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Abstract

Children are often the first and most affected groups in a disaster. However, their voice in disaster risk reduction (DRR) research and practice is woefully lacking, especially, of those who have multiple and complex vulnerabilities such as living in resource-constrained settings, and poverty. Children are often considered helpless. Nevertheless, there is a growing evidence of children's ability to have a positive impact on their own, their families' and their community's disaster preparedness if they are actively involved in DRR. Despite this, peer-reviewed literature on disaster preparedness or disaster resilience education (DRE) programmes where children are active participants, especially in resource- constrained settings is sparse. Therefore, this PhD research focuses on bridging that gap by actively involving children in the development and delivery of a DRE intervention in the inner-city slums of Chennai, India.

The specific aims of this thesis were to:

a. understand the lived experience of flood-affected children and families;

b. co-develop a DRE intervention with children who also deliver it to their peers in a different neighbourhood, also impacted by floods;

c. explore the acceptability and feasibility of the intervention along with barriers and facilitators to its development and delivery;

d. explore the perceived impact of this intervention on children's mental wellbeing and resilience.

Participatory action research guided the design of this PhD thesis. Thus, Phase one of this thesis, examined the literature and worked with the communities to establish research direction. This exercise determined that including children as active participants in the design and delivery of a DRE intervention was the preferred next step. Collaborating with a local Non-Governmental Organisation (NGO) partner ensured access to flood-affected communities, and their children. Phase two, focused on co-developing and delivering a DRE intervention with the children. Phase three, reported on the

acceptability, feasibility of this intervention, including, related barriers and facilitators.

The findings from this PhD thesis re-emphasized the need for active child participation in DRR. Children were eager to take an active part in DRR. They not only led the intervention development process by identifying issues that were important to them in a disaster situation, but, they also identified intervention delivery strategies to make the intervention interactive, fun, and engaging for other children. They enjoyed the process of developing and delivering the intervention and felt a sense of accomplishment. Parents, community members and staff members of the NGO were proud of and confident in their children's disaster preparedness abilities. Child participation was had a positive effect on their mental wellbeing and resilience. They were less anxious about floods and cyclones. Furthermore, children were passionate and committed to identifying vulnerable communities and disseminating this intervention with the NGO.

This thesis provides an example about how child participation in disaster preparedness can be achieved, even in resource-constrained settings, such as, an inner-city slum of Chennai, India. Future research is required to test the effectiveness of this intervention and create pathways for scale-up and implementation in order to positively impact more children and families, especially those who have multiple and complex vulnerabilities.

Declaration

This thesis is an original work of my research and 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.

Signature: .....

Print Name: REVATHI NUGGEHALLI KRISHNA

Date: .....

Publications during enrolment

The following publications and submissions arose from the research presented in this thesis:

1. **Krishna, R. N.**, Spencer, C., Ronan, K., & Alisic, E. (Under Review). Child Participation in Disaster Resilience Education: Potential impact on child mental wellbeing.

2. **Krishna, R. N.**, Spencer, C., Ronan, K., & Alisic, E. (Under Review). Development of a Child co-developed Disaster Resilience Education Intervention in Chennai, India.

3. **Krishna, R. N.**, Ronan, K., Spencer, C., & Alisic, E. (2021). The lived experience of disadvantaged communities affected by the 2015 South Indian Floods: Implications for disaster risk reduction dialogue. *International Journal of Disaster Risk Reduction,* 54, 102046. https://doi.org/10.1016/j.ijdrr.2021.102046

4. **Krishna, R. N.**, Ronan, K. R., & Alisic, E. (2018). Children in the 2015 South Indian floods: community members' views. *European journal of psychotraumatology*, *9*(Suppl 2), 1486122. DOI: 10.1080/20008198.2018.1486122

5. **Krishna, R. N**., Majeed, S., Ronan, K., & Alisic, E. (2018). Coping with disasters while living in poverty: A systematic review. [Special Issue: 'Adversity in the Asia Pacific region: Challenges facing health and society']. *Journal of Loss and Trauma*, 23(5), 419 – 438. DOI: 10.1080/15325024.2017.1415724

Thesis including published works declaration

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 three original papers published in peer reviewed journals and two submitted publications. The core theme of the thesis is *child participation in Disaster Preparedness activities*. The ideas, development and writing up of all the papers in the thesis were the principal responsibility of myself, the student, working within the *Monash University Accident Research Centre* under the supervision of *Drs. Eva Alisic and Caroline Spencer*. The inclusion of co-authors reflects the fact that the work came from active collaboration between researchers and acknowledges input into team-based research.

My contribution to chapters 2, 4, 5, 6, and 8, where co-authored manuscripts are part of the chapters is listed in the table below.

Thesis Chapter	**Publication Title**	**Status** *(published, in press, accepted or returned for revision,/ submitted)*	**Nature and % of student contribution**	**Co-author name(s) Nature and % of Co-author's contribution***	**Co-author(s), Monash student Y/N***
2	*Coping with disasters while living in poverty: A systematic review*	*Published*	*65%. Concept, data analysis, creation of coding and writing the first draft*	*1) Saadia Majeed, coding of the papers and input into the manuscript 15%* *2) Kevin Ronan, input into the manuscript, 10%* *3) Eva Alisic, input into the*	*No* *No* *No*

				manuscript, 10%	
4	*The lived experience of disadvantaged communities affected by the 2015 South Indian Floods: Implications for disaster risk reduction dialogue*	*Published*	60%. Concept, creation of coding tree for data analysis, completion of data analysis, writing the first draft	*1) Kevin Ronan input into concept creation and double-checking coding 8%* *2) Caroline Spencer, input into the manuscript, 12%* *3) Eva Alisic, input into the manuscript, double-checking coding 20%*	No No No
5	*Children in the 2015 South Indian floods: community members' views.*	Published	65%. Concept, creation of coding tree for data analysis, completion of data analysis, writing the first draft	*1) Kevin Ronan, input into concept creation, double-checking coding 15%,* *2) Eva Alisic, input into the manuscript, double-checking coding 20%*	No No
6	*Child co-developed Disaster Resilience Education: Describing the process.*	Submitted	70%. Concept, conducting the study, data analysis, first draft of the paper	*1) Kevin Ronan input into concept creation 5%* *2) Caroline Spencer, input into the manuscript, 10%* *3) Eva Alisic, input into the manuscript, double-checking coding 15%*	No No No
8	*Child Participation in Disaster Resilience Education: Potential impact on*	Submitted	75%. Concept, conducting the study, data analysis, first draft of the paper	*1) Kevin Ronan input into concept creation 5%* *2) Caroline Spencer, input into the*	No No

	child mental wellbeing			*manuscript, 10%* *3) Eva Alisic, input into the manuscript, double-checking coding 10%*	No

I have not renumbered sections of submitted or published papers in order to generate a consistent presentation within the thesis. Inclusive pagination is included throughout the thesis, with additional page numbers inserted in the footer of published papers. Published papers are included in their final published format, and therefore also retain their own page numbers. Papers that have not been published yet are in the format that were submitted to the journal.

Student name: Revathi Nuggehalli Krishna

Student signature: Date:

I hereby certify that the above declaration correctly reflects the nature and extent of the student's and co-authors' contributions to this work. In instances where I am not the responsible author I have consulted with the responsible author to agree on the respective contributions of the authors.

Main Supervisor name: A/Prof. Eva Alisic

Main Supervisor signature: **Date:**

Table of Contents

List of Figures

List of Tables

Table of Appendices

List of Abbreviations

CCDRR – Child-Centred Disaster Risk Reduction
CONSORT – Consolidated Standards of Reporting Trials
CRED – the Centre for Research on Epidemiology of Disasters
DRE – Disaster Resilience Education
DRR – Disaster Risk Reduction
FGD – Focus Group Discussion
GUIDED – GUIDance for the rEporting of intervention Development
HESPER - the Humanitarian Emergency Settings Perceived Needs Scale
IDI – In-depth Interview
IDMC – Internal Displacement Monitoring Centre
IPCC – Intergovernmental Panel on Climate Change
LMIC– Low-and-Middle Income Countries
MMAT – the Mixed Methods Appraisal Tool
NGO – Non-Governmental Organisation
PRISMA – Preferred Reporting Items for Systematic Reviews
PTSD – Posttraumatic Stress Disorder
SPSS – Statistical Package for Social Scientists
UN CRC – the United Nations Committee on the Rights of the Child
UN OCHA – the United Nations Office for the Coordination of Humanitarian Affairs
UNESCO – the United Nations Educational, Scientific and Cultural Organisation
UNICEF – the United Nations Children's Fund
UNISDR – the United Nations International Strategy for Disaster Reduction
WHO – the World Health Organisation

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as the project changed, pointing me to new directions I could explore, and for being part of my research journey. Thank you for encouraging me to think more about research dissemination and potential scale up of this intervention.

