55–1.39) | 2.25 (1.49–2.57)[a] | 1.01 (0.63–1.61) |
| *Occupation* | | | | | | | | |
| Household duties | 1.0 | – | 1.0 | – | 1.0 | – | 1.0 | – |
| Work outside the home | 1.54 (0.82–2.88) | – | 2.16 (0.75–6.10) | – | 0.71 (0.30–1.69) | – | 1.11 (0.61–2.02) | – |
| *Religion* | | | | | | | | |
| Islam | 1.0 | – | 1.0 | – | 1.0 | – | 1.0 | – |
| Hindu | 0.97 (0.54–1.73) | – | 0.53 (0.12–2.28) | – | 0.71 (0.33–1.53) | – | 0.88 (0.52–1.48) | – |
| *Wealth quintile* | | | | | | | | |
| Highest | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Fourth | 1.82 (1.04–3.20)[b] | 1.62 (0.88–2.96) | 2.15 (0.53–8.68) | 1.96 (0.46–8.38) | 1.48 (0.79–2.79) | 1.36 (0.76–2.44) | 1.75 (1.08–2.84)[b] | 1.63 (0.97–2.73) |
| Middle | 2.60 (1.48–4.56)[b] | 2.11 (1.10–4.09)[b] | 3.29 (0.86–12.52) | 2.84 (0.60–13.44) | 2.90 (1.57–5.35)[b] | 2.46 (1.35–4.49)[b] | 2.09 (1.91–5.03)[a] | 3.05 (1.72–5.41)[a] |
| Second | 2.69 (1.56–4.63)[a] | 2.24 (1.15–4.39)[b] | 4.60 (1.30–16.28)[b] | 4.22 (0.87–20.37) | 1.91 (1.04–3.50)[b] | 2.22 (1.19–4.14)[b] | 2.11 (1.60–4.11)[a] | 2.49 (1.39–4.47)[b] |
| Lowest | 3.25 (1.86–5.67)[a] | 2.57 (1.24–5.29)[b] | 6.81 (2.00–23.21)[b] | 5.74 (1.14–28.82)[b] | 2.55 (1.36–4.79)[b] | 2.17 (1.13–4.16)[b] | 2.26 (1.97–5.21)[a] | 3.13 (1.68–5.86)[a] |
| *Body mass index category* | | | | | | | | |
| Underweight | 1.0 | – | 1.0 | – | 1.0 | – | 1.0 | – |
| Normal weight | 0.98 (0.49–1.94) | – | 0.32 (0.04–2.50) | – | 1.51 (0.76–3.0) | – | 0.97 (0.53–1.78) | – |
| Overweight | 0.90 (0.64–1.28) | – | 0.92 (0.45–1.87) | – | 0.68 (0.46–1.01) | – | 0.84 (0.62–1.15) | – |
| Obese | 1.08 (0.69–1.68) | – | 1.00 (0.42–2.41) | – | 0.49 (0.28–0.88)[b] | – | 0.79 (0.53–1.19) | – |
| *Parity* | | | | | | | | |
| Two children or less | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Three children or more | 3.12 (2.11–4.60)[a] | 1.99 (1.31–3.04)[b] | 1.26 (0.61–2.59) | 0.78 (0.35–1.73) | 1.67 (1.12–2.49)[b] | 1.48 (1.02–2.16)[b] | 2.28 (1.66–3.12)[a] | 1.61 (1.14–2.27)[b] |
| *Diabetes mellitus* | | | | | | | | |
| No | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Yes | 1.72 (1.06–2.79)[b] | 1.87 (1.08–3.25)[b] | 2.39 (1.07–5.36)[b] | 4.18 (1.77–9.86)[a] | 1.18 (0.68–2.04) | 1.38 (0.81–2.36) | 2.07 (1.31–3.27)[b] | 2.55 (1.54–4.23)[a] |
| *Pelvic organ prolapse* | | | | | | | | |
| No | 1.0 | 1.0 | 1.0 | 1.0 | NA | NA | NA | NA |
| Yes | 2.84 (1.97–4.08)[a] | 2.46 (1.67–3.61)[a] | 2.08 (1.02–4.26)[b] | 1.78 (0.81–3.89) | NA | NA | NA | NA |

NA, not applicable; [a], $p < 0.001$; [b], $p < 0.05$

(NHANES)[3,15]. Notably, the prevalence of at least one PFD for women aged 30–39 years was double that reported for the same age group in NHANES[3]. Although the NHANES data were captured using different validated questionnaires, these measured similar outcomes. Consistent with studies from developed countries, we found an increase in PFD prevalence with increasing age and parity[3,15]. Whereas the NHANES data showed no association between PFDs and the poverty income ratio, we observed a significant association between PFDs and low wealth status.

UI was the most common PFD, affecting nearly one-quarter of the surveyed women. The prevalence of UI was higher than that reported in developed countries[3,14], but lower than for some developing countries[21,22]. As in other studies[21,22], age and parity were risk factors for UI, as was diabetes[23], although this diagnosis was reliant on self-report. The association between diabetes and UI may reflect glycosuria, urinary tract infections or bladder dysfunction, secondary to diabetes[24]. As reported here, UI has been associated with symptomatic POP in community-based studies[24,25].

One in every six women surveyed had POP. Age, parity, vaginal delivery, poor delivery practices, heavy lifting and poor nutrition have been associated with POP in developing countries[1]. Our finding, that poor women were more likely to have POP, could be a function of obstetric complications experienced by poor women mostly living in rural areas[26]. The greater likelihood of poorer women undertaking heavy physical work may also contribute to their higher risk of POP.

Epidemiological data for FI in developing countries are sparse, with the reported prevalence varying from 4 to 41%[27,28]. This reflects assessment using different validated and non-validated questionnaires, different time frames over which symptoms have been assessed and the inclusion of older women. The relatively low prevalence of FI observed in the present study may reflect the relatively young age of our study sample. UI, parity, vaginal delivery, level of education, diabetes, inflammatory bowel disease and osteoarthritis have been identified as independent risk factors for FI[27]. Consistent with a prior study[28], we found diabetes to be a risk factor for FI. Factors that may predispose diabetic women to FI include peripheral neuropathy[29], and gastrointestinal complications of diabetes[30]. In the present study, FI was also significantly associated with lower wealth status, but not with age or parity.

Study strengths of the BMWHS include the robust sampling of a socioeconomically heterogeneous group of women recruited nationally, the use of validated measures of the PFDs and objective measurement of height and weight. Careful questionnaire development, interviewer training and quality control of the interviews ensured the validity and completeness of the results. The limitations include not having documented the mode of childbirth or the amount of heavy work performed by the study participants. Although we do not have data on mode of delivery, we used parity as a surrogate measure of vaginal delivery because the Cesarean section rate would have been less than 2% for women of this age in Bangladesh[20]. Furthermore, causality cannot be established by cross-sectional data. Reporting bias may have occurred as we assessed diabetes mellitus based on women reporting that they had been diagnosed with diabetes by a health professional within the last 3 years. However, given the restricted access of women in Bangladesh to health professionals, it is unlikely that this would be an over-estimate of the prevalence of diabetes. It is more likely that some women with diabetes have never been tested for it.

## Conclusion

Symptomatic pelvic floor dysfunction is known to adversely impact well-being[31]. In this setting, PFDs are not only embarrassing and distressing, but also can be socially disabling. As PFDs, particularly UI and POP, affect one-third of women at a relatively young age in Bangladesh, the diagnosis, treatment and prevention of these chronic conditions should be considered a woman's health priority, particularly as their prevalence is likely to increase as the population ages. More specifically, efforts should be strengthened to improve access to family planning and safe delivery services. Training in pelvic floor exercises should also be incorporated as part of routine postnatal care through existing health services to reduce the likelihood of developing incontinence. Furthermore, early intervention strategies for symptomatic PFDs should be considered.

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# Chapter 10: Integrative Discussion, Conclusion and Future Direction

Despite startling improvement in the reproductive health of women, non-reproductive health issues remain neglected in Bangladesh and these underpinned the issues examined in this thesis. A nationally representative, cross-sectional survey of women aged 30-59 years was conducted to improve our understanding of women's knowledge of CCa and BCa and barriers to early prevention and diagnosis. This thesis also aimed to determine the prevalence and severity of symptoms of the menopause; and documented the prevalence of, and risk factors for, UI, FI and POP amongst Bangladeshi women at mid-life.

In Bangladesh, more than 80% of women are aware of CCa, however, about 40% of these women were unaware of a screening test for this condition, despite the women in this survey living in areas where opportunistic screening is known to have been offered. Women living in rural areas and women with little education were less likely to be aware of CCa than urban-dwelling women with some education. On the other hand, women who were obese and older were more likely to be aware of CCa compared with women of normal weight and younger. In this setting, obesity is likely to be a surrogate measure of higher social class. We found similar results for BCa and BCa screening awareness in the women surveyed.

Consistent with other studies in developing countries, the uptake of CCa and BCa screening has been low in Bangladesh, even though potentially effective opportunistic CCa screening programs exist. The reasons for not undertaking screening were that women thought that they needed to have symptoms or did not know screening was needed, or both. Our multivariable analyses showed that residing in a rural area and being uneducated were independent barriers to CCa screening uptake, while being employed outside of the

household and being older were associated with the uptake of CCa screening. For BCa screening uptake, there was a trend towards women being less likely to undergo CBE if they had no education. As a Muslim country, it was anticipated that religious and cultural beliefs might be the most influential barriers to screening uptake among women in Bangladesh. However, our results showed that simple lack of knowledge of CCa and BCa and lack of awareness of the role of screening were the key barriers to screening uptake.

A systematic literature search was conducted to review the published data on the prevalence of menopausal symptoms in Asian women. The key findings were that physical symptoms were the most prevalent symptoms in Asian women compared with psychological, vasomotor and sexual symptoms. There was wide variation in the prevalence of symptoms which was due to the differences in modes of recruitment, study design, sampling procedures, the time frame over which symptoms were assessed and use of different assessment tools. A high level of bias for both external and internal validity was observed for most studies. The systematic review revealed that further studies of representative samples are necessary to understand whether the variation in prevalences is exclusively a function of methodological issues or could include a component of ethnic, cultural or socio-economic considerations.

To address the lack of information identified in the systematic review, we conducted a nationally representative study using a validated questionnaire, the MENQOL. Our study showed that 59.4% of the women aged 30-59 years were premenopausal, 8.4% perimenopausal, 32.3% postmenopausal, and nearly all women reached menopause by the age of 50 years. Consistent with the review, our study showed that physical symptoms were the most prevalent, followed by psychological, vasomotor and sexual symptoms. The VMS

showed the greatest differences across the menopausal groups. The prevalences of VMS and sexual symptoms were higher in our study than in other studies of women in Asia. The prevalence of moderate-severely bothersome VMS was 4.1% in premenopausal, 33.3% in perimenopausal, and 28.2% in postmenopausal women. Our results showed that, compared with premenopausal women, perimenopausal and postmenopausal women were more likely to have moderate-severely bothersome VMS. Compared with women of normal weight, obese women were more likely to have moderate-severely bothersome VMS. The prevalence of moderate-severely bothersome joint pain was 40.3% in postmenopausal, 36.2% in perimenopausal, and 15.3% in premenopausal women. Risk factors for moderate-severely bothersome joint pain included being peri-menopausal or postmenopausal compared with premenopausal women and having no education compared with women educated beyond secondary school. Our study demonstrated that a substantial proportion of Bangladeshi women experience menopause associated moderate-severely bothersome VMS and joint pain. Despite the high symptom prevalence, no women reported treatment, suggesting that menopausal symptoms remain neglected in Bangladesh.

The BMWHS provides the first nation-wide estimates of the 3 symptomatic PFDs in women at mid-life in Bangladesh. The key finding was that PFDs are common in Bangladeshi women at a relatively young age. More than one-third of all the women, and more than half of the women aged 50-59 years were identified as having at least one PFD. In addition to age, the main factors associated with having at least one PFD were high parity, low wealth status and diabetes diagnosed by a health professional. UI was the most common disorder amongst PFDs and was present in nearly one-quarter of women. This proportion is higher than numerous studies conducted in developed countries but lower than some studies in

developing countries. Major risk factors for UI were age, high parity, low wealth status, diabetes and having POP.