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listening to my research stories or asking me about my analysis plans, watching Gaargi, reading my paper, putting together furniture for the baby, or even more importantly, being my dessert eating partners – these things have made my PhD and motherhood journey a lot more fun, thank you. Friends outside of the PhD, you know who you are, thank you for your interest in my research, asking me about the process, offering to help me with proofreading, and providing much needed entertainment, your friendship and warmth reassured me to keep going when things got hard. Thank you Anisha, Ann, Lakshmi and Sethu for having me over during my Chennai visits, feeding me, entertaining me, making sure I rested and drank water, especially when I was pregnant and collecting data. I am forever grateful for all these friendships within and outside of this PhD, you guys made navigating my PhD, and motherhood seem effortless!

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finalizing my references, phew! Thank you for all your love, encouragement and undying belief in me.

Prolegomenon

In this prolegomenon, I use autoethnography to introduce myself, my journey as a researcher and report on my experiences doing this research in a culture that is very familiar (having lived nearly all my life in India), yet, quite new to me as I recognise that living a life, and conducting a research are quite different from each other.

Autoethnography seeks to systematically analyse personal experience to understand cultural experience (Ellis, Adams, & Bochner, 2011). Chronicling the research process and the personal experience of being a researcher provides a platform to recognize the inevitable influence a researcher has on the research process –choosing who, what, when, where and how to do research (Ellis et al., 2011). Autoethnography, using the tenets of autobiography and ethnography, is considered both a process and a product. Autoethnography, as a research method and process, could be a thesis in itself. However, in this thesis, I use it as a short reflective introduction to the work described in the thesis.

I am relatively new to the field of disasters. My first experience related to disasters was when I volunteered after the first wave during the 2004 Indian Ocean tsunami. I was an undergraduate student at the time and this experience brought issues related to inequity, lack of understanding of mental health, lack of access to mental health care and just the effects of living through such a trauma to the forefront. Personally, beyond the gravity of the situation, this experience cemented my interest in doing work that would have a positive impact on people's lives. Initially, I thought I'd do that by entering the armed forces. However, as it commonly happens, I found myself neither in the armed forces nor working in the field of mental health. A few years in the corporate world reaffirmed my passion for mental health.

After a few twists and turns, I moved to the United States of America (USA) to pursue a masters in clinical psychology. This was the first time I moved overseas. It was fascinating to live in and observe a completely different culture and understand the many systems – healthcare, education and public policy. As I worked and studied, I saw that people were nearly the same, but, the divide

between rich and poor was far more severe. One of the things that struck me was how neighbours didn't know each other. Growing up in India, I was used to neighbours knowing each other, checking up and generally supporting one another in various activities such as child care. A neighbour was part of child-care arrangement for my parents, from when I was five months old. Although this 'neighbourhood friendliness' is not generalisable to all India or the United States, the need for social support is ubiquitous.

While in the USA, I completed clinical internships and was employed as a clinician, delivering clinical services for children and families. During one of those internships, I worked with children and families where children were at the risk of being removed from their homes due to acute mental health or behavioural issues or due to their potential involvement within the US justice system. It was a brief, home-based clinical service which was led by a team comprising of a clinician and a case manager. We worked with the families, school system, and child protection services, as applicable. My work there gave me an up-close and personal perspective on how families with complex issues coped and how many of their issues stemmed from poverty, intergenerational trauma, marginalisation and inequity. It made me realise that while the scale of the problems might be different in developed and developing countries, problems related to inequity are similar in both settings. These experiences spurred me on to focus on children and families who were disadvantaged. Similarly, while I was working in Vermont, USA, Hurricane Sandy hit the NorthEastern USA and I saw how coping with disasters is different in a developed versus an under-resourced country. However, for families in disadvantaged communities, the struggle to prepare, cope with and recover from the disaster was not that different. But, where the systems are not set up to reach those disadvantaged (e.g. countries such as India) the road back to their 'normal life' is much more challenging. So, this made me more resolute in my aim to work with disadvantaged children and families.

The resolution to work with disadvantaged families and my research interest brought me to India. Here I led the clinical team in a randomized control trial to adapt and deliver the Thinking Healthy Programme (Atif et al., 2017; Fuhr et al., 2019), a low-intensity psychosocial intervention to treat perinatal depression at Sangath, a mental health research organisation in Goa, India. This intervention

was delivered by peers, who were other mothers in the neighbourhood. Peers, or a lay health worker delivering health interventions, specifically mental health interventions, is an innovation of this last decade which helps under-resourced countries such as India bridge the gap between mental health care need and its availability. The gap between need and availability is wide in India. Mental illness is the leading cause of non-fatal disease burden, but, there are two mental health workers and 0.3 psychiatrists per 100,000 population (Sagar et al., 2020). My experience during the trial gave me the confidence to pursue a PhD, and bolstered my idea of working with disadvantaged groups. Furthermore, I also saw how innovative approaches could be used to make research applicable and impactful to a larger group than just research participants. It also made me appreciate the need for capacity building within organisations, communities and the need for all voices, primarily, those whose voices are often missed, be heard.

These experiences cumulatively helped me choose my research topic. Although, I wanted my PhD research to be more mental health focused, I learned that the community I chose to work with, had different needs. Since I wanted my PhD research to be applicable and impactful, I chose to listen to them and dive into an area of research that I had nearly no experience in - disaster resilience education. I had a lot of learning to do; on the other hand, I also recognised that I could approach my research with fresh perspective without much of pre-determined notions. I grew up in Bangalore, India, albeit not in Chennai, both cities' culture and intricacies would not have been that different. Nevertheless, I realised throughout my time during my PhD and even at my previous work at Sangath that while my Indian identity, knowing how to speak the language and socialise was important, culture and intricacies of how communities function is as unique as a fingerprint. Furthermore, I recognize that there is an obvious class and caste difference between me and my research participants and in India, that makes a lot of difference in being able to access education, and have a voice in your local community. It was an amazing and an incredibly humbling experience to work with children and the community so closely – to learn about the realities of their lives, their strengths and how they developed coping strategies, and resilience around their environment. When I first went into the community, it took a few meetings for members of the community and staff members from the

collaborating NGO to trust me and to align their expectations to what I would be doing. They believed that I might be offering them cash or something else if not right away, at least at the end of my stay there, however, when we went through the consent process, it was clear to them that it was research study with no monetary incentives attached. This also acted as a natural selection process, since only those genuinely interested in this project participated.

Once the project started, we found that an intervention that provides children with practical tips on preparing for hazards was more important for the community and so, we focused on that. During my long stays in Chennai, I visited the community and the collaborating NGO often. Sometimes, even though we had agreed on a time for meeting all the children, they didn't show either because they forgot or were playing or more essential and practical stuff got in the way – such as needing to collect water. Drinking water, usually always readily available in developed countries, is a considerable struggle in places like India and an even bigger struggle for these communities who live in urban slums. Drinking water is released in a communal tap, maybe once or twice a week, depending on the season for a few hours at a time. So, families need to bring containers, stand in a queue to access and store all the drinking water they need for the week. If they missed their turn, they'd either have to wait or buy water which can be expensive and these communities are already experiencing poverty. Often, children, mostly girls, missed these meetings because they had to stand in the queue for water. This is one of the many examples where girls were worse off than boys. Girls were more often at risk of dropping out for social reasons including lack of parental support, fear for their safety during their walk to and back from the meeting venue, and menstrual cycles. They were also usually tasked with chores more than their male counterparts. If a set of siblings (a boy and a girl) were meant to the come to the meeting and it was one of the days of water storage, then, the girl stayed behind to store water, even if the girl was younger than her male sibling. So, when I met the parents, we did not always talk about disasters or hazard preparedness. Much of what the parents and I discussed were life issues revolving around their children, their schools, other risks for children in the neighbourhood, and their safety. However, as the programme progressed, children and parents prioritised these

meetings and I moved the meetings to Sunday afternoons so that there were no schedule clashes or safety concerns.

While these adjustments helped, the intervention development was yet to be completed when my field time in India ended. I think it is a testament to the children's and the community's commitment that we were able to continue intervention development via online meetings. Once every two weeks, I called the children on one of the NGO staff members' phones and we continued intervention development. In order to keep them motivated, I chose a park or different place for me to be so that they could see some of Melbourne before and after our meeting. The children delivered the intervention on their own after the first two sessions when I was with them. The children also suggested other neighbourhoods and communities that might benefit from this intervention. I consider this as an example of not only how invested the children were, but, also how resourceful and thoughtful they are!