POP was also common with one in every six women suffering from this condition. Factors associated with POP were higher parity and lower wealth status. The prevalence of FI in our study was low (5.3%) when compared with previous studies in developing countries. This was possibly due to the women in our study being younger than those included in other studies. Less wealthy women and women reporting a diagnosis of diabetes were at greater risk of FI than wealthier and non-diabetic women, respectively. There is a need for increased attention to the diagnosis, treatment and ultimately prevention of PFDs in Bangladesh and other developing countries as these chronic conditions are not only embarrassing, but are often lifestyle limiting, and can be disabling.

The BMWHS had several strengths. It was a nation-wide population-based study using a robust sampling technique, and validated instruments. The BMWHS provided a rich data base which has enabled us to explore women's knowledge about, and uptake of, CCa and BCa screening and to estimate the age-specific prevalence of UI, FI, POP and menopausal symptoms and their severity. Careful questionnaire development, interviewer training, and quality control of interviews ensured the validity and reliability of the results. Furthermore, identification of the field challenges and experiences from the BMWHS has provided background for other researchers planning to conduct surveys about women's health issues in developing countries. The main limitation of the BMWHS is that causality between risk factors and outcomes cannot be established due to the cross-sectional nature of the study. There may also have been some lack of precision in relation to the estimate of the mean age of menopause as in some cases women needed to estimate their age based on major life events.

In Bangladesh, more than 14 million women will be 50 years or older by 2021(153). With an ageing population, the number of women with these conditions, CCa, BCa, menopausal symptoms and PFDs, will increase substantially. Although BCa statistics are lacking in Bangladesh, the Bangladesh Ministry of Health and Family Welfare has identified CCa and BCa as major targets for early disease detection and campaigns have been proposed to educate women about the symptoms and signs of CCa and BCa (154). For programs to be effective in Bangladesh, women need to be educated about the concept of screening for these conditions even when they lack symptoms. Targeted educational health programs are needed to increase CCa screening uptake, while CBE should be promoted for down staging of BCa in Bangladesh.

Unlike numerous other studies undertaken in women in Asian countries, our study shows that bothersome VMS are common among perimenopausal and postmenopausal women in Bangladesh and remain untreated. With an ageing population, the number of symptomatic women in the community will be substantial and options for symptom relief need to be available. With population ageing, PFDs will emerge as a major health problem. Targeted education health programs are needed to increase awareness of these conditions in Bangladesh, with the view to improving the treatment of these conditions and ultimately reducing their impact on morbidity and mortality.

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# Appendices

## Appendix I

1.1 English questionnaire

MONASH UNIVERSITY, AUSTRALIA

UNIVERSITY OF DHAKA

**INTRODUCTION AND CONSENT**

Hello.
My name is _____ and I am inviting you to take part in a survey on **"Examining Neglected Health Problems in Women at Midlife in Bangladesh"**. We are seeking to understand how much women know about cancers that only affect women and problems some women have that might limit their activities. If you are aged 30-59 years old we would appreciate your agreeing to being involved in this study. The survey takes about 45-60 minutes to complete.

As part of the survey I would first like to ask some questions about you and your household. I will then ask you questions about your understanding of cancer in women. After that there are questions about your personal health. All of the answers you give will be kept private. We will not use your name but will use a serial number. As a result, your responses will no longer be identifiable except by the number.

Participation in this survey is completely voluntary. We cannot guarantee or promise that this survey will directly benefit you but we hope our work will help to reduce neglected health problems nationally. If we come to any question you don't want to answer, just let me know and I will go on to the next question; or you can stop the interview at any time. However, we hope you will participate in the survey since your views are very important.

At this time, do you want to ask me anything about the survey?

May I begin the interview now?

Signature of respondent: ……Date:……

Signature of interviewer: ……Date:……

**NOTE:**
□ Respondent agrees to be interviewed (verbal consent) – **Continue**

□ Respondent does not agree to be interviewed – **The end**

**SURVEY QUESTIONNAIRE**

**Examining Neglected Health Problems in Women at Midlife in Bangladesh**

**SECTION 1: IDENTIFICATION**

| NO. | QUESTIONS AND FILTERS | CODING CATEGORIES | | CODES |
|---|---|---|---|---|
| 101 | Division | Barisal | 1 | ☐ |
| | | Chittagong | 2 | |
| | | Dhaka | 3 | |
| | | Khulna | 4 | |
| | | Rajshahi | 5 | |
| | | Rangpur | 6 | |
| | | Sylhet | 7 | |
| 102 | District | Barisal | 1 | ☐ |
| | | Comilla | 2 | |
| | | Tangail | 3 | |
| | | Satkhira | 4 | |
| | | Rajshahi | 5 | |
| | | Rangpur | 6 | |
| | | Habigonj | 7 | |
| 103 | Upazila (Sub-distric) Code | Please specify in number..... | | ☐ |
| 104 | Union/Ward Code | Please specify in number..... | | ☐ |
| 105 | Village/Block | Please write down the name of village/block | | |
| 106 | Cluster Number | Please specify in number..... | | |
| 107 | Type of Cluster | Urban.....1 | Rural.....2 | ☐ |
| 108 | Household Number | Please specify in number..... | | ☐ |
| 109 | Name of the Interviwee..... | | | |
| 111 | Name of the Husband of Interviwee..... | | | |
| 112 | Name of the Interviwers..... | | | |

| | | |
|---|---|---|
| ☐ Start time of the interview | Hours: | Minutes: |

**SECTION 2: SOCIO-DEMOGRAPHIC AND HOUSEHOLD CHARACTERISTICS**

| NO. | QUESTIONS AND FILTERS | CODING CATEGORIES | CODES | SKIP |
|---|---|---|---|---|
| 201 | How old are you? | Please specify in years…… | ☐☐ | |
| 202 | What is your date of birth? | Please write down the year of birth…… | ☐☐☐☐ | |
| 203 | Have you ever attended school? | Yes ..... 1<br>No ..... 0 → | ☐ | 205 |
| 204 | If yes, how many years of schooling have you completed? | Please specify in absolute years..... | ☐ | |
| 205 | What is your occupation, that is, what kind of work do (did) you mainly do? | Agriculture..... 01<br>Domestic/Household work ..... 02<br>Maid servant/Day labourer..... 03<br>Business..... 04<br>Service ..... 05<br>Doctor/Enginieer/Teacher ..... 06<br>Others (Please specify)..... 99 | ☐ | |
| 206 | Has your husband ever attended school? | Yes ..... 1<br>No ..... 0 → | ☐ | 208 |
| 207 | If yes, how many years of schooling has your husband completed? | Please specify in absolute years..... | ☐☐ | |
| 208 | What kind of work does (did) your husband mainly do? | Agriculture..... 01<br>Rickshaw/van puller ..... 02<br>Day labourer..... 03<br>Business..... 04<br>Service ..... 05<br>Doctor/Enginieer/Teacher ..... 06<br>Others (Please specify)..... 99 | ☐ | |
| 209 | What is the main source of drinking water for members of your household? | **Main Source** / **Yes** / **No**<br>Piped water / 1 / 0<br>Deep Tubwell / 1 / 0<br>Well / 1 / 0<br>Water from spring / 1 / 0<br>Rain water / 1 / 0<br>Bottle water / 1 / 0<br>Surface water (River/Dam/Lake/Ponds/Stream/Canal/Irrigation channel) / 1 / 0 | ☐☐ | |
| 210 | What is the main source of water used by your household for other purposes such as cooking and hand washing? | **Main Source** / **Yes** / **No**<br>Piped water / 1 / 0<br>Deep Tubwell / 1 / 0<br>Well / 1 / 0<br>Water from spring / 1 / 0<br>Rain water / 1 / 0<br>Bottle water / 1 / 0<br>Surface water (River/Dam/Lake/Ponds/Stream/Canal/Irrigation channel) / 1 / 0 | ☐☐ | |
| 211 | What kinds of toilet facility do members of your household usually use? | **Type of toilet** / **Yes** / **No**<br>Flush/Pour Flush toilet / 1 / 0<br>Pit latrine / 1 / 0<br>Busket toilet / 1 / 0<br>Hanging toilet / 1 / 0<br>No facility/Bush/Field / 1 / 0 → | ☐☐ | 213 |
| 212 | Do you share this toilet facility with other | Yes ..... 1 | ☐ | |

| NO. | QUESTIONS AND FILTERS | CODING CATEGORIES | CODES | SKIP |
|---|---|---|---|---|
| | households? | No ..... 0 | | |
| 213 | Does your household have the following items?<br><br>**(Multiple responses)** | **Households Items** / **Yes** / **No**<br>Electricity 1 0<br>A radio/television 1 0<br>A computer/ i pad 1 0<br>A mobile telephone 1 0<br>A land phone 1 0<br>A refrigerator 1 0<br>An almirah/wardrobe 1 0<br>A table 1 0<br>A chair 1 0<br>A watch 1 0<br>A bi-cycle 1 0<br>A motor cycle/motor scooter/tempo 1 0<br>An animal-drawn cart 1 0<br>A car/truck/bus 1 0<br>A boat with a motor 1 0 | | |
| 214 | Does your household own any livestock, herds, other farm animals or poultry? | Yes ..... 1<br>No ..... 0 | | |
| 215 | Does your household own any homestead? | Yes ..... 1<br>No ..... 0 | | |
| 216 | Does your household own any land (other than the homestead land)? | Yes ..... 1<br>No ..... 0 | | |
| 217 | What is the main material of the floor of your house? | **Main material** / **Yes** / **No**<br>Natural floor (Earth/Sand) 1 0<br>Rudimentary floor (Wood Planks , Palm/Bamboo) 1 0<br>Finished floor (Parquet or polished wood, Ceramic tiles, Cement, Carpet) 1 0 | | |
| 218 | What is the main material of the roof of your house? | **Main material** / **Yes** / **No**<br>Natural roof (Earth/Sand) 1 0<br>Rudimentary roof (Wood Planks , Palm/Bamboo) 1 0<br>Finished roof (Parquet or polished wood, Ceramic tiles, Cement, Carpet) 1 0 | | |
| 219 | What is the main material of the wall of your house? | **Main material** / **Yes** / **No**<br>Natural wall (Earth/Sand) 1 0<br>Rudimentary wall (Wood Planks , Palm/Bamboo) 1 0<br>Finished wall (Parquet or polished wood, Ceramic tiles, Cement, Carpet) 1 0 | | |
| 220 | What is your religion? | Islam ..... 01<br>Hindu ..... 02<br>Buddhist ..... 03<br>Christianity ..... 04<br>Others (Please specify) ..... 99 | | |
| 221 | What is your marital status? | Married ..... 01<br>Unmarried ..... 02 | | |

| NO. | QUESTIONS AND FILTERS | CODING CATEGORIES | CODES | SKIP |
|---|---|---|---|---|
| | | Separated ..... 03<br>Divorced ..... 04<br>Widow ..... 05<br>Others (Please specify)..... 99 | ☐ | |
| 222 | Have you ever given birth to a child? (including stillbirths, excluding miscarriages) | Yes ..... 1<br>No ..... 0 → | ☐ | 225 |
| 223 | How many live children do you have? | Please specify in numbers ..... | ☐ | |
| 224 | How many live children were died? | Please specify in numbers ..... | ☐ | |
| 225 | Have you ever taken birth control pills? | Yes ..... 1<br>No ..... 0 → | ☐ | 227 |
| 226 | How many years in all have you taken birth control pills? | Please specify in months ..... | ☐☐ | |
| 227 | Have you had a tubal ligation ('tubes' tied)? | Yes ..... 1<br>No ..... 0 | | |
| 228 | What is your weight (in kg)? | Please **MEASURE** in kg ..... | ☐☐ | |
| 229 | What is your height (in cm)? | Please **MEASURE** in cm ..... | ☐☐ | |
| 230 | Have you had a test for high blood sugar or diabetes within the past three years? | Yes ..... 1<br>No ..... 0 | ☐ | |
| 231 | Have you ever been told by a doctor or other health professional that you have diabetes? | Yes ..... 1<br>No ..... 0 | ☐ | |

**SECTION3: CERVICAL CANCER**

**KNOWLEDGE ABOUT CERVICAL CANCER AND SCREEING BARRIERS**

| NO | QUESTIONS AND FILTERS | CODING CATEGORIES | CODES | SKIP |
|---|---|---|---|---|
| 301 | Have you ever heard of cervical cancer? | Yes ..... 1<br>No ..... 0 → | ☐ | 401 |
| 302 | Have you or your family had cervical cancer? | (see table below) | ☐☐☐☐☐☐☐ | |
| 303 | Can you please tell me any symptoms which would indicate a woman has cervical cancer? | Yes ..... 1<br>No ..... 0 → | ☐ | 305 |
| 304 | What are the symptoms of cervical cancer?<br><br>**(Multiple responses)** | (see table below) | ☐☐ | |

| Family member | Yes | No | Don't know | Don't want to say |
|---|---|---|---|---|
| You | 1 | 2 | 77 | 88 |
| Mother | 1 | 2 | 77 | 88 |
| Maternal grandmother | 1 | 2 | 77 | 88 |
| Paternal grandmother | | | | 88 |
| Daughter | 1 | 2 | 77 | 88 |
| Sisters | 1 | 2 | 77 | 88 |
| Maternal aunties | 1 | 2 | 77 | 88 |
| Paternal aunties | 1 | 2 | 77 | 88 |

| Symptoms | Yes | No |
|---|---|---|
| Vaginal bleeding between periods | 1 | 0 |
| Vaginal discharge | 1 | 0 |

| NO | QUESTIONS AND FILTERS | CODING CATEGORIES | | | CODES | SKIP |
|---|---|---|---|---|---|---|
| | | Bleeding after sex | 1 | 0 | | |
| | | Pain or discomfort during/after sex | 1 | 0 | | |
| | | Bleeding after menopause | 1 | 0 | | |
| 305 | Have you ever heard about women having testing to find cervical cancer screening? | nu¨v ..... 1<br>bv ..... 0 → | | | | 401 |
| 306 | Do you know what major methods of cervical cancer screening are? | Yes ..... 1<br>No ..... 0 → | | | | 308 |
| 307 | What are the major methods of cervical cancer screening?<br><br>**(Multiple responses)** | Screening methods | Yes | No | | |
| | | Pap test | 1 | 0 | | |
| | | Visual inspection of cervix after applying acetic acid (VIA) | 1 | 0 | | |
| | | HPV (Human papillomavirus) testing | 1 | 0 | | |
| 308 | Have you ever had screening for cervical cancer? | Yes ..... 1<br>No ..... 0 → | | | | 311 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 309 | What sort of screening did you have? | Pap test (pap smear/pap test)- ..... 01<br>VIA (visual inspection of cervix after applying acetic acid) ..... 02<br>HPV (Human Papilloma virus) ..... 03<br>Don't know ..... 77 | | | | |
| 310 | How many times have you been screened for cervical cancer? | Please write down in numbers..... | | | | |
| 311 | Why did you not take up screening for cervical cancer?<br><br>**(Multiple responses)** | **Barriers/Causes** | Yes | No | | |
| | | Did not know screening was needed | 1 | 0 | | |
| | | Did not know where to go | 1 | 0 | | |
| | | Had no symptoms | 1 | 0 | | |
| | | Lack of information about disease/treatment | 1 | 0 | | |
| | | Expensive (accommodation, treatment, medicine) | 1 | 0 | | |
| | | Service centre was too far | 1 | 0 | | |
| | | Transportation problem | 1 | 0 | | |
| | | **Family did not allow** | 1 | 0 | | |
| | | No one to accompany | 1 | 0 | | |
| | | Modesty/Shyness | 1 | 0 | | |
| | | Fear of test result/having cancer | 1 | 0 | | |
| | | Fear of deportation by the families/friends/neighbours | 1 | 0 | | |
| | | Undressing/Embarrassing or awkward nature of diagnosis | 1 | 0 | | |
| | | Painful instrument used for screening | 1 | 0 | | |
| | | Attitude of the service providers | 1 | 0 | | |
| | | Lack of female screeners | 1 | 0 | | |
| | | Lack of government financial support | 1 | 0 | | |
| | | Lack of time | 1 | 0 | | |
| | | Chronic disabling conditions | 1 | 0 | | |
| | | **Religious reasons** | 1 | 0 | | |
| | | Others, please specify..... | 1 | 0 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 312 | If religious reason, could you please explain in details?<br><br>**(Multiple responses)** | | **Religious reasons** | Yes | No | | |
| | | | Coming from God/ God's will | 1 | 0 | ☐ | |
| | | | Only God can cure | 1 | 0 | ☐ | |
| | | | Undressing in front of others is not permitted | 1 | 0 | ☐ | |
| | | | Other religious reasons…… | 1 | 0 | ☐ | |
| 313 | If family did not allow, could you please explain in details?<br><br>**(Multiple responses)** | | **Familial reasons** | Yes | No | | |
| | | | Husband did not allow me to go to the doctors | 1 | 0 | ☐ | |
| | | | Husband did not provide me with economic support | 1 | 0 | ☐ | |
| | | | Father/Mother-in-law did not allow me to go to the doctors | 1 | 0 | ☐ | |
| | | | Other family reasons …… | 1 | 0 | ☐ | |

**SECTION 4: BREAST CANCER**

**KNOWLEDGE AND PRACTICES OF BREAST CANCER AND SCREENING BARRIERS**

| NO. | QUESTIONS AND FILTERS | CODING CATEGORIES | CODES | SKIP |
|---|---|---|---|---|
| 401 | Have you ever heard of breast cancer? | Yes ..... 1<br>No ..... 0 → | | 501 |
| 402 | Have you or a member of your family had breast cancer? | | | |

| Family member | Yes | No | Don't know | Don't want to say |
|---|---|---|---|---|
| You | 1 | 2 | 77 | 88 |
| Mother | 1 | 2 | 77 | 88 |
| Maternal grandmother | 1 | 2 | 77 | 88 |
| Paternal grandmother | | | | 88 |
| Daughter | 1 | 2 | 77 | 88 |
| Sisters | 1 | 2 | 77 | 88 |
| Maternal aunties | 1 | 2 | 77 | 88 |
| Paternal aunties | 1 | 2 | 77 | 88 |

| | | | | |
|---|---|---|---|---|
| 403 | Can you please tell me any symptoms which would indicate a woman has breast cancer? | Yes ..... 1<br>No ..... 0 → | | 405 |
| 404 | What are the symptoms of breast cancer?<br><br>**(Multiple responses)** | | | |

| Symtopms | Yes | No |
|---|---|---|
| Nipple discharge | 1 | 0 |
| Lump (Chaka) in the breasts | 1 | 0 |
| Pain in the breasts | 1 | 0 |
| Deformity of breasts | 1 | 0 |
| Skin ulceration | 1 | 0 |
| Redness on the breasts | 1 | 0 |

| | | | | |
|---|---|---|---|---|
| 405 | Have you ever heard about any methods to find breast cancer in women? | Yes ..... 1<br>No ..... 0 → | | 501 |
| 406 | What are the methods of breast cancer screening? | | | |

| Methods | Yes | No | |
|---|---|---|---|
| Breast self-examination (BSE) | 1 | 0 → | 501 |
| Clinical breast examination (CBE) | 1 | 0 → | 501 |
| Mammography | 1 | 0 → | 501 |

| | | | | |
|---|---|---|---|---|
| 407 | Do you know how to check your breasts for lumps or other abnormalities? | Yes ..... 1<br>No ..... 0 → | | 410 |
| 408 | Do you ever check your own breasts for possible lumps (Chaka), distortions or swelling? | Yes ..... 1 →<br>No ..... 0 | | 410 |
| 409 | Why do you not check your breasts yourself<br><br>**(Multiple responses)** | | | |

| Reasons not to check | Yes | No |
|---|---|---|
| I didn't know doing this is important | 1 | 0 |
| I wouldn't know what to do | 1 | 0 |
| I didn't know when to do | 1 | 0 |
| I don't think there is anything wrong with my breasts | 1 | 0 |
| I would be embarrassed/ashamed to be doing this | 1 | 0 |

| | | | | |
|---|---|---|---|---|
| 410 | Have you ever had your breasts examined by a doctor, nurse, or other health professional for lumps? | Yes..... 1<br>No..... 0 → | ☐ | 412 |
| 411 | How many times has your health care provider examined (felt for lumps with his/ her hands) your breasts in the last 5 years? | Please write down in numbers ..... | | |
| 412 | Have you ever had a mammogram? A mammogram is an x-ray of each breast to look for breast cancer. | Yes..... 1<br>No..... 0 → | ☐ | 414 |
| 413 | How many times have you had a mammogram? | Pleasewrite down in numbers ..... | ☐ | |

| 414 | If you have never had any breast cancer screening (either by clinical breast examination or by mammography) can you please explain the reasons?<br><br>(**Multiple responses)** |
|---|---|

| **Barriers/Causes** | **Yes** | **No** | |
|---|---|---|---|
| Did not know screening was needed | 1 | 0 | ☐ |
| Did not know where to go | 1 | 0 | ☐ |
| Had no symptoms | 1 | 0 | ☐ |
| Lack of information about disease/treatment | 1 | 0 | ☐ |
| Expensive (accommodation, treatment, medicine) | 1 | 0 | ☐ |
| Service centre was too far | 1 | 0 | ☐ |
| Transportation problem | 1 | 0 | ☐ |
| **Family did not allow** | 1 | 0 | ☐ |
| No one to accompany | 1 | 0 | ☐ |
| Modesty/Shyness | 1 | 0 | ☐ |
| Fear of test result/having breast cancer | 1 | 0 | ☐ |
| Fear of divorce due to breast cancer | 1 | 0 | ☐ |
| Fearful about mammography | 1 | 0 | ☐ |
| Fear of deportation/rejection by the families/friends/neighbours | 1 | 0 | ☐ |
| Undressing/Embarrassing or awkward nature of diagnosis with breast cancer | 1 | 0 | ☐ |
| Breast cancer bring curse to the family | 1 | 0 | ☐ |
| Lack of female screeners | 1 | 0 | ☐ |
| Lack of government financial support | 1 | 0 | |
| Lack of time | 1 | 0 | |
| Chronic disabling conditions | 1 | 0 | |
| **Religious reasons** | 1 | 0 | |
| Others, please specify…… | 1 | 0 | |

| 415 | If religious reason, could you please explain in detail?<br><br>(**Multiple responses)** |
|---|---|

| **Religious reasons** | **Yes** | **No** | |
|---|---|---|---|
| Coming from God/ God's will | 1 | 0 | ☐ |
| Only God can cure | 1 | 0 | ☐ |
| Undressing in front of others is not permitted | 1 | 0 | ☐ |

| | | | | | | |
|---|---|---|---|---|---|---|
| 416 | If family did not allow, could you please explain in detail?<br><br>(**Multiple responses)** | **Familial reasons** | **Yes** | **No** | | |
| | | Husband did not allow me to go to the doctors | 1 | 0 | | |
| | | Husband did not provide me with economic support | 1 | 0 | | |
| | | Father/Mother-in-law did not allow me to go to the doctors | 1 | 0 | | |
| | | Other family reasons …… | 1 | 0 | | |

**SECTION 5: URINARY INCONTINENCE**

I am now going to ask you some questions about your body functions.

The first questions are about whether you ever experience problems leaking/passing your urine. You may find some of these questions embarrassing, however if you have any of these symptoms you are not alone in this. Problems with leaking/passing urine are very common amongst women. Answering these questions will help us understand just how common this is for Bangladeshi women and how severely women are affected.