Throughout this research process, I spent a lot of time in these communities and with the staff members of the NGO. And my experience of working within these communities humbled me and doing research with them gave me a new perspective. Their disadvantage can seem overwhelming, but, the children and communities have the ability to not only overcome it, but find ways to do that creatively. It is not often that research participants are co-researchers, especially when they are children. So, this experience was new, a great learning and an experience that I enjoyed very much. I hope that the intervention developed through this research continues to be adapted as necessary and used by the NGO, the children and the communities. I hope that it can be a good first step for future researchers and practitioners. Furthermore, I hope that I can continue to contribute to the field, empowering children to take the lead in participating in decisions that matter to them and prepare themselves, their families and communities for hazards.

Chapter 1: Introduction

1.1 Background of this study

Globally, hazards and disasters are a significant problem (Peek & Mileti, 2002). By 2050, the United Nations (UN) predicts that about 2 billion people would be at risk of being directly affected by a natural hazard (United Nations News, 2004), double the number of people from the early 1990s where approximately, one-seventh of the population was at risk (Norris & Kaniasty, 1992). The UN attributes the increase in the number of people who will be affected by disasters to many reasons, including deforestation, sea levels on the rise, and population growth in vulnerable areas. For example, more people are moving to areas at higher risk including areas prone to coastal (e.g., Johnston et al., 2005), seismic (Mitchell & Thomas, 2001), volcanic (Ronan & Johnston, 1999; Ronan, Finnis, & Johnston, 2005), and other hazards including floods. A number of factors link the vulnerability around population growth including the build-up of urban areas in hazard-prone areas and the non-availability of resources to make these build-ups hazard resistant. Adding to this complexity is the fact that disasters have social influences that are interwoven with the physical that impact millions of lives – adults and children alike. Although children can be more resilient than adults in some cases, children are far more vulnerable to disasters and its impact than adults. However, children can be innovative 'agents of change'.

The UN and other children development related agencies have bolstered the concept of children as agents of children for a few decades now (Amri, Haynes, et al., 2017; Fielding, 2001; Flanagan et al., 2001; Mitchell et al., 2008; Malone, 2013; Percy-Smith et al., 2013). Children who are involved in well-run development programmes, including those related to disasters, experience positive outcomes such as increased confidence, willingness to take part in positive activities and increased life skills (Mwanga et al., 2008; Nicotera, 2008; Venka et al., 2012; Haynes et al., 2015). Children's right to be heard, and express their views on issues that affect them, such as disaster risk reduction and climate change adaptation is supported by the UN CRC (UNCRC, 1989; Children in a Changing Climate, 2011; UNISDR et al., 2012).

In the last decades, disaster resilience education programs in schools have been piloted and implemented in more than 100 countries, including India (UNESCO et al., 2012; Ronan, 2014). The programs aim to increase the knowledge of children and promote increased awareness and behaviour change related to disaster preparedness within the home. Research suggests that children who participate in disaster resilience education programmes have increased awareness and knowledge; however, these initiatives rarely influence significant improvements outside of the school (Finnis et al., 2010; Ronan et al., 2010; Amri, Bird, et al., 2017).

More research could reach children within the communities to bolster any disaster preparedness education they received at school and to reach children who receive no disaster preparedness education. Moreover, research studies have established that children, who receive good education and adult support, can express their views and influence change in their communities. This PhD is an example of how children, through their participation in disaster resilience education, can contribute to their own, their families and their community's disaster preparedness.

1.2 Aims of this research

The research questions and aims for this PhD were determined using a participatory approach. I went into flood-affected communities in Tamil Nadu, India to understand children's and families' lived experience through the floods, and how their lives have been impacted by those experiences. The child participants in this PhD research play a dual role. They are both research participants and co- researchers in this PhD as they played a crucial role in the development and delivery of Disaster Resilience Education (DRE) intervention. Thus, for this PhD, I aim to answer the following research questions:

a. What are the experiences and needs of communities living in poverty during the 2015 floods in Tamil Nadu, India?
b. What are the experiences of children experiencing poverty during the 2015 floods in Chennai, India?
c. How can a DRE intervention be developed to best prepare children and families living in poverty against future hazards relevant to the area?

d. What are the processes for developing such an intervention with children? How can a participatory approach/ co-design approach be used to engage children in the development and delivery of a DRE intervention?
e. What are the barriers and facilitators to the acceptability and feasibility of the co-developed DRE intervention?

A secondary question that I aim to answer is:

f. How does active child participation influence mental health outcomes e.g. self- efficacy, adaptive coping skills and problem-solving skills?

1.3 Study Location: Chennai, Tamil Nadu, India

India is the second-largest peninsula in the world and a South Asian country with diverse terrain – from Himalayan peaks in the north to Indian Ocean coastline in the south. It is the seventh-largest country by area, the second-most populous country in the world. Tamil Nadu, India was the data collection site for this PhD. The preliminary study included rural and urban parts of Tamil Nadu, however, once the research direction and questions were established, all research activities as well as data collection happened in two inner-city slums in Chennai, India. It is the southernmost state in India. Tamil Nadu has a coastline of over a 1,000 km making it India's second-longest coastline. It is the eleventh-largest state in India and the sixth-most populous with about 68 million people (Dept of Home Affairs, 2011).

Over the last few decades Chennai has expanded to accommodate the increase in the city's population to meet the demands of the citizens. Thus, Chennai has seen tremendous and haphazard urbanization, which has made the city vulnerable to hazards. Padmanaban and colleagues (2017) predict that forests, mangroves and agricultural land maybe swallowed by urban sprawl by 2027 in Chennai. Rapid urbanisation has swallowed up waterbodies in a span of three decades. Haphazard urbanisation and climate change have together made the city vulnerable to many shocks, including floods and cyclones (The News Minute, 2016).

One of the main natural hazards that affects Chennai is cyclone. Although the number of cyclones haven't significantly increased, impacts of occasionally succeeding intense rainfall events from cyclones are likely to become more severe in the future (IPCC, 2007). The combination of densely populated areas in Chennai, increasing risks of climate-related hazards makes the city particularly vulnerable to disasters.

Tondiarpet, is my primary research location in Chennai. Children in this community participated in the co-development and delivery of the Disaster Resilience Education intervention. Tondiarpet sits in the northern end of the city along the coastal lines of Bay of Bengal. This area is characterised by two canals (Buckingham and Link canal) which cater the drainage of floodwater into the sea. However, haphazard construction to accommodate increasing population have interrupted much of the water bodies (The News Minute, 2016). Furthermore, almost all land in this area is vulnerable to climate-related hazards, as it also has a coastal exposure it is particularly prone to cyclones (Shaw, Takeuchi, Jonas, Krishnamurthy, & Mathavan, 2010). This area also has a big landfill site for dumping of solid waste taking garbage for five zones (almost 50% of waste accumulation in the city). A sewage treatment plant is located in this area. Although all solid waste is collected everyday, less than half is treated and even less than a quarter is recycled. Although most roads are paved, during heavy rains, the road network can be interrupted. While about 50% of the houses are built according to building codes, less than half houses built are constructed above the plinth level and more than half the people live in close proximity to polluted industries, dumping grounds, etc (Shaw et al., 2010).

A report in 2010 by Shaw and colleagues (2010) found that although the population growth rate per year is around 2% more than 23,000 people on average live on one sq/km. The demographic structure shows that more than 45% of the population is below 14 or over 64 years. Water-borne diseases are common, about quarter of the population in this area suffer from every year. Schools in the area often serve as shelters during and after disasters. Even though households are not entirely prepared for a disaster, a sense of community ensures that schools provide shelter for affected people during disasters. Voluntary evacuation is limited as well

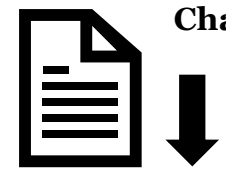
as the communities' participation in relief works. Our studies confirmed in Chapters 4 and 5 report these findings.

Tondiarpet has high levels of poverty - more than 40% of people live below the poverty line. Most households depend on one income source, much of which comes from informal sectors which tend to be unreliable (Shaw et al., 2010). Consequently, unemployment is high at over 25%, regardless of the age group. Thus, it is not surprising that the households have limited credit facility and do not receive financial support for private initiatives to prepare for future disasters. The fact that less than 20% of households have a good saving practice for such an event compounds this. Less than 1% of this area's annual budget of the local government targets Disaster Risk Management and there are limited incentives given to people to rebuild, receive alternative livelihood, or healthcare after a disaster.

1.4 Thesis Outline

This PhD thesis uses a hybrid approach, following the Australian model of a 'thesis including published works'. This approach combines traditional thesis chapters and manuscripts (submitted/ published). Following this model, this thesis is constructed around five manuscripts (2 published, 1 accepted, 2 under review) which are embedded within nine chapters. Figure 1.1 provides an overview of the chapters.