Please put a **Tick** mark in **ONE box** for the response to **EACH question**

**Question for Urinary Incontinence Diagnosis (QUID)**

| NO. | QUESTIONS AND FILTERS | CODING CATEGORIES | | | | | | CODES | SKIP |
|---|---|---|---|---|---|---|---|---|---|
| | **Do you leak urine (even small drops), wet yourself, or wet your pads or under-garments…**..... | None of the time | Rarely | Once in a while | Often | Most of the time | All of the time | | |
| 501 | When you cough or sneeze? | 0 | 1 | 2 | 3 | 4 | 5 | ☐ | |
| 502 | When you bend down or lift something up? | 0 | 1 | 2 | 3 | 4 | 5 | ☐ | |
| 503 | When you walk quickly, jog, or exercise? | 0 | 1 | 2 | 3 | 4 | 5 | ☐ | |
| 504 | While you are undressing to use the toilet? | 0 | 1 | 2 | 3 | 4 | 5 | ☐ | |
| 505 | Do you get such a strong and uncomfortable need to urinate that you leak urine (even small drops) or wet yourself before reaching the toilet? | 0 | 1 | 2 | 3 | 4 | 5 | ☐ | |
| 506 | Do you have to rush to the bathroom because you get a sudden, strong need to urinate? | 0 | 1 | 2 | 3 | 4 | 5 | ☐ | |

**SECTION 6: FECAL INCONTINENCE**

I am now going to ask you some about possible bowel, symptoms and some more questions about bladder symptoms, and, if you have these, how much they bother you. While answering these questions, please consider your symptoms over the last **3 months.**

Please put a **Tick** mark in in the appropriate **BOX** or **BOXES.**

**Pelvic Organ Prolapse Distress Inventory 6 (POPDI-6)**

| **Did you experience the following problems in the last 3 months?** | | | | | |
|---|---|---|---|---|---|
| **No - 0** | **Yes** | | | | |
| **If yes, how much does it bother you?** | **Not at all 1** | **Somewhat 2** | **Moderately 3** | **Quite a bit 4** | |

**Pelvic Organ Prolapse Distress Inventory 6 (POPDI-6)**

| NO. | QUESTIONS AND FILTERS | CODING CATEGORIES | | | | | CODE | SKIP |
|---|---|---|---|---|---|---|---|---|
| | | No | Not at all | Somewhat | Moderately | Quite a bit | | |
| 601 | Do you usually experience *pressure* in the lower abdomen? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 602 | Do you usually experience *heaviness or dullness* in the pelvic area? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 603 | Do you usually have a bulge or something falling out that you can see or feel in your vaginal area? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 604 | Do you ever have to push on the vagina or around the rectum to have or complete a bowel movement? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 605 | Do you usually experience a feeling of incomplete bladder emptying? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 606 | Do you ever have to push up on a bulge in the vaginal area with your fingers to start or complete urination? | 0 | 1 | 2 | 3 | 4 | ☐ | |

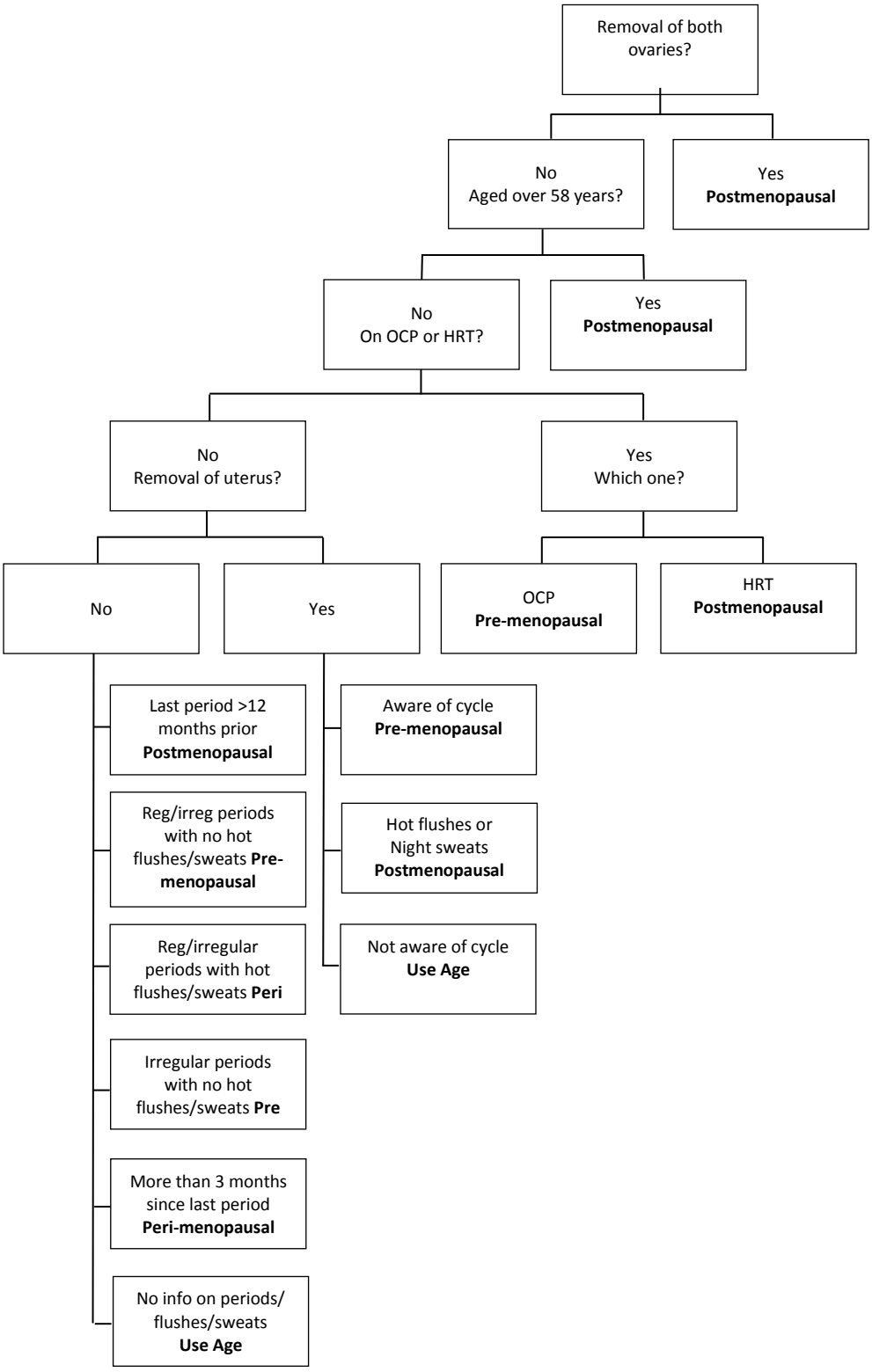
**Colorectal-Anal Distress Inventory 8 (CRADI-8)**

| NO. | QUESTIONS AND FILTERS | CODING CATEGORIES | | | | | CODE | SKIP |
|---|---|---|---|---|---|---|---|---|
| | | No | Not at all | Somewhat | Moderately | Quite a bit | | |
| 607 | Do you feel you need to strain too hard to have a bowel movement? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 608 | Do you feel you have not completely emptied your bowels at the end of a bowel movement? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 609 | Do you usually lose stool beyond your control if your stool is well formed? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 610 | Do you usually lose stool beyond your control if your stool is loose? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 611 | Do you usually lose gas from the rectum beyond your control? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 612 | Do you usually have pain when you pass your stool? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 613 | Do you experience a strong sense of urgency and have to rush to the bathroom to have a bowel movement? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 614 | Does part of your bowel ever pass through the rectum and bulge outside during or after a bowel movement? | 0 | 1 | 2 | 3 | 4 | ☐ | |

**SECTION 7: MENOPAUSE**

Menopause is when a woman stops having her monthly bleed and can no longer have children. I am now going to ask you a few questions using a **FLOW CHART** to know whether you have reached this time of life (the menopause).

It is important that you respond to each statement even if you feel that it does not apply to you.



| | | | | |
|---|---|---|---|---|
| 700 | What is the menopausal status of the interviewee acoording to the above menotined flow chart? | Premenopause .....1<br>Peri-menopasue .....2<br>Postmenopuase.....3 | ☐ | |

**MENOPAUSE: SYMPTOMS (Menopause-Specific Quality of Life (MENQOL))**

The next few questions are about symptoms some women have when they reach menopause (no longer fertile) or are close to menopause.

Please answer each question, thinking about the symptoms you have experienced in the **LAST MONTH.**

- ☐ If you **have NOT** experienced the problem in the last month, just **TICK** the **'NO'** box and we will go on to the next question.
- ☐ If you **have** experienced the problem in the last month (**TICK** the **'YES'** box), and I will ask you how bothered you have been by it. **(Tick the box that indicates how bothered the participant was by the problem).**

| **Did you experience these problems in the LAST MONTH?** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **No- 0** **Yes** | | | | | | | |
| **If yes, how much does it bother you?** | **Not at all** | **Rarely bothered** | **Sligthly bothered** | **Moderately bothered** | **Mostly bothered** | **Very much bothered** | **Extremly bothered** |
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** |

| **NO** | ***Have you experienced the problem in the last month?*** | | ***If you have had the problem during the last month, how bothered were you?*** | | | | | | | **CODE** |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 701 | **A.** Hot flushes | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 702 | **B.** Night sweats | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 703 | **C.** Sweating | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 704 | **D.** Being dissatisfied with my personal life | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 705 | **E.** Feeling anxious or nervous | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 706 | **F.** Experiencing poor memory | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 707 | **G.** Accomplishing less than I used to | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 708 | **H.** Feeling depressed, down or blue | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 709 | **I.** Being impatient with other people | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 710 | **J.** Feelings of wanting to be alone | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 711 | **K.** Flatulence (wind) or gas pains | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 712 | **L.** Aching in muscles and joints | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 713 | **M.** Feeling tired or worn out | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 714 | **N.** Difficulty sleeping | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 715 | **O.** Aches in back of neck or head | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 716 | **P.** Decrease in physical strength | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 717 | **Q.** Decrease in stamina | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 718 | **R.** Feeling a lack of energy | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 719 | **S.** Drying skin | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 720 | **T.** Weight gain | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 721 | **U.** Increased facial hair | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 722 | **V.** Changes in appearance, texture or tone of your skin | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 723 | **W.** Feeling bloated | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 724 | **X.** Low backache | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 725 | **Y.** Frequent urination | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 726 | **Z.** Involuntary urination when laughing or coughing | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 727 | **AA.** Change in your sexual desire | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 728 | **AB.** Vaginal dryness during intercourse | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 729 | **AC.** Avoiding intimacy | □ No-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |

| | | |
|---|---|---|
| ☐ End of the interview | Hours: | Minutes: |

***THANK YOU VERY MUCH FOR YOUR PARTICIPATION***

## 1.2 Bengali questionnaire

# জরিপ প্রশ্নপত্র
## বাংলাদেশের মধ্যবয়সী মহিলাদের অবহেলিত স্বাস্থ্য সমস্যা

### সেকশন ১: সনাক্তকরণ সম্পর্কিত তথ্যাবলী

| NO. | QUESTIONS AND FILTERS | CODING CATEGORIES | | CODES |
|---|---|---|---|---|
| 101 | বিভাগ | বরিশাল | 1 | ☐ |
| | | চিটাগাং | 2 | |
| | | ঢাকা | 3 | |
| | | খুলনা | 4 | |
| | | রাজশাহী | 5 | |
| | | রংপুর | 6 | |
| | | সিলেট | 7 | |
| 102 | জেলা | বরিশাল | 1 | ☐ |
| | | কুমিল্লা | 2 | |
| | | টাঙ্গাইল | 3 | |
| | | সাতক্ষীরা | 4 | |
| | | রাজশাহী | 5 | |
| | | রংপুর | 6 | |
| | | হবিগঞ্জ | 7 | |
| 103 | উপজেলা কোড | সংখ্যায় নির্দিষ্ট করে লিখুন..... | | ☐ |
| 104 | ইউনিয়ন/ওয়ার্ড কোড | সংখ্যায় নির্দিষ্ট করে লিখুন..... | | ☐ |
| 105 | গ্রাম/ব্লক | গ্রাম/ব্লকের নাম লিখুন _____ | | |
| 106 | গুচ্ছ সংখ্যা | সংখ্যায় নির্দিষ্ট করে লিখুন..... | | ☐ |
| 107 | গুচ্ছ শ্রেণীবিভাগ | শহর.....1 | গ্রাম.....2 | ☐ |
| 108 | বাড়ী/খানার নম্বর | সংখ্যায় নির্দিষ্ট করে লিখুন..... | | ☐ |
| 109 | স্বাক্ষাৎকার প্রদানকারীর নাম..... | | | |
| 111 | স্বাক্ষাৎকার প্রদানকারীর স্বামীর নাম..... | | | |
| 112 | স্বাক্ষাৎকার গ্রহণকারীর নাম..... | | | |