Figure 1.1: Thesis Chapters Overview

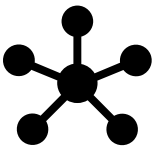


Chapter 1: Introduction

The introduction provides background for this PhD thesis by defining the problem, and providing contextual background.

Chapter 2: Literature Review*

This literature review includes a detailed literature review on topics that are central to this thesis: disasters and demography, impact of disasters on children, CC-DRR, and children's participation in DRR.



Chapter 3: Conceptual Framework

The conceptual framework focuses on the theoretical framework guiding this PhD research. It also includes commentary about how theory, and conceptual frameworks influence the research and help in understanding and interpreting the results.

Chapter 4: Experiences and needs of communities affected by the 2015 South Indian floods*

The overall aim of this chapter is to understand lived experience of flood-affected communities living in poverty, in the Chennai Metropolitan area.

Chapter 5: Experiences of children affected by the 2015 South Indian floods*

This chapter generates insight into families' experiences and its effects of the 2015 floods in Tamil Nadu, India, with a specific focus on children in communities experiencing poverty

Chapter 6: Co-development of the Disaster Resilience Education in Chennai, India*

This chapter describes both the process of intervention development and the content and structure of the intervention.

Chapter 7: Acceptability and Feasibility of the child co-developed and delivered Disaster Resilience Education in Chennai, India

This chapter reports on the acceptability and feasibility of the DRE intervention from a multi-stakeholder perspective

Chapter 8: Child Participation in Disaster Resilience Education – Potential impact on their mental wellbeing and resilience*

This chapter reports on the potential impact of child participation on their mental wellbeing and resilience.

Chapter 9: Integrated Discussion and Conclusion

This chapter will conclude this thesis by discussing its key contributions to DRR research and practice in addition to providing a summary of the key findings of the research.

*indicates that a manuscript is embedded in the chapter.

Table 1.1 provides the link between chapters, manuscripts and research questions that each of those chapters/ manuscript answers.

Table 1.1: Link between chapters, manuscripts and research questions

Phase of the PhD research	Relevant Chapter	Relevant Research Question	Corresponding Publication (as applicable)
Phase 1	Chapter 2	The systematic review informed all the research questions	**Krishna, R. N.**, Majeed, S., Ronan, K., & Alisic, E. (2018). Coping with disasters while living in poverty: A systematic review. [Special Issue: 'Adversity in the Asia Pacific region: Challenges facing health and society']. *Journal of Loss and Trauma,* 23(5), 419 – 438. DOI: 10.1080/15325024.2017.1415724
	Chapters 4 and 5	What are the experiences and needs of communities living in poverty during the 2015 floods in Tamil Nadu, India?	**Krishna, R. N.**, Ronan, K., Spencer, C., & Alisic, E. (2021). The lived experience of disadvantaged communities affected by the 2015 South Indian Floods: Implications for disaster risk reduction dialogue. *International Journal of Disaster Risk Reduction*. 54, 102046. DOI: 10.1016/j.ijdrr.2021.102046
		What are the experiences of children experiencing poverty during the 2015 floods in Chennai, India?	**Krishna, R. N.**, Ronan, K. R., & Alisic, E. (2018). Children in the 2015 South Indian floods: community members' views. *European*

			Journal of Psychotraumatology, 9(Suppl 2). 1486122. DOI: 10.1080/20008198.2018.1486122
Phase 2	Chapter 6	How can a DRE intervention be developed to best prepare children and families living in poverty against future hazards relevant to the area?	**Krishna, R. N.**, Spencer, C., Ronan, K., & Alisic, E. (Under review). Child co-developed Disaster Resilience Education: Describing the process.
		What are the processes of developing such an intervention with children? How can a participatory approach/ co-design approach be used to engage children in the development and delivery of a DRE intervention?	
Phase 3	Chapter 7	What are the barriers and facilitators to the acceptability and feasibility of the co-developed DRE intervention?	Manuscript being prepared for submission in 2021
	Chapter 8	How does active child participation influence mental health outcomes e.g. self-	**Krishna, R. N.**, Spencer, C., Ronan, K., & Alisic, E. (Under Review). Child Participation in Disaster

	efficacy, adaptive coping skills and problem-solving skills?	Resilience Education: Potential impact on child mental wellbeing.

Chapter 2: Literature Review

2.1 Introduction

This chapter outlines existing studies and practices related to children and disasters, their participation in DRR activities. The chapter specifically focuses on children in environments with complex vulnerabilities. For example, poverty, high levels of parental illiteracy, and perceived discrimination and marginalisation. The chapter begins with an introduction to the impact disasters have on Low- and Middle-Income Countries (LMICs), followed by a brief discussion on how poverty adds a layer of complexity to disaster preparedness and recovery in those countries. This chapter also includes a systematic review published as part of this PhD candidature (Krishna, Majeed, Ronan, & Alisic, 2018) describing the coping strategies used by families experiencing poverty in the Asia Pacific region. Next, this chapter presents evidence related to child participation in DRR, its impact on the children, their families and communities in preparing better for future hazards. Most importantly, this chapter identifies gaps in the literature and discusses the implications of these gaps on this PhD research.

2.2 Impact of disasters on Low- and Middle-Income countries

Over the past few decades, scientific understanding of hazards has grown substantially, thus, increasing the ability to predict, prepare and respond to hazards. Similarly, our ability, to move human settlements away from hazardous zones, to build zones that are of higher quality, with more resistant infrastructure, housing and public facilities have increased. However, disasters are becoming more frequent. There were 231 disasters worldwide in 1987, which grew to 396 disasters in 2019 (CRED, 2020). Figure 2.1 shows the global occurrence of disasters by type in 2019 compared to 2009-2018 annual average.

Figure 2.1: Occurrence of Disaster in 2019 compared to disasters in 2009-18 annual average

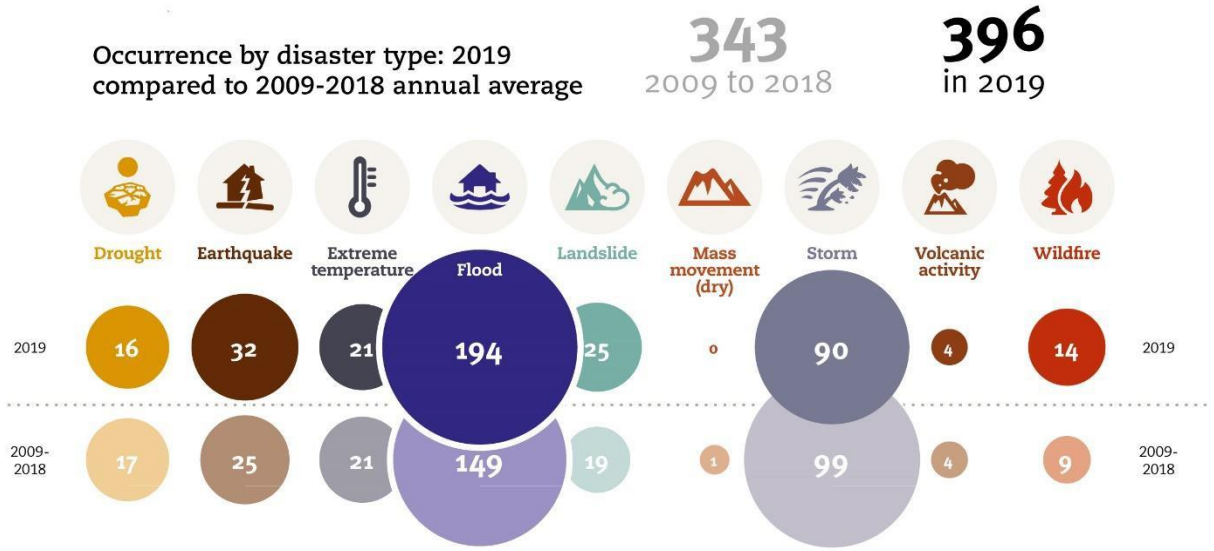


Image reproduced with permission from the Centre for Research on the Epidemiology of Disasters (CRED, 2020)

Although the number of disasters has increased, fatalities related to disasters have gradually declined over the years, due to advances in early warning systems, improved emergency services and planning (UNISDR, 2014). However, the number of people affected by disasters continues to increase in large proportions. The Global Report on Internal Displacement reports that disasters displaced 33.4 million people internally in 2019. Of that, approximately 74% (24.9 million) was due to natural disasters; over five million people were internally displaced in India alone (IDMC, 2020).

The UNISDR recognised floods as the deadliest type of disasters in the last two decades with 3,254 flooding events being responsible for 44% of the disasters globally (UNISDR, 2020) as indicated in Fig 2.2

Figure 2.2: Occurrence of floods in 2000-2019

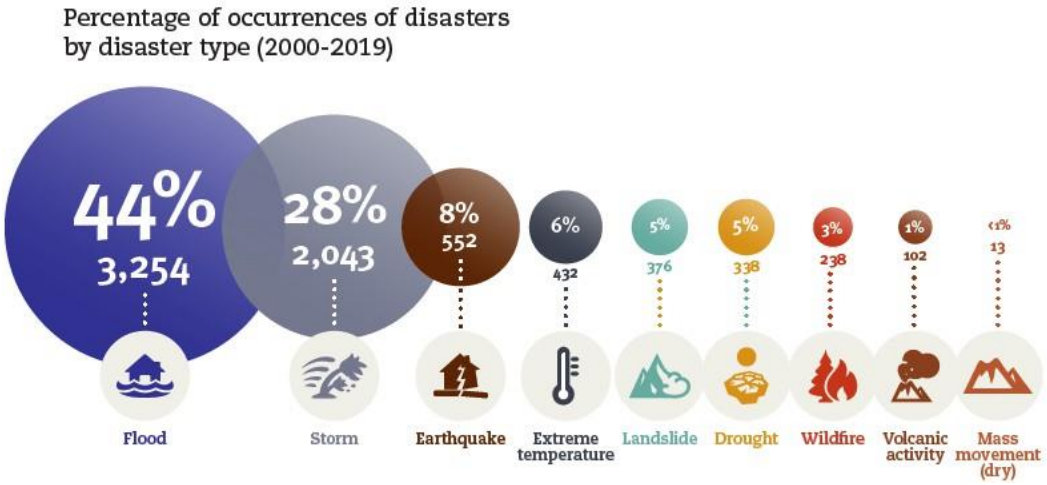


Image reproduced with permission from CRED (2020)

While disasters are not confined to Low-and-Middle Income Countries (LMICs), the impact of disasters on economies and people with fewer resources are more severe compared to their high- income counterparts. Although the number of disaster events both high income and low- and middle-income countries might be relatively even, the ability to recover and actual recovery from the disaster for groups of countries are markedly different.

High-income countries tend to report higher economic losses and lower numbers of people affected and killed because of a disaster event. On the other hand, lower-middle and upper-middle-income countries tend to report limited economic losses but, a relatively higher number of deaths per disaster event. Lower- middle and upper-middle-income countries also make up most disaster events, death, and total people affected, although, they also account for most of the world's population. Low-income countries account for 23% of total deaths due to disasters despite accounting for less than 10% of the world's population. Followed by low- income countries, the lower-middle-income countries, India is one of them, reported higher death rates (255 deaths per event). Better infrastructure, risk governance, surveillance systems and reduced exposure to natural hazards might be responsible for improved protection in high-income countries (UNISDR, 2020).

The Centre for Research on Epidemiology of Disasters (CRED) reports that the Asian continent suffered the highest number of disaster events in 2019 that accounted for 74% of the total population affected and resulted in 45% of deaths due to disasters (CRED, 2020). Over the past two decades too, eight of the top 10 countries affected by disaster events are in Asia (UNISDR, 2020). Specifically, India is the second most affected country for floods with an average of 17 flood events per year, affecting approximately 345 million people (UNISDR, 2020). In 2019, India reported the highest number of deaths and people affected for the year, by disasters, because of cyclone Fani.

2.3 Tamil Nadu, India: Disaster Profile

India is the second-largest peninsula in the world and a South Asian country with diverse terrain – from Himalayan peaks in the north to Indian Ocean coastline in the south. It is the seventh-largest country by area, the second-most populous country in the world. Currently, India houses about 17% of the total world's population, but about 24% of the world's poorest live here (Bank, 2020; Katayama & Wadhwa, 2019). Poverty alleviation schemes in India have existed since the 1960s; however, corruption and unfair practices plagued most. There is also generally lack of scientific recording of data, which creates a barrier in painting an accurate picture.

India is one of the most disaster-prone countries owing to its geo-climatic conditions as well as its high degree of socio-economic vulnerability. More than 58% of the landmass is prone to earthquakes of moderate to very high intensity (NIDM, 2014). Over 12% of the land is prone to flood, and about 75% of the coastline is prone to cyclones and tsunamis. Thirteen coastal states and union territories are susceptible to sea-level rise in India, with about 84 coastal districts affected by tropical cyclones. The Eastern coastline is more prone to cyclones as about 80% of total cyclones off that region hit there. Tamil Nadu is one of the states on that coastline and some of the most populated megacities such as Chennai, and Kolkata lie along this coastline. About 50-60% of the tropical cyclones form in the Bay of Bengal and the Arabian Sea every year are severe. Changing demographics, socio-economic conditions, unplanned urbanization,

development within high-risk zones, and environmental degradation further compound disaster risks in India.

Tamil Nadu, the state in focus for this PhD research, is the southernmost state in India. Tamil Nadu has a coastline of over a 1,000 km making it India's second- longest coastline. It is the eleventh-largest state in India and the sixth-most populous with about 68 million people (Dept of Home Affairs, 2011). Tamil Nadu has high levels of poverty, especially in rural areas. High dropout and low completion rates of secondary schools continue to contribute to the maintenance of poverty. Other contributing problems include class, gender, inter-district and urban-rural disparities. Although Tamil Nadu is one of most literate states in India, with about 80% of the population literate, 21% of the public schools face a critical shortage of teaching staff (Bank, 2009). The city of Chennai, the primary location of this PhD research, experienced five major floods between 1943 and 2005. A national newspaper, The Indian Express reported that the floods in 1943, 1978 and 2005 floods caused the most severe damages. Unplanned and often illegal urban development has led to the destruction of many waterways. Along with that, ageing infrastructure and poorly designed drainage system will lead to an increased frequency of flooding (Kumar, 2018).

2.4 Disasters and Poverty

People living in poverty are more vulnerable to shocks, regardless of their origin. Furthermore, natural hazards expose people in poverty more than their 'non-poor' counterparts. Potential to increased exposure to hazards comes from the fact that poor people often live in high-risk areas. Their choice to live in high-risk areas are either, for economic opportunities – such as seasonal employment, to access to public services, for amenities including lower rental rates due to the high-risk nature of the area (Hallegatte, 2012). As such, it is a common scenario globally. Similarly, in Mumbai, India households in regularly flooded areas continue to live there despite the risks due to access to jobs, schools, health care facilities and social networks (Patankar, 2015). These factors also impede their decision to evacuate during a disaster. For example, a recent systematic review (Benevolenza & DeRigne, 2019) found that even in a high-income country such as the USA, socio-economically challenged households were more reluctant to

evacuate compared to other residents in the same community. Barriers to evacuation included factors such as the need for transportation, shelter options, and costs such as loss of income, access to social networks, and health care, to name a few. Increased exposure to hazards coupled with their reluctance to evacuate or relocate from high-risk areas creates a vicious cycle of poverty and disasters – where poor people are more affected by disasters and disasters keeps those people in poverty (Benevolenza & DeRigne, 2019).

While an increased risk of exposure to disasters exists for people experiencing poverty, their factors amplify their vulnerability. Benevolenza & DeRigne (Benevolenza & DeRigne, 2019) found that although wealthier people suffered more economic loss in absolute terms, people experiencing poverty lost more than those who were not poor. People with poor health, or low social, or economic resources before the disaster are more vulnerable to its negative consequences (Rhodes, 2010). Differential access to resources before the disaster, such as reliable information, transportation, and extended social networks, can affect the impact of the disaster for families (Adeola, 2009; Stephens, Hamedani, Markus, Bergsieker, & Eloul, 2009).

Overall, people living in poverty are particularly vulnerable to the effects of disasters, with long-term economic, health, and mental health consequences (Carter, Little, Mogues, & Negatu, 2008; Dercon, 2004; Galea, Tracy, Norris, & Coffey,2008). Disasters, unfortunately, not only keeps people in poverty, but they also push families who have worked their way out of poverty back into poverty. A study (Eshel & Kimhi, 2015; Hallegatte, Vogt-Schilb, Bangalore, & Rozenberg, 2016) found that households affected by disasters are 25% more likely to fall into poverty. If all disasters could be prevented next year, the number of people in extreme poverty would be immediately reduced by around 26 million (Hallegatte et al., 2015; Hallegatte, Bangalore, & Jouanjean, 2016; Hallegatte, Vogt-Schilb, Bangalore, & Rozenberg, 2016; Hallegatte, Vogt-Schilb, Rozenberg, Bangalore, & Beaudet, 2020). Floods and droughts have the greatest impact on poverty because of the low-intensity high-frequency nature of these events, yet, have the power to impact many people in the long-term (Erman et al., 2018; Erman et al., 2019). To make things worse, support following a disaster often fails to provide the poorest

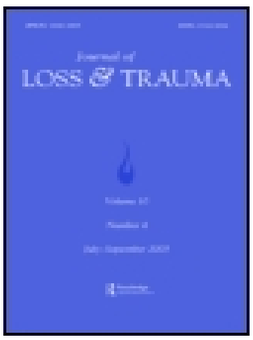
with adequate resources because of their lack of voice and influence – in both research and practice. Consequently, people in poverty are often excluded from governance, leading them to have little to no say in the decision-making process – they might be discriminated against in how aid is distributed (Aldrich, 2010) or biased against in other kinds of support such as employment and education assistance. Thus, extensive research with communities confronted with poverty to address this multifaceted problem is a priority.