| | | |
|---|---|---|
| ☐ স্বাক্ষাৎকার শুরুর সময় | ঘন্টা: | মিনিট: |

## সেকশন ২: সামাজিক, জনমিতিক ও পারিবারিক বৈশিষ্ট্য সম্পর্কিত তথ্যাবলী

| NO. | QUESTIONS AND FILTERS | CODING CATEGORIES | CODES | SKIP |
|---|---|---|---|---|
| 201 | আপনার বয়স কত? | পূর্ণ বছরে বয়স লিখুন..... | ☐☐ | |
| 202 | আপনার জন্ম বছর বলুন? | সাল লিখুন..... | ☐☐☐☐ | |
| 203 | আপনি কি কখনো স্কুলে গিয়েছেন? | হ্যাঁ.....1<br>না.....0 → | ☐ | 205 |
| 204 | আপনি সর্বোচ্চ কোন শ্রেণী পর্যন্ত লেখাপড়া করেছেন? | শ্রেণী পূর্ণ বছরে লিখুন | ☐ | |
| 205 | আপনি প্রধানত কি ধরনের কাজ করেন? | কৃষিকাজ.....01<br>বাড়ীর কাজ/গৃহিনী.....02<br>দিনমজুর/গৃহপরিচারিকা.....03<br>ব্যাবসায়ী.....04<br>চাকুরী.....05<br>ডাক্তার/ইঞ্জিনিয়ার/শিক্ষক.....06<br>অন্যান্য (নির্দিষ্টভাবে উল্লেখ করুন).....99 | ☐ | |
| 206 | আপনার স্বামী কখনও স্কুলে গিয়েছিলেন কি? | হ্যাঁ.....1<br>না.....0 → | ☐ | 208 |
| 207 | আপনার স্বামী সর্বোচ্চ কোন শ্রেণী পর্যন্ত লেখাপড়া করেছেন? | শ্রেণী পূর্ণ বছরে লিখুন | ☐☐ | |
| 208 | আপনার স্বামী প্রধানত কি ধরনের কাজ করেন? | কৃষিকাজ.....01<br>রিক্সাচালক / ভ্যানচালক.....02<br>দিনমজুর.....03<br>ব্যাবসায়ী.....04<br>চাকুরী.....05<br>ডাক্তার/ইঞ্জিনিয়ার/শিক্ষক.....06<br>অন্যান্য (নির্দিষ্টভাবে উল্লেখ করুন).....99 | ☐ | |
| 209 | আপনার পরিবারের সদস্যদের খাবার পানির প্রধান উৎস কি? | **প্রধান উৎস** / **হ্যাঁ** / **না**<br>পাইপের পানি / 1 / 0<br>নলকুপ / 1 / 0<br>কুয়ার পানি / 1 / 0<br>ঝরণার পানি / 1 / 0<br>বৃষ্টির পানি / 1 / 0<br>বোতলের পানি / 1 / 0<br>নদী, পকুর, খাল-বিল অথবা সেচ থেকে প্রাপ্ত পানি / 1 / 0 | ☐☐ | |
| 210 | আপনি আপনার গৃহস্থালীর কাজের জন্য প্রধানত (যেমন, রান্নাবান্না, হাত ধোয়া, গোসল করা) কোথা থেকে পানি সংগ্রহ করেন? | **প্রধান উৎস** / **হ্যাঁ** / **না**<br>পাইপের পানি / 1 / 0<br>নলকুপ / 1 / 0<br>কুয়ার পানি / 1 / 0<br>ঝরণার পানি / 1 / 0<br>বৃষ্টির পানি / 1 / 0<br>বোতলের পানি / 1 / 0<br>নদী, পকুর, খাল-বিল অথবা সেচ থেকে প্রাপ্ত পানি / 1 / 0 | ☐☐ | |
| 211 | আপনার পরিবারের সদস্যরা সাধারণত কি ধরণের পায়খানা ব্যবহার করেন? | **পায়খানারধরণ** / **হ্যাঁ** / **না**<br>ফ্লাশ/স্যানিটারী টয়লেট / 1 / 0<br>মাটির পায়খানা / 1 / 0<br>বাস্কেট পায়খানা / 1 / 0<br>ঝুলন্ত পায়খানা / 1 / 0<br>ঝোপ/মাঠ/জঙ্গল / 1 / 0 → | ☐☐ | 213 |
| 212 | আপনি কি অন্য পরিবারের সাথে পায়খানা ভাগাভাগি করেন? | হ্যাঁ.....1<br>না.....0 | ☐ | |

| NO. | QUESTIONS AND FILTERS | CODING CATEGORIES | CODES | SKIP |
|---|---|---|---|---|
| 213 | আপনার বা আপনার খানায় বসবাসরত কোন সদস্যদের কি পার্শে বর্ণিত উপকরণগুলো আছে?<br><br>**প্রোব করুন ঃ প্রতিটি উপকরণের ক্ষেত্রে প্রতিটি সঠিক স্থান বের করে টিক চিহ্ন দিন।**<br><br>**(একাধিক উত্তর হতে পারে)** | **উপকরণসমূহ** / **হ্যাঁ** / **না**<br>বিদ্যুৎ সংযোগ 1 0<br>রেডিও/টেলিভিশন 1 0<br>কম্পিউটার/আইপ্যাড 1 0<br>মোবাইল ফোন 1 0<br>টেলিফোন 1 0<br>রেফ্রিজারেটর 1 0<br>আলমিরা/ওয়ারড্রব 1 0<br>টেবিল 1 0<br>চেয়ার 1 0<br>ঘড়ি 1 0<br>বাইসাইকেল 1 0<br>মোটর সাইকেল/স্কুটার/টেম্পো 1 0<br>প্রানী টানা গাড়ি (ঘোড়াগাড়ি, গরুর গাড়ি) 1 0<br>গাড়ি /বাস/ট্রাক 1 0<br>ইঞ্জিনচালিত নৌকা 1 0<br>রিক্সা/ভ্যান 1 0 | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ | |
| 214 | আপনার পরিবারে হাঁস, মুরগী, গরু, ছাগল, ভেড়া, মহিষ আছে কিনা? | হ্যাঁ.....1<br>না.....0 | ☐ | |
| 215 | আপনার পরিবারের নিজস্ব কোন বসতভিটা আছে কিনা? | হ্যাঁ.....1<br>না.....0 | ☐ | |
| 216 | আপনার পরিবারের নিজস্ব বসতভিটা ছাড়া অন্য কোন জমি আছে কিনা? | হ্যাঁ.....1<br>না.....0 | ☐ | |
| 217 | আপনার ঘরের মেঝে কি দিয়ে তৈরী? | **উপকরণসমূহ** / **হ্যাঁ** / **না**<br>প্রাকৃতিক মেঝে (মাটি/বালি) 1 0<br>অপূর্নাঙ্গ মেঝে (বাঁশ/কাঠ) 1 0<br>পূর্নাঙ্গ মেঝে (সিরামিক, টাইলস, সিমেন্ট, কার্পেট) 1 0 | ☐☐ | |
| 218 | আপনার ঘরের ছাদ কি দিয়ে তৈরী? | **উপকরণসমূহ** / **হ্যাঁ** / **না**<br>প্রাকৃতিক উপাদান (ছন বা খড়) 1 0<br>অপূর্নাঙ্গ ছাদ (বাশ বা কাটের তক্তা, কার্ডবোর্ড) 1 0<br>পূর্নাঙ্গ ছাদ (টিন, কাঠ, টাইলস্, সিমেন্ট) 1 0 | ☐☐ | |
| 219 | আপনার ঘরের দেয়াল কি দিয়ে তৈরী? | **উপকরণ** / **হ্যাঁ** / **না**<br>প্রাকৃতিক দেয়াল (বেত/Palm/ Frunks, Dirt) 1 0<br>অপূর্নাঙ্গ দেয়াল (বাঁশ ও কাদা, পাথর ও কাদা কাঠের তক্তা) 1 0<br>পূর্নাঙ্গ দেয়াল (টিন, সিমেন্ট, পাথর, ইট, কাঠ) 1 0 | ☐☐ | |
| 220 | আপনার ধর্ম কি? | ইসলাম.....01<br>হিন্দু.....02<br>বৌদ্ধ .....03<br>খ্রীষ্টান .....04<br>অন্যান্য (নির্দিষ্টভাবে উল্লেখ করুন).....99 | ☐ | |
| 221 | আপনার বৈবাহিক অবস্থা কি? | বিবাহিত .....01<br>অবিবাহিত.....02<br>পরিত্যাক্তা .....03<br>তালাকপ্রাপ্ত.....04<br>বিধবা.....05<br>অন্যান্য (নির্দিষ্টভাবে উল্লেখ করুন).....99 | ☐ | |
| 222 | আপনি কি কখনও জীবিত অথবা মৃত সন্তান প্রসব করেছেন? | হ্যাঁ.....1<br>না.....0 → | ☐ | 225 |

| NO. | QUESTIONS AND FILTERS | CODING CATEGORIES | CODES | SKIP |
|---|---|---|---|---|
| 223 | আপনার বর্তমানে কতজন সন্তান জীবিত আছে? | সংখ্যায় নির্দিষ্ট করে লিখুন ..... | ☐ | |
| 224 | আপনার কতজন সন্তান মারা গেছে? | সংখ্যায় নির্দিষ্ট করে লিখুন ..... | ☐ | |
| 225 | আপনি কি কখনও জন্মনিয়ন্ত্রণ বড়ি গ্রহণ/সেবন করেছেন? | হ্যাঁ.....1<br>না.....0 → | ☐ | 227 |
| 226 | আপনি সর্বমোট কত বছর জন্মনিয়ন্ত্রণ বড়ি সেবন করেছেন? | পূর্ণ বছরে লিখুন ..... | ☐☐ | |
| 227 | আপনার ওজন কত (কেজিতে)? | দয়া করে পরিমাপ করুন ..... | ☐☐ | |
| 228 | আপনার উচ্চতা কত (সেন্টিমিটারে)? | দয়া করে পরিমাপ করুন ..... | ☐☐ | |
| 229 | গত তিন বছরে আপনি আপনার রক্তের গ্লুকোজ বা ডায়াবেটিস পরীক্ষা করেছেন কি? | হ্যাঁ.....1<br>না.....0 | ☐ | |
| 230 | ডাক্তার বা অন্য কোন স্বাস্থ্যকর্মী আপনাকে কখনও বলেছেন কি আপনার ডায়াবেটিস আছে? | হ্যাঁ.....1<br>না.....0 | ☐ | |

## সেকশন ৩: গর্ভাশয়ের মুখে ক্যান্সার সম্পর্কে জ্ঞান ও এর পরীক্ষার (Sereening) ক্ষেত্রে বাধাসমূহ

| NO | QUESTIONS AND FILTERS | CODING CATEGORIES | CODES | SKIP |
|---|---|---|---|---|
| 301 | আপনি কি কখনও গর্ভাশয়ের মুখে ক্যান্সার সম্পর্কে শুনেছেন বা জানেন? | হ্যাঁ..... 1<br>না..... 0 → | ☐ | 401 |
| 302 | আপনার বা আপনার পরিবারের কোন সদস্যদের কি গর্ভাশয়ের মুখে ক্যান্সার ছিল? | (see table below) | ☐ | |
| 303 | আপনি কি এমন কোন লক্ষণের কথা বলতে পারবেন, যা একজন মহিলার গর্ভাশয়ের মুখে ক্যান্সার রয়েছে বলে ইঙ্গিত করে? | হ্যাঁ..... 1<br>না..... 0 → | ☐ | 305 |
| 304 | গর্ভাশয়ের মুখে ক্যান্সার এর প্রধান লক্ষণ গুলি কি কি?<br>**(একাধিক উত্তর হতে পারে)** | (see table below) | ☐ | |
| 305 | আপনি কখনও শুনেছেন কি যে স্ক্রিনিং এর মাধ্যমে মহিলাদের গর্ভাশয়ের মুখে ক্যান্সার নির্ণয় করা যায় ? | হ্যাঁ..... 1<br>না..... 0 → | ☐ | 401 |
| 306 | আপনি কি জানেন গর্ভাশয়ের মুখে ক্যান্সার স্ক্রিনিং এর প্রধান পদ্ধতিগুলি কি কি? | হ্যাঁ..... 1<br>না..... 0 → | ☐ | 308 |
| 307 | স্ক্রিনিং এর প্রধান পদ্ধতিগুলি কি কি?<br>**(একাধিক উত্তর হতে পারে)** | (see table below) | ☐ | |
| 308 | আপনি কি কখনও গর্ভাশয়ের মুখে ক্যান্সার স্ক্রিনিং করেছেন? | হ্যাঁ..... 1<br>না..... 0 → | ☐ | 311 |

| | হ্যাঁ | না | জানি না | বলতে চাই না |
|---|---|---|---|---|
| আপনার | 1 | 2 | 77 | 88 |
| মা | 1 | 2 | 77 | 88 |
| দাদী | 1 | 2 | 77 | 88 |
| নানী | 1 | 2 | 77 | 88 |
| মেয়ে | 1 | 2 | 77 | 88 |
| বোন | 1 | 2 | 77 | 88 |
| খালা | 1 | 2 | 77 | 88 |
| ফুফু | 1 | 2 | 77 | 88 |

| **লক্ষণ** | হ্যাঁ | না |
|---|---|---|
| মাসিক চলাকালীন ব্যতিত যোনি পথ থেকে রক্তপাত | 1 | 0 |
| যোনিপথে স্রাব বের হওয়া | 1 | 0 |
| যৌন মিলনের পরে রক্তপাত | 1 | 0 |
| যৌনমিলনের পরে ব্যাথা/অস্বস্থিবোধ করা | 1 | 0 |
| রজোবন্ধ (menopause) হবার পর রক্তপাত | 1 | 0 |

| **পদ্ধতিগুলি** | হ্যাঁ | না |
|---|---|---|
| প্যাপ টেস্ট (pap smear/pap test)- | 1 | 0 |
| ভি, আই, এ, টেস্ট (visual inspection of cervix after applying acetic acid) | 1 | 0 |
| এইচ, পি, ভি, টেস্ট (Human Papilloma virus) | 1 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 309 | আপনি কি ধরনের স্ক্রিনিং করেছেন? | প্যাপ টেস্ট (pap smear/pap test)-.....01<br>ভি, আই, এ, টেস্ট (visual inspection of cervix after applying acetic acid).....02<br>এইচ, পি, ভি, টেস্ট (Human Papilloma virus).....03<br>জানিনা/মনে নেই .....77 | | | | |
| 310 | আপনি কতবার গর্ভাশয়ের মুখে ক্যান্সার স্ক্রিনিং করেছেন? | সংখ্যায় লিখুন..... | | | | |
| 311 | আপনি কেন গর্ভাশয়ের মুখে ক্যান্সার স্ক্রিনিং করেননি?<br><br>**(একাধিক কারণ হতে পারে)** | **কারণসমূহ** | হ্যাঁ | না | | |
| | | স্ক্রিনিং করা প্রয়োজন জানতাম না | 1 | 0 | | |
| | | স্ক্রিনিং এর জন্য কেথায় যেতে হবে জানতাম না | 1 | 0 | | |
| | | কোন উপসর্গ ছিল না | 1 | 0 | | |
| | | এই রোগ ও চিকিৎসা সম্পর্কে কোন তথ্য ছিল না | 1 | 0 | | |
| | | ব্যয়বহুল (হাসপাতালে অবস্থান, চিকিৎসা, ঔষধ) | 1 | 0 | | |
| | | চিকিৎসা কেন্দ্র অনেক দুরে | 1 | 0 | | |
| | | যাতায়াত সমস্যা | 1 | 0 | | |
| | | **পরিবারের লোকজন সম্মতি দেয়নি** | 1 | 0 | | |
| | | সাথে যাবার মত কেউ ছিল না | 1 | 0 | | |
| | | ক্যান্সার বিষয়ে কারো সাথে আলাপ করতে লজ্জাবোধ করা | 1 | 0 | | |
| | | পরীক্ষা সম্পর্কে ভয় যদি ক্যান্সার ধরা পড়ে | 1 | 0 | | |
| | | পরিবার, বন্ধু ও প্রতিবেশীদের থেকে প্রত্যাখ্যাত হবার ভয় | 1 | 0 | | |
| | | সেবাদানকারী/স্ক্রিনিংকারীর সামনে বিবস্ত্র হতে হবে এই লজ্জা/ভয় | 1 | 0 | | |
| | | স্ক্রিনিং এর জন্য ব্যথ্যাযুক্ত যন্ত্রপাতি ব্যবহার করা | 1 | 0 | | |
| | | সেবাদানকারী/স্ক্রিনিংকারীর খারাপ মনোভাব | 1 | 0 | | |
| | | মহিলা স্ক্রিনিংকারীর অভাব | 1 | 0 | | |
| | | সরকারী আর্থিক সহায়তার অভাব | 1 | 0 | | |
| | | সময়ের অভাব | 1 | 0 | | |
| | | দীর্ঘস্থায়ী অসুস্থতা | 1 | 0 | | |
| | | **ধর্মীয় কারন** | 1 | 0 | | |
| | | অন্যান্য | 1 | 0 | | |
| 312 | যদি ধর্মীয় কারণ হয়, দয়া করে ব্যাখ্যা করবেন কি?<br><br>**(একাধিক উত্তর হতে পারে)** | **ধর্মীয় কারণসমূহ** | হ্যাঁ | না | | |
| | | গর্ভাশয়ের মুখে ক্যান্সার সৃষ্টি কর্তার ইচ্ছাতেই হয় | 1 | 0 | | |
| | | একমাত্র সৃষ্টিকর্তাই সুস্থ করতে পারেন | 1 | 0 | | |
| | | অন্যের সামনে বিবস্ত্র হওয়া ধর্মীয়ভাবে নিষিদ্ধ | 1 | 0 | | |
| | | অন্যান্য ধর্মীয় কারণ, নির্দিষ্ট করে বলুন | 1 | 0 | | |
| 313 | যদি পরিবার অনুমতি না দেয়, দয়া করে ব্যাখ্যা করবেন কি ?<br><br>**(একাধিক উত্তর হতে পারে)** | **পারিবারিক কারণসমূহ** | হ্যাঁ | না | | |
| | | স্বামী ডাক্তারের কাছে যাবার অনুমতি দেয় না | 1 | 0 | | |
| | | স্বামী আর্থিক সহায়তা দেয় না | 1 | 0 | | |
| | | শশুর-শাশুড়ী ডাক্তারের কাছে যাবার অনুমতি দেয় না | 1 | 0 | | |
| | | অন্যান্য পারিবারিক কারণ, নির্দিষ্ট করে বলুন | 1 | 0 | | |

## সেকশন ৪: স্তনক্যান্সার সম্পর্কে জ্ঞান ও এর পরীক্ষার (Sereening) ক্ষেত্রে বাধাসমূহ

| NO. | QUESTIONS AND FILTERS | CODING CATEGORIES | CODES | SKIP |
|---|---|---|---|---|
| 401 | আপনি কি কখনও স্তন ক্যান্সার সম্পর্কে শুনেছেন বা জানেন? | হ্যাঁ .....1<br>না .....0 → 501 | ☐ | |
| 402 | আপনার বা আপনার পরিবারের কোন সদ্যসের কি স্তন ক্যান্সার ছিল? | সদস্য / হ্যাঁ / না / জানিনা / বলতে চাই না<br>আপনার 1 2 77 88<br>মা 1 2 77 88<br>দাদী 1 2 77 88<br>নানী 1 2 77 88<br>মেয়ে 1 2 77 88<br>বোন 1 2 77 88<br>খালা 1 2 77 88<br>ফুফু 1 2 77 88 | ☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐<br>☐ | |
| 403 | আপনি কি এমন কোন লক্ষনের কথা বলতে পারবেন যা একজন মহিলার স্তন ক্যান্সার রয়েছে বলে ইঙ্গিত করে? | হ্যাঁ .....1<br>না .....0 → 405 | ☐ | |
| 404 | স্তন ক্যান্সার এর প্রধান লক্ষণ গুলি কি কি?<br>**(একাধিক উত্তর হতে পারে)** | **লক্ষণসমূহ** / হ্যাঁ / না<br>স্তনের বোটা দিয়ে কিছু বের হওয়া 1 0<br>স্তনের ভিতরে চাকা অনুভব করা 1 0<br>স্তনে ব্যাথা 1 0<br>স্তনের আকার পরিবর্তিত হওয়া 1 0<br>স্তনের ত্বকে ঘা 1 0<br>স্তনের ত্বকে লালচে ভাব 1 0 | ☐<br>☐<br>☐<br>☐<br>☐<br>☐ | |
| 405 | একজন মহিলার স্তন ক্যান্সার সনাক্তকরনের জন্য গৃহিত পদ্ধতিগুলি সম্পর্কে আপনি শুনেছেন কি ? | হ্যাঁ .....1<br>না .....0 → 501 | ☐ | |
| 406 | সনাক্তকরনের প্রধান পদ্ধতিগুলি কি কি? | **পদ্ধতিগুলি** / হ্যাঁ / না<br>নিজেই নিজের স্তন পরীক্ষা করা 1 0 → 501<br>ডাক্তার বা নার্স এর সাহায্য পরীক্ষা করা 1 0 → 501<br>ম্যামোগ্রাম (Mammogrphy) করা 1 0 → 501 | ☐ | |
| 407 | আপনি কি জানেন, কিভাবে নিজেই নিজের স্তনের চাকা বা অন্যান্য অস্বাভাবিকতা পরীক্ষা করতে হয়? | হ্যাঁ .....1<br>না .....0 → 410 | ☐ | |
| 408 | আপনি কি কখনও আপনার স্তনের চাকা, ফোলা অথবা অস্বাভাবিকতা পরীক্ষা করেছেন? | হ্যাঁ .....1 → 410<br>না .....0 | ☐ | |
| 409 | আপনি কেন নিজেই আপনার স্তন পরীক্ষা করেননি ?<br>**(একাধিক উত্তর হতে পারে)** | **পদ্ধতিগুলি** / হ্যাঁ / না<br>আমি জানতাম না এটি গুরুত্বপূর্ণ 1 0<br>আমি জানতাম না কিভাবে করতে হয় 1 0<br>আমি জানতাম না কখন করতে হয় 1 0<br>আমি মনে করিনা আমার স্তনে কোন সমস্যা আছে 1 0<br>আমি এটা করতে লজ্জা ও অস্বস্তিবোধ করি 1 0 | ☐<br>☐<br>☐<br>☐<br>☐<br>☐ | |
| 410 | আপনি কি কখনও ডাক্তার, নার্স বা অন্য কোন স্বাস্থ্য কর্মীর কাছে স্তন পরীক্ষা করেছেন? | হ্যাঁ .....1<br>না .....0 → 412 | ☐ | |
| 411 | আপনার চিকিৎসা সেবাদানকারী গত পাঁচ বছরে কতবার আপনার স্তন পরীক্ষা করেছেন? | সংখ্যায় লিখুন..... | | |
| 412 | আপনি কি কখনও মেমোগ্রাম করেছেন? (মেমোগ্রাম হচ্ছে এক ধরনের এক্সরে, যা দ্বারা স্তন ক্যান্সার পরীক্ষা করা হয়।) | হ্যাঁ .....1<br>না .....0 → 414 | ☐ | |
| 413 | গত পাঁচ বছরে আপনি কতবার মেমোগ্রাম করেছেন? | সংখ্যায় লিখুন..... | ☐ | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 414 | আপনি কেন স্তন ক্যান্সার (পরীক্ষাগারে পরীক্ষা বা মেমোগ্রাম) স্ক্রিনিং করেননি?<br><br>**(একাধিক কারণ হতে পারে)** | **কারণসমূহ** | হ্যাঁ | না | | |
| | | স্ক্রিনিং করা প্রয়োজন জানতাম না | 1 | 0 | | |
| | | স্ক্রিনিং এর জন্য কোথায় যেতে হবে জানতাম না | 1 | 0 | | |
| | | কোন লক্ষণ ছিলনা | 1 | 0 | | |
| | | এই রোগ ও চিকিৎসা সম্পর্কে কোন তথ্য ছিল না | 1 | 0 | | |
| | | ব্যয়বহুল (হাসপাতালে অবস্থান, চিকিৎসা, ঔষধ) | 1 | 0 | | |
| | | চিকিৎসা কেন্দ্র অনেক দুরে | 1 | 0 | | |
| | | যাতায়াত সমস্যা | 1 | 0 | | |
| | | **পরিবারের লোকজন সম্মতি দেয়নি** | 1 | 0 | | |
| | | সাথে যাবার মত কেউ ছিল না | 1 | 0 | | |
| | | স্তন ক্যান্সার বিষয়ে কারো সাথে আলাপ করতে লজ্জাবোধ করা | 1 | 0 | | |
| | | পরীক্ষা সম্পর্কে ভয়, যদি স্তন ক্যান্সার ধরা পড়ে | 1 | 0 | | |
| | | ক্যান্সারের কারনে বিবাহ বিচ্ছেদের ভয় | 1 | 0 | | |
| | | মেমোগ্রাম সম্পর্কে ভয় | 1 | 0 | | |
| | | পরিবার, বন্ধু, প্রতিবেশীদের থেকে প্রত্যাখাত হবার ভয় | 1 | 0 | | |
| | | সেবাদানকারী/স্ক্রিনিংকারীর সামনে বিবস্ত্র হতে হবে এই লজ্জা/ভয় | 1 | 0 | | |
| | | স্তন ক্যান্সার পরিবারে অভিশাপ বয়ে আনে | 1 | 0 | | |
| | | মহিলা স্ক্রিনিংকারীর অভাব | 1 | 0 | | |
| | | সরকারী আর্থিক সহায়তার অভাব | 1 | 0 | | |
| | | সময়ের অভাব | 1 | 0 | | |
| | | দীর্ঘস্থায়ী অসুস্থতা | 1 | 0 | | |
| | | **ধর্মীয় কারন** | 1 | 0 | | |
| | | অন্যান্য | 1 | 0 | | |
| 415 | যদি ধর্মীয় কারণ হয়, দয়া করে ব্যাখ্যা করবেন কি?<br><br>**(একাধিক কারণ হতে পারে)** | **ধর্মীয় কারণসমূহ** | হ্যাঁ | না | | |
| | | স্তন ক্যান্সার সৃষ্টি কর্তার ইচ্ছাতেই হয় | 1 | 0 | | |
| | | একমাত্র সৃষ্টিকর্তাই সুস্থ করতে পারেন | 1 | 0 | | |
| | | অন্যের সামনে বিবস্ত্র হওয়া ধর্মীয়ভাবে নিষিদ্ধ | 1 | 0 | | |
| | | অন্যান্য ধর্মীয় কারণ, নির্দিষ্ট করে বলুন | 1 | 0 | | |
| 416 | যদি পরিবার অনুমতি না দেয়, দয়া করে ব্যাখ্যা করবেন কি ?<br><br>**(একাধিক কারণ হতে পারে)** | **পারিবারিক কারণসমূহ** | হ্যাঁ | না | | |
| | | স্বামী ডাক্তারের কাছে যাবার অনুমতি দেয় না | 1 | 0 | | |
| | | স্বামী আর্থিক সহায়তা দেয় না | 1 | 0 | | |
| | | শশুর-শাশুড়ী ডাক্তারের কাছে যাবার অনুমতি দেয় না | 1 | 0 | | |
| | | অন্যান্য পারিবারিক কারণ, নির্দিষ্ট করে বলুন | 1 | 0 | | |