2.5 Common coping mechanisms to disasters

The first manuscript in this thesis reviews the literature specific to coping with disasters while experiencing poverty in the Asia Pacific region. It highlights the role of socio-economic, sociocultural factors and indigenous knowledge play in the coping strategies used by families. The review found that authors most often described financial coping strategies in their studies. At the same time, there was a lack of reporting on coping strategies related to health and psychosocial strategies. More importantly, the systematic review draws attention to the fact that children's voices in disaster research, especially of their experiences and their involvement in DRR activities are mostly non-existent. This published manuscript is available in the *Journal of Loss and Trauma*, published on 25th January 2018. DOI: 10.1080/15325024.2017.1415724.

Empirical Paper 1: Coping with Disasters While Living in Poverty: A Systematic Review

Krishna, R. N., Majeed, S., Ronan, K., & Alisic, E. (2018). Coping with disasters while living in poverty: A systematic review. [Special Issue: 'Adversity in the Asia Pacific region: Challenges facing health and society']. *Journal of Loss and Trauma*. 23(5), 419 – 438. DOI: 10.1080/15325024.2017.1415724



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Coping with Disasters While Living in Poverty: A Systematic Review

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ABSTRACT

This review synthesizes the literature on how Asia-Pacific children and families living in poverty cope with disasters. A systematic search yielded 26 studies from six low- and middle-income countries (LMIC) in the region. Findings emphasized the role of socioeconomic factors, sociocultural factors, and indigenous knowledge. Coping strategies related to finances were most prominently described in the studies, in contrast to health and psychosocial strategies. Substantial gender issues were identified. The review highlights gaps regarding child involvement in research and coping strategies used by children living in poverty.

ARTICLE HISTORY
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KEYWORDS
Children; families; LMIC; South Asia

The Intergovernmental Panel on Climate Change (IPCC) defines disaster as, "Severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic, or environmental effects that require immediate emergency response to satisfy critical human needs and that may require external support for recovery" (Intergovernmental Panel on Climate Change [IPCC], 2012, p. 5). Disasters have a disproportionately adverse effect on low- and middle-income countries (LMICs) compared to high-income countries (HICs). In 2015 alone, the Asia-Pacific region experienced about 47% of the world's disasters with over 16,000 fatalities and over 70 million people affected (Emergency Events Database). Please call out this source and query for a corresponding ref list entry. Consequently, this region, which includes a significant proportion of LMICs, is the world's most disaster-prone region (United Nations Economic and Social Commission for Asia and the Pacific, 2015).

Vulnerability to disasters depends on many factors—economic, social, cultural, political, and psychological—that affect people's susceptibility to

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environmental hazards in addition to enhanced risk for physical exposure to hazards themselves (Twigg, 2015; Wisner, Blackie, Cannon, & Davis, 2004). Although vulnerability is most certainly not exclusively about poverty, it plays a central role in creating and sustaining vulnerability (Akter & Mallick, 2013). People living in poverty are particularly vulnerable to the effects of disasters, with long-term economic, health, and mental health consequences (Carter, Peter, Tewodaj, & Workneh, 2007; Dercon, 2004; Galea, Tracy, Norris, & Coffey, 2008). While they are more likely to perceive an event as hazardous, people in poverty are less likely to prepare for disasters or evacuate (Fothergill & Peek, 2004). When disaster strikes, they are at higher risk for physical injuries, mental health problems (Fothergill & Peek, 2004), and the loss of lives and possessions (Gladwin & Peacock, 1997). Poverty is commonly defined as "an indicator of lack of access to resources and income opportunities" (Yodmani, 2001). It has multiple dimensions, with dependency, lack of power, and lack of voice as central issues (Narayan, Patel, Schafft, Rademacher, & Koch-Schulte, 1999). Stigma and shame associated with poverty can make it even harder for people in poverty to access resources and services (Patel & Kleinman, 2003).

The United Nations Development Program (UNDP) defines poverty in absolute terms: an income of less than US$2 a day. However, the reality of poverty exists on a relative scale, and its definition and measurement are hotly debated (UNDP, 2006; Edward, 2006). Reducing food intake and withdrawing children from school are examples of how families in poverty may cope with adversities despite the detrimental effect of these strategies (Roncoli, Ingram, & Kirshen, 2001). People whose lives are not constrained by poverty do not have to engage in similar actions, providing them with better chances of absorbing and coping with current and future adversities (Levine, Ludi, & Jones, 2011).

Coping capacity is defined as "the ability of people, organizations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters" (United Nations International Strategy for Disaster Reduction [UNISDR], 2009). This is not only confined to individuals' actions, it can be interpreted as a collective effort to address a stressful condition. Conservation of Resources (COR) theory (Hobfoll, 1989) emphasizes that individuals endeavor to obtain, retain, and protect the things they value most. Resources include objects (e.g., car, house, other assets), condition resources (social relationships, employment), personal resources (e.g., self-esteem, self-efficacy), and energy resources (e.g., knowledge, money). COR theory postulates that resource loss has more impact than resource gain, and resource loss begets future resource loss. Consequently, loss cycles are more accelerated than gain cycles, helping to explain why people who are socially or economically disadvantaged are more adversely affected by disasters. Age, gender, educational level, social support, income level, and additional life stressors further influence coping capacity within individuals and collectives

(Bonanno, Galea, Bucciareilli, & Vlahov, 2007; Brewin, Andrews, & Valentine, 2000). Given this context, *coping* in the current review includes strategies that families employ to ensure physical and mental well-being of themselves and their family members.

Children exposed to disasters can be particularly vulnerable and have different needs from adults due to many factors including their age (Peek, 2008), loss of perceived safety, difficulty in making sense of the world, and loss of important attachment figures (Norris, Friedman, & Watson, 2002). Involving children in disaster risk reduction dialogue has been challenging (United Nations Children's Fund [UNICEF], 2011, Mudavanhu et al., 2015), owing to factors related to culture, political will, and motivation of families (Muzenda-Mudavanhu, 2016). At the same time, a number of studies have documented that children themselves are motivated to be part of disaster risk reduction dialogue and related decision making and action (e.g., see review by Johnson, Johnston, Ronan, & Peace, 2014; see also Webb & Ronan, 2014). Hence, with the recent Sendai Framework (UNISDR, 2015) also highlighting children as "agents of change," it is important to gain insight into how children and families cope with disasters, particularly when it is made more complex through poverty.

With an intent to provide a stepping stone for the development of disaster resilience interventions for children and families living in poverty, the current review aims to answer three questions:

1. How do children and families living in poverty in the Asia-Pacific region cope with disasters?
2. What coping strategies have been identified as supporting their psychosocial well-being?
3. To what extent have children been actively involved in the studies addressing the first two questions?

Methods

Search strategy

We created a search strategy that covered the major databases linked closely to the fields of disaster, trauma, social sciences, and health—CINAHL, MEDLINE, PsycINFO, EMBASE, PILOTS, Proquest, and Scopus. We scoped literature relevant to disasters and included MeSH subject headings where applicable. Titles, key terms related to our inclusion criteria, and abstracts from key papers were used to ensure efficiency of the search strategy that would lead to maximum relevant articles. The final search terms to find the studies have been included in the appendices (Appendix 1). Appendix 1 first mention.

Study selection

The articles retrieved via the search strategy were imported into EndNote and duplicates were removed. We excluded grey literature and nonempirical

literature such as conference papers, dissertations, book chapters, and reports. We also excluded studies in other languages than English and studies that did not consider psychosocial aspects of coping (e.g., an exclusive focus on agriculture strategies). Two independent researchers (RNK and SM) screened the publications using the title and abstract of 10 articles according to the inclusion–exclusion criteria (Appendix 2) and reviewed the selection together. The rest of the articles were divided among the two researchers to screen independently, with about 10% ($n = 124$) of randomly selected articles being screened by both to ensure consensus of screening, with an agreement of over 83%. Based on this finding, we used a conservative approach, retaining papers for full-text review in case of any uncertainty rather than excluding them at this stage.