## সেকশন ৫: প্রস্রাব নির্গমণ (Urinary incontinence)

এ পর্যায়ে আমি আপনাকে আপনার স্বাস্থ্য সম্পর্কিত বিষয়ে কিছু প্রশ্ন করতে যাচ্ছি।

প্রথম প্রশ্নটি হচ্ছে আপনি কি কখনও আপনা-আপনি প্রস্রাব নির্গত হবার মত সমস্যা অনুভব করেছেন? এর মধ্যে কিছু প্রশ্ন আপনার কাছে বিব্রতকর/অস্বস্তিকর মনে হতে পারে। তবে আপনি মনে রাখবেন প্রস্রাব নির্গত হবার সমস্যাটি মহিলাদের মধ্যে খুবই সাধারন/প্রচলিত। তাই এ বিষয়ে আপনার বিব্রত হবার কোন কারন নাই। এই প্রশ্নগুলোর উত্তর দিলে আমরা খুব সহজেই বুঝতে পারবো যে, এই সমস্যাটি বাংলাদেশের মহিলাদের মধ্যে কি পরিমান রয়েছে এবং কিভাবে তা মহিলাদেরকে প্রভাবিত করে।

সাক্ষাৎকার গ্রহনকারী প্রতিটি প্রশ্নের উত্তরের জন্য টিক (√) চিহ্ন দিবে।

## Question for Urinary Incontinence Diagnosis (QUID)

| NO. | QUESTIONS AND FILTERS | CODING CATEGORIES | | | | | | CODES | SKIP |
|---|---|---|---|---|---|---|---|---|---|
| | আপনার কি প্রায়ই আপনা আপনি প্রস্রাব বের হয়ে যায় (যদি তা সামান্য ফোটাও হয়)/যৌনিপথে ভেজা অনুভব করেন/ অন্তর্বাস,পায়জামা, পেটিকোট ভিজে যায়..... | কখনও হয় না | কদাচিৎ হয় | হঠাৎ কখনও হয় | প্রায়ই হয় | বেশির ভাগ সময়ই হয় | সবসময় হয় | | |
| 501 | যখন আপনি হাঁচি বা কাশি দেন? | 0 | 1 | 2 | 3 | 4 | 5 | ☐ | |
| 502 | যখন আপনি নিচু হয়ে কোন কাজ করেন বা কিছু উপরে ওঠান? | 0 | 1 | 2 | 3 | 4 | 5 | ☐ | |
| 503 | যখন আপনি দ্রুত হাটেন/ জগিং করেন/ ব্যায়াম করেন? | 0 | 1 | 2 | 3 | 4 | 5 | ☐ | |
| 504 | প্রস্রাবের জন্য টয়লেট গিয়ে কাপড় খোলার আগেই প্রসাব বের হয়ে যায়? | 0 | 1 | 2 | 3 | 4 | 5 | ☐ | |
| 505 | প্রস্রাবের সময় হলে জোরালো ও অস্বস্তিকর চাপ অনুভব করেন এবং টয়লেটে যাবার আগেই প্রস্রাব বের হয়ে যায় (সামান্য ফোটা হলেও) | 0 | 1 | 2 | 3 | 4 | 5 | ☐ | |
| 506 | তাড়াহুড়ো করে টয়লেটে যেতে হয়, কারন হঠাৎ করেই প্রচন্ড প্রস্রাবের চাপ অনুভব করেন? | 0 | 1 | 2 | 3 | 4 | 5 | ☐ | |

## সেকশন ৬: পায়খানা নির্গমণ (Fecal incontinence)

এ পর্যায়ে আমি আপনাকে আপনার পেট ও মুত্রথলির বিভিন্ন সমস্যা সংক্রান্ত লক্ষণ বিষয়ে কিছু প্রশ্ন করতে যাচ্ছি। যদি আপনার এসব সমস্যা থাকে তবে তা আপনাকে কতটুকু বিব্রত করে। প্রশ্নগুলির উত্তর দেবার সময় দয়া করে গত **তিন মাসের** লক্ষণের ভিত্তিতে উত্তর দিবেন।

সাক্ষাৎকার গ্রহণকারী সঠিক **ঘরটিতে/ঘরগুলিতে টিক** চিহ্ন দিবে

| | | | | |
|---|---|---|---|---|
| আপনার কি গত **তিন মাসে** এই সমস্যাগুলো হয়েছিল? | | | | |
| না - 0 হ্যাঁ | | | | |
| হ্যা হলে, তা আপনাকে কতটুকু বিব্রত করে? | একটুও না<br>1 | কিছুটা<br>2 | মোটামুটি<br>3 | কিছুটা বেশি<br>4 |

**Pelvic Organ Prolapse Distress Inventory 6 (POPDI-6)**

| NO. | QUESTIONS AND FILTERS | CODING CATEGORIES | | | | | CODE | SKIP |
|---|---|---|---|---|---|---|---|---|
| | | না | একটুও না | কিছুটা | মোটামুটি | কিছুটা বেশি | | |
| 601 | আপনি কি প্রায়ই আপনার তলপেটে চাপ অনুভব করেন? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 602 | আপনি কি প্রায়ই আপনার তলপেটের নিচে ভারী এবং নিস্তেজ বোধ করেন? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 603 | আপনি কি প্রায়ই অনুভব করেন/দেখতে পান যে, আপনার যৌনিপথ থেকে কিছু বের হয়ে আসছে? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 604 | আপনাকে কি প্রায়ই পায়খানা (Bowel movement) শেষ করার জন্য পায়ুপথ বা যোনিপথে চাপ প্রয়োগ করতে হয়? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 605 | আপনি কি প্রায়ই প্রস্রাব করার সময় অনুভব করেন যে, আপনার প্রস্রাব পুরোপুরি শেষ হয়নি বা মুত্রথলি খালি হয়নি? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 606 | আপনাকে কি প্রায়ই প্রস্রাব শুরু বা শেষ করার জন্য যোনিপথে আঙ্গুল দিয়ে চাপ প্রয়োগ করতে হয়? | 0 | 1 | 2 | 3 | 4 | ☐ | |

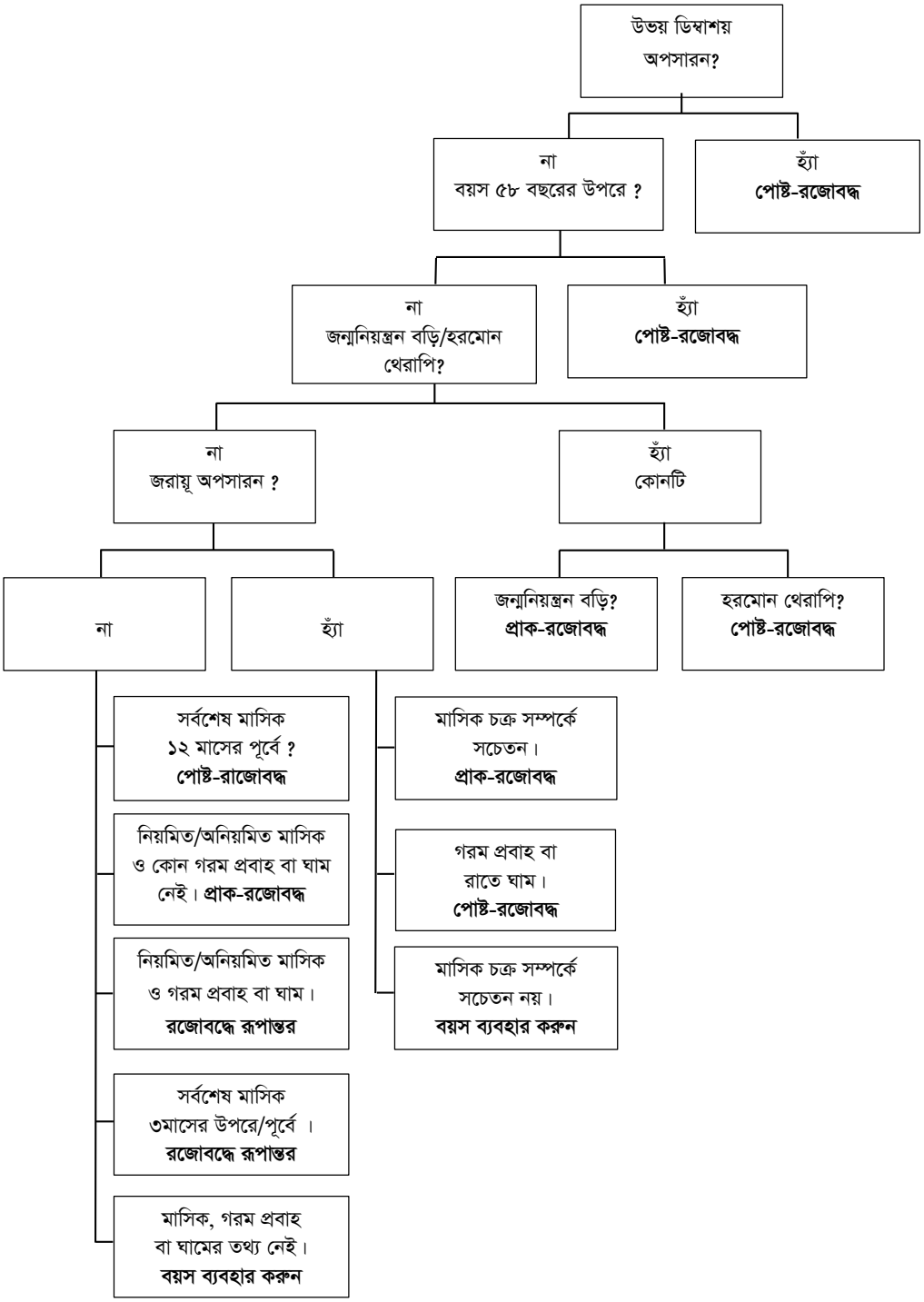
## Colorectal-Anal Distress Inventory 8 (CRADI-8)

| NO. | QUESTIONS AND FILTERS | CODING CATEGORIES | | | | | CODE | SKIP |
|---|---|---|---|---|---|---|---|---|
| | | না | একটুও না | কিছুটা | মোটামুটি | কিছুটা বেশি | | |
| 607 | আপনাকে কি প্রায়ই পায়খানা শেষ করার জন্য খুব বেশি জোর/চাপ প্রয়োগ করতে হয়? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 608 | আপনার কি প্রায়ই মনে হয় যে পায়খানা শেষ হবার পরও অন্ত্র পুরোপুরি খালি হয়নি? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 609 | আপনার পায়খানা শক্ত/স্বাভাবিক হওয়া সত্বেও প্রায়ই কি আপনার টয়লেটে যাবার আগেই পায়খানা বের হয়ে যায়? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 610 | আপনার পায়খানা যখন পাতলা থাকে তখন কি প্রায়ই আপনার পায়খানা বের হয়ে যায়? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 611 | আপনার পায়ুপথ/মলদ্বার দিয়ে কি প্রায়ই বায়ু/বাষ্প বের হয় যা আপনার নিয়ন্ত্রণের বাইরে? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 612 | আপনি কি প্রায়ই পায়খানা করার সময় ব্যাথা অনুভব করেন? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 613 | আপনি কি প্রায়ই পায়খানা করার জন্য জরুরী অবস্থা অনুভব করেন এবং তাড়াহুড়ো করে টয়লেটে যেতে হয়? | 0 | 1 | 2 | 3 | 4 | ☐ | |
| 614 | আপনার কি প্রায়ই পায়খানা করার সময় বা পরে আপনার অন্ত্রের কিছু অংশ মলদ্বারের বাইরে বের হয়ে আসে? | 0 | 1 | 2 | 3 | 4 | ☐ | |

## সেকশন ৭: রজোবন্ধ (Menopause)

রজোবন্ধ (Menopause) হলো এমন সময় যখন একজন মহিলার মাসিক বা ঋতুস্রাব সম্পূর্ণরূপে বন্ধ হয়ে যায় এবং সে আর কখনও সন্তানধারন করতে পারে না। আমি এখন প্রবাহ চিত্রের মাধ্যমে কিছু প্রশ্ন করতে যাচ্ছি যে আপনি জীবনের এই সন্ধিক্ষণে (রজোবন্ধ) পৌঁছেছেন কিনা?

এটা গুরুত্বপূর্ণ যে, আপনি প্রতিটি প্রশ্নের উত্তর দিয়েছেন, যদিও আপনি মনে করেন এটি আপনার জন্য প্রযোজ্য নয়।




| | | | | |
|---|---|---|---|---|
| 700 | উপরোক্ত প্রবাহচিত্র অনুযায়ী স্বাক্ষাৎকার প্রদানকারী রজোবন্ধের কোন পর্যায়ে আছেন? | প্রাক-রজোবন্ধ ..... 1<br>রজোবন্ধে রূপান্তর ..... 2<br>পোষ্ট-রজোবন্ধ ..... 3 | ☐ | |

## রজোবন্ধ উপসর্গ [Menopause-Specific Quality of Life (MENQOL)]

পরবর্তী প্রশ্নগুলো রজোবন্ধ লক্ষণ সম্পর্কিত, যখন মহিলারা রজোবন্ধ বা রজোবন্ধ এর কাছাকাছি সময়ে উপনীত হয়।

দয়া করে লক্ষণগুলোর **গতমাসের** অভিজ্ঞতার ভিত্তিতে প্রতিটি প্রশ্নের উত্তর দিবেন।

☐ আপনার যদি গতমাসে এই সমস্যাগুলো না হয়ে থাকে তবে শুধুমাত্র **"না"** ঘরে **টিক চিহ্ন** দিবেন এবং পরবর্তী প্রশ্নে চলে যাব।

☐ আপনার যদি গতমাসে এই সমস্যাগুলো হয়ে থাকে তবে **"হ্যা"** ঘরে **টিক চিহ্ন** দিবেন এবং আপনার কাছে জানতে চাইবো এটা আপনাকে কতটুকু বিব্রত করে। **( দয়া করে সেই ঘরে টিক চিহ্ন দিন যা নির্দেশ করে যে সমস্যাটি সাক্ষাৎকার প্রদানকারীকে কতটুকু বিব্রত করে)**

| আপনার কি **গত মাসে** এই সমস্যাগুলো হয়েছিল? | | | | | | | |
|---|---|---|---|---|---|---|---|
| না - 0 হ্যাঁ | | | | | | | |
| হ্যা হলে, তা আপনাকে কতটুকু বিব্রত করে? | একটুও বিব্রত করেনা 1 | কদাচিৎ বিব্রত করে 2 | সামান্য বিব্রত করে 3 | মোটামুটি বিব্রত করে 4 | প্রায়ই বিব্রত করে 5 | খুব বিব্রত করে 6 | অতিমাত্রায় বিব্রত করে 7 |

| NO | আপনার কি গত মাসে এই সমস্যাগুলোর অভিজ্ঞতা হয়েছে? | | গত মাসে যদি এই সমস্যাগুলোর অভিজ্ঞতা হয়ে থাকে তা হলে তা আপনাকে কতটুকু বিব্রত করেছে | | | | | | | CODE |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | |
| 701 | শরীরে জ্বালাপোড়া অনুভব করা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 702 | রাতের বেলায় ঘামা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 703 | শরীর ঘামা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 704 | খিট খিটে মেজাজ অনুভব করা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 705 | স্নায়ুবিক দূর্বলতা বা উদ্বিগ্নতা অনুভব করা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 706 | স্মৃতিশক্তি কমে যাওয়া | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 707 | স্বাভাবিকের তুলনায় কম কাজ করতে পারা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 708 | বিষন্নতা অনুভব করা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 709 | অন্যদের সাথে ধৈর্য্যহীন হয়ে পড়া | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 710 | একা থাকতে ইচ্ছা হওয়া | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 711 | গ্যাসের ব্যাথা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 712 | পেশী ও জয়েন্টে ব্যাথা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 713 | ক্লান্তি অনুভব করা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 714 | ঘুমের সমস্যা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 715 | মাথা, ঘাড় ও পিঠে ব্যাথা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 716 | শারিরীক শক্তি কমে যাওয়া | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 717 | মনের জোর কমে যাওয়া | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 718 | কর্মশক্তির অভাব বোধ করা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 719 | ত্বক শুষ্ক হয়ে যাওয়া | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 720 | ওজন বেড়ে যাওয়া | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 721 | মুখে লোম বেড়ে যাওয়া | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 722 | চেহারা ও ত্বকে পরিবর্তন আসা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 723 | ফোলা অনুভব করা/ শরীর ফুলে যাওয়া | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 724 | কোমরে ব্যাথা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 725 | ঘনঘন প্রস্রাব করা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 726 | হাসি কাশির সময় অনিচ্ছাকৃতভাবে প্রস্রাব হওয়া | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 727 | যৌন বাসনায় পরিবর্তন আসা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 728 | সহবাসের সময় যৌনাঙ্গ শুকিয়ে যাওয়া | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |
| 729 | স্বামীর সাথে অন্তরঙ্গতা এড়িয়ে চলা | □না-0 | □ 1 | □ 2 | □ 3 | □ 4 | □ 5 | □ 6 | □ 7 | ☐ |

| | | |
|---|---|---|
| ☐ স্বাক্ষাৎকার শেষ করার সময় | ঘন্টা: | মিনিট: |

*অংশগ্রহনের জন্য আপনাকে অসংখ্য ধন্যবাদ।*

## Appendix II

2.1 Ethics approval from the Monash University Human Research Ethics Committee, Melbourne, Australia

MONASH University

**Monash University Human Research Ethics Committee (MUHREC)**
Research Office

# Human Ethics Certificate of Approval

| | |
|---|---|
| **Date:** | **18 July 2013** |
| **Project Number:** | **CF13/1280 - 2013000646** |
| **Project Title:** | **Examining neglected health problems in women at mid-life in Bangladesh** |
| **Chief Investigator:** | **Prof Susan Davis** |
| **Approved:** | **From 18 July 2013 to 18 July 2018** |

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**Terms of approval**

1. The Chief investigator is responsible for ensuring that permission letters are obtained, if relevant, and a copy forwarded to MUHREC before any data collection can occur at the specified organisation. **Failure to provide permission letters to MUHREC before data collection commences is in breach of the National Statement on Ethical Conduct in Human Research and the Australian Code for the Responsible Conduct of Research**.
2. Approval is only valid whilst you hold a position at Monash University.
3. It is the responsibility of the Chief Investigator to ensure that all investigators are aware of the terms of approval and to ensure the project is conducted as approved by MUHREC.
4. You should notify MUHREC immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.
5. The Explanatory Statement must be on Monash University letterhead and the Monash University complaints clause must contain your project number.
6. **Amendments to the approved project (including changes in personnel):** Requires the submission of a Request for Amendment form to MUHREC and must not begin without written approval from MUHREC. Substantial variations may require a new application.
7. **Future correspondence:** Please quote the project number and project title above in any further correspondence.
8. **Annual reports:** Continued approval of this project is dependent on the submission of an Annual Report. This is determined by the date of your letter of approval.
9. **Final report:** A Final Report should be provided at the conclusion of the project. MUHREC should be notified if the project is discontinued before the expected date of completion.
10. **Monitoring:** Projects may be subject to an audit or any other form of monitoring by MUHREC at any time.
11. **Retention and storage of data:** The Chief Investigator is responsible for the storage and retention of original data pertaining to a project for a minimum period of five years.

Professor Nip Thomson
Chair, MUHREC

cc: Prof Robin Bell; Mr Md. Rakibul Islam, Assoc Prof Mohammad Bellal Hossain

2.2 Ethics approval from the Bangladesh Medical Research Council, Dhaka, Bangladesh

বাংলাদেশ চিকিৎসা গবেষণা পরিষদ
Bangladesh Medical Research Council
BMRC

Ref: BMRC/ERC/2013-2014/1336 Date: 17/01/2014

# Ethical Review Committee

**Md. Rakibul Islam**
PhD Student
Department of Epidemiology & Preventive Medicine
Women's Health Research Program
Monash University
Melbourne 3004, Australia.

## Subject: Ethical Clearance

With reference to your application, this is to inform you that your Research Proposal entitled **"Examining Neglected Health Problems in Women at Mid-life in Bangladesh"** has been reviewed and approved by the Ethical Review Committee of Bangladesh Medical Research Council (BMRC).

You are requested to note the following ethical guidelines as mentioned at page 2 (overleaf) of this memo.

[redacted]
MD, MSc, MPH, PhD, FRCP Edin
**Director**



Mohakhali, Dhaka-1212, Bangladesh, [redacted]
[redacted] Website: www bmrc net

## THE ETHICAL GUIDELINES TO BE FOLLOWED BY THE PRINCIPAL/ CO-INVESTIGATORS

- The rights and welfare of individual volunteers are adequately protected.
- The methods to secure informed consent are fully appropriate and adequately safeguard the rights of the subjects (in the case of minors, consent is obtained from parents or guardians).
- The Investigator(s) assume the responsibility of notifying the Ethical Review Committee if there is any change in the methodology of the protofcol involving a risk to the individual volunteers.
- To immediately report to the Ethical Review Committee if any evidence of unexpected or adverse reaction is noted in the subjects under study.
- This approval is subject to P.I.'s reading and accepting the BMRC ethical principles and guidelines currently in operation.