Appendix 2 first mention.

Full text of these "selected" ($n = 204$) articles were then used to do a final round of selection according to the inclusion–exclusion criteria. The researchers completed this review independently, then randomly selected about 10% ($n = 20$) and achieved a 90% consensus rate. In order to ensure that no potentially relevant papers were missed, references of the selected articles were reviewed, and relevant articles were screened and included if appropriate. The PRISMA flowchart (Figure 1) details the entire selection process.

We assessed each study's quality by using the Mixed Methods Appraisal Tool (MMAT), Version 2011. The MMAT is adaptable to different methodologies: qualitative, quantitative, and mixed-methods with an intraclass

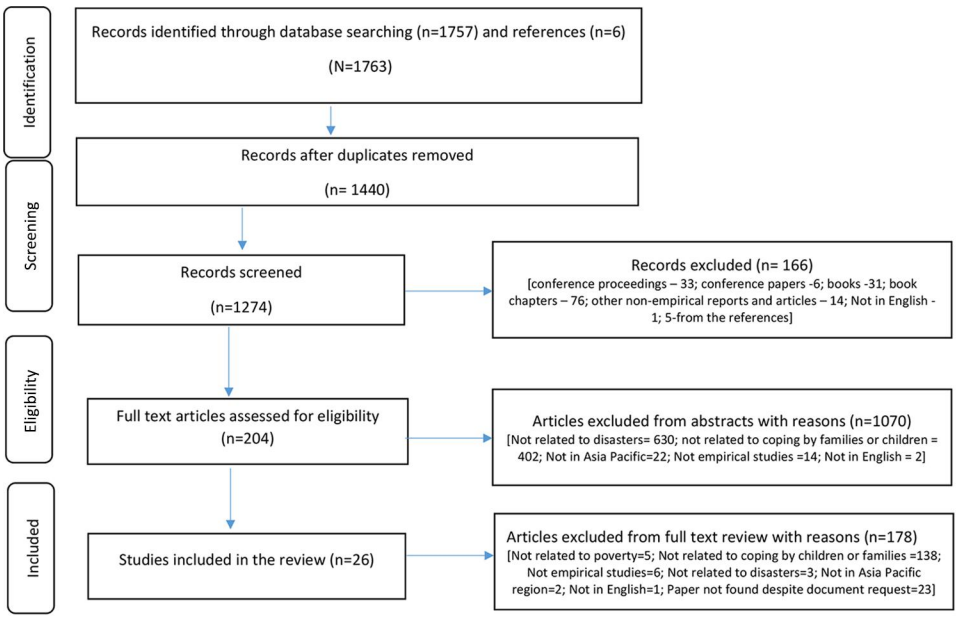

Figure 1. PRISMA-P Flow Chart.

correlation of 0.72 to 0.94 (Pace et al., 2012). We developed and piloted a data-extraction form based on the principles laid out by Saldaña (2013). We categorized the coping strategies using the circle of capacities (Wisner, Gaillard, & Kelman, 2012) as a starting point. A core concept of the circle of capacities is that no one is completely helpless, but all have certain resources and access to resources that help them cope and recover. The resources included in the circle of capacities are social, human, physical, natural, political, and economic resources. Hobfoll et al. (2007) propose five essential psychological and social elements that aid successful recovery from an adverse event such as a disaster: a sense of safety, calmness, self and collective-efficacy, connectedness, and hope. In line with these elements and the Conservation of Resources theory, the resources or coping strategies most relevant to the review relate to human, social, and economic resources at the family level. Hence, the categories focused on those strategies that influence the health and well-being of children and families—psychosocial strategies, economic strategies, and community-based strategies.

Results

Twenty-six studies met the inclusion criteria. These studies described household and families' coping strategies during and after a disaster event in the Asia Pacific region. The methodological rigor of the papers included in the review was average. While 30% of the studies ($n = 8$) met 75%, and 19% ($n = 5$) met a full 100% of the MMAT criteria for their respective methodologies, 50% of the studies met 50% or less of the MMAT criteria. Many of these studies did not discuss the potential effects their own researchers' interactions had on their participants and, consequently, on the results of the studies.

The most commonly discussed disaster was related to hydrological events—floods ($n = 9$), cyclones ($n = 6$), and tsunami ($n = 2$). All 26 studies were conducted in LMIC's with a majority of the studies from Bangladesh ($n = 10$) and India ($n = 8$). All studies in the review studied coping mechanisms used by people who lived in poverty—for example, squatter settlements, slums, or similar. Only two studies included children as participants in their studies. A summary of the reviewed studies and the results of the critical review (MMAT score) is presented in Table 1.

Economic coping strategies

Despite poverty, families tended to prepare for disasters: About 50% of the families in one study saved regularly with savings groups or (NGOs), with the intention of being able to use it after a disaster (Jabeen, Johnson, & Allen, 2011). All the included studies identified borrowing or saving money ahead of

Table 1. Summary of the Selected Papers and the Mixed Methods Appraisal Tool (MMAT) Score.

Author & date	Disaster type and location	Study & sample description	MMAT score* (critical appraisal of the paper)	Examples of coping strategies
Alam and Collins (2010)	Cyclone hazards, Bangladesh	● Qualitative ● $N = 120$ (108 male; 12 female) & 8 focus group discussions (FGDs)	QL-2	● Use of social support networks ● Increased religious activities ● Community initiative, e.g., communal cooking
Bhandari, Okada, and Knottnerus (2011)	1934 Earthquake, Nepal	● Qualitative ● $N = 15$ elderly respondents & secondary data	QL- 2	● Use of religious and cultural practices ● Use of social support networks ● Use of indigenous knowledge
Braun and Aßheuer (2011)	Floods, Bangladesh	● Quantitative ● 625 households from 5 study sites.	QT -3	● Saving & borrowing money ● Reduction in food consumption ● Use of social networks
Binder et al. (2014)	2009 Tsunami, Samoa Island	● Qualitative ● Interviews = 66; $n = 37$ (9 male, 28 female); $n = 29$ interviews;	QL 4	● Support within the community ● Development of cultural support networks to grieve and cope
Chatterjee (2010)	2005 Floods, India	● Quantitative study ● $N = 50$ households from slums	QT -2	● Borrowing money ● Storing food ● Creating elevated platforms in the house
Gaillard et al. (2008)	Floods, Philippines	● Mixed methods ● $N = 20$ in depth interviews	MM 3	● Storing of food ● Reducing food intake

		• Survey: N = 46		• Borrow & save money • Migration
Jabeen et al. (2010)	Floods and heat waves, Bangladesh	• Qualitative study • *N* = 163 interviews	QL 2	• Saving and borrowing money • Sharing services with neighbors
Jülich (2011)	2003 drought, India	• Quantitative • *N* = 39 households	QT 1	• Reduction in food consumption • Use of social network, especially in cases of migration
Lee (2016)	Disaster (not specific), Nepal	• Qualitative study • *N* = 11	QL 1	• Use of social support systems • Borrow money
Mallick and Vogt (2012)	2009 Cyclone Aila, Bangladesh	• Mixed methods • field survey: *N* = 288 participants • in-depth interviews: *N* = 280	MM 2	• Sell possessions • Use social networks, especially in cases of migration
Mallick et al. (2011)	Cyclone Sidr 2007, Bangladesh	• Mixed methods • Survey *N* = 124 households (110 males, 14 females) • IDI, *N* unclear	MM -2	• Saving food • Borrow and save money • Access of relief aid and available services • Social support within the community
Matin and Taylor (2015)	2009 Cyclone Aila, Bangladesh·	• Mixed methods • *N* = 43 participants	MM 3	• Diversification of income • Borrowing money
Mazumdar et al. (2014)	2009 Cyclone Aila, India	• Quantitative	QT 3	• Borrowing money

(*Continued*)

Table 1. Continued.

Author & date	Disaster type and location	Study & sample description	MMAT score* (critical appraisal of the paper)	Examples of coping strategies
		• $N = 809$ (180 households)		• Reduction in food consumption • Use of social support networks
Mishra (2007)	2002 drought, India	• Mixed methods • $N = 40$ and 5 case studies reviewed	MM 1	• Borrowing money • Diversification of income • Reduction in food consumption
Mishra (2012)	drought, India	• Quantitative • $N = 257$ households	QT 2	• Use of social support networks • Migration
Parida (2015)	Flood, India	• Qualitative study • $N = 68$	QL 2	• Borrowing money • Use of social support networks • Diversification of income
Paul and Routray (2011)	Cyclone, Bangladesh	• Mixed methods • $N = 331$ households	MM 3	• Reduced food consumption • Relief aid use • Use of indigenous knowledge
Rajkumar et al. (2008)	2004 tsunami, India	• Qualitative study • 6 FGDs	QL 2	• Use of social support networks • Use of cultural practices
Rashid (2000)	Flood, Bangladesh	• Qualitative study • $N = 32$	QL 3	• Borrowing and save money • Raised platforms at home to save possessions
Ray-Bennett (2009)	Disaster (unspecified), India	• Qualitative study.	QL 3	• Use of social support networks

		• $N = 32$		• Storing of food • Diversification of income
Ray-Bennett et al. (2016)	2008 flood, Bangladesh	• Qualitative study • $N = 10$ households	QL 1	• Use of social support networks • Community mobilization
Sultana and Rayhan (2012)	2005 flood, Bangladesh	• Quantitative method • $N = 595$ households	QT 3	• Borrowing money • Use of relief aid
Usamah et al. (2014)	Volcano, Philippines	• Mixed methods • $N = 100$	MM 2	• Borrowing money • Use of cultural values
Wang et al. (2013)	2008 earthquake, China	• Qualitative study • $N = 25$	QL 4	• Use of social support networks
Wang, Shi, Ng, Wang, and Chan (2011)	Earthquake, China	• Qualitative study • $N = 25$	QL 3	• Use of social support networks • Providing support to others
Zoleta-Nantes (2002)	Flood hazards, Philippines	• Qualitative • $N = 45$ officials; 78 (urban poor & residents of wealthy neighborhoods) & 9 street children	QL 2	• Use of social support network • Borrowing money • Diversification of income

*The MMAT score is the overall score for study based on the components of the study: Qualitative (QL) and Quantitative (QT) scores range from 1 to 4 and Mixed Methods (MM) from 0 to 3. 1(QL/QT) & 0(MM) = 25%; 2(QL/QT) & 1(MM) = 50%; 3(QL/QT) & 2(MM) = 75% and 4(QL/QT) & 3(MM) = 100% achievement of overall quality (Pluye et al., 2011).

time as a coping strategy. Sources from which to borrow money included relatives, friends, past savings, informal credit, or moneylenders, and by accessing programs by NGOs. However, this borrowing incurred increased debt, while income decreased (Mishra, 2007).

In flood- and cyclone-related studies, families preferred to stay in their houses in attics or by building barriers using sandbags, or positioning their belongings on stilts, and creating outlets for flow of water, fearing theft of their possessions. Hence, it is not surprising that some studies ($n = 5$) identified migration as a last resort and usually temporary.

Diversification of income was a common strategy (Mishra, 2007; Matin & Taylor, 2015; Parida, 2015; Ray-Bennett, 2009). This was done by pursuing other sources of income not normally engaged in, for example, collecting recyclable material to sell, taking in laundry, sewing, and selling of homemade things. Some families also engaged their children in livelihood activities and pawned their belongings for money (e.g., jewelry, land). Though not common, some studies found that families engaged in begging to cope with the financial burden ($n = 5$). Sometimes, men of these families had to migrate to find work and leave their families behind in order to earn money (Braun & Aßheuer, 2011; Gaillard, Pangilinan, Cadag, & Le Masson, 2008; Jülich, 2011; Mallick & Vogt, 2012), however, this was fraught with its own challenges (e.g., difficulty in finding jobs, no communication with their families; some men even abandoned their families and remarried, leaving their wives to fend for themselves and their children).

Some families who had access to resources purchased land on higher ground. Families who were educated (at graduate level) built houses with better materials that in many cases outlasted the disaster event (Mallick, Rahaman, & Vogt, 2011) and coped better (Matin & Taylor, 2015).

Health-related coping strategies

All studies indicated that families prepared for disasters by storing food—grains, cereals, dried and powdered green leafy vegetables. In order to get potable water or relief materials, families often traveled considerable distances. Furthermore, all studies reported that families reduced their food intake, usually starting with adults, and then if necessary this extended to children and lasted throughout the disaster (Ray-Bennett et al., 2016). While relief camps during floods provided nutritional support, these camps were often considered unsuitable for women and children, for instance if camp toilets were out in the open (Rashid, 2000). People coped in such situations by walking long distances, including wading in water, to get toileting access. On the other hand, in flood situations, families who remained in their houses found it impossible to access toilets and many times defecated and urinated in the house (Rashid, 2000). Lastly, if family members, including children, fell

sick, the usual treatment was to just "rest," since a doctor was neither affordable nor accessible (Ray-Bennett et al., 2016; Zoleta-Nantes, 2002).

Psychosocial coping strategies

Families reported that relatives were a source of emotional support. Some studies found that when families were compelled to migrate, more than 50% of the migration happened into neighborhoods where friends and families were already present, or that they migrated together (Jabeen et al., 2011; Rashid, 2000). Families shared services (e.g., toilets) and food with neighbors. Coping strategies also included working together as part of a family and community. For example, neighbors helped each other to build huts or pick up things after the floods from the rivers (Rashid, 2000). Some families got together and mobilized community action (Ray-Bennett et al., 2016). For example, two families bought a boat together and used it to save themselves and their possessions, later renting it out for community use. Cultural practices and the evolution of culture to accommodate the needs of the community after tsunami were instrumental for people in the Samoa islands (Binder, Baker, Mayer, & O'Donnell, 2014).

Community-based coping strategies

Indigenous knowledge was recognized as a contributing factor in psychological preparedness toward a disaster (Paul & Routray, 2011). Studies ($n = 14$) noted that praying and other religious activities were commonly observed coping strategies. In order to appease the gods, families and communities performed religious rituals and also believed in superstitions, which contributed to their preparedness for the disaster (Mishra, 2007). Some communities used rituals to help families grieve. Fishermen in India who lost their children to tsunami remembered them by embracing a tradition: they planted and cared for coconut saplings to which they routinely offered their deceased children's favorite food, and they sat beneath the shadow of the saplings (Rajkumar, Premkumar, & Tharyan, 2008).

Gender differences in coping with disasters

Women and girl children were the first family members to reduce their food intake (Parida, 2015; Ray-Bennett et al., 2016), both in the number of times they ate as well as the quantity of food they consumed. Women faced multiple challenges and discrimination; for example domestic violence, or for using relief shelters with other men of the community or lack of legal rights to land (Alam & Collins, 2010; Mallick et al., 2011; Mallick & Vogt, 2012; Matin & Taylor, 2015; Mishra, 2007; Parida, 2015; Rashid, 2000; Ray-Bennett, 2009).

On the other hand, one study reported a reduction in domestic violence and dowry practices after the tsunami (Rajkumar et al., 2008). Some studies highlighted women's resilience to help themselves and their communities (Binder et al., 2014; Matin & Taylor, 2015). Other studies found women were more at risk of being exploited (including sexually) on the basis of their religion or social standing in order to receive aid material (Mallick & Vogt, 2012; Mishra, 2007).

Barriers to coping

As demonstrated, finances were a source of great stress for families coping with disasters. Migrants, religious minorities or those who were not involved in community organizations found it difficult to access services and relief materials (Chatterjee, 2010; Mallick & Vogt, 2012; Parida, 2015; Usamah, Handmer, Mitchell, & Ahmed, 2014). Women and girls were at a higher risk for exploitation (Alam & Collins, 2010; Mallick et al., 2011; Matin & Taylor, 2015; Mishra, 2007; Parida, 2015). Shame and stigma toward disability, homelessness, or seeking support multiple times made accessing services more challenging (Rashid, 2000). Some studies highlighted that the lack of education ($n = 3$), thus the lack of awareness and information led to an increase in the families' inability to cope. Multiple relief aid agencies (local, national, and international), each with their unique and often unaligned objectives, presented a challenge for implementation, including the use of evidence based disaster management practices (Lee, 2016). Corruption and unfair practices were other barriers recognized in some of the studies (Mallick et al., 2011; Mallick & Vogt, 2012; Parida, 2015; Usamah et al., 2014).

Attitudes toward disasters and coping

While most studies did not discuss the attitudes of participants toward disasters, of those who did, a common view was that the events were God's will ($n = 4$; e.g., Wisner et al., 2004, p. 10). Studies found that participants reported a greater appreciation for life (Wang, Chan, Shi, & Wang, 2013) or that they took their lives more seriously (Rajkumar et al., 2008).

Recommendations to aid better coping of families

Valuing and incorporating indigenous knowledge was recognized as essential in the efforts of both government and civil society (Jabeen et al., 2010). Both evidence and practice need to be contextualized to the local setting with all members of the community involved throughout the disaster cycle (Lee, 2016). A few studies recommended that governments be more cognizant of the factors that create increased vulnerability in order to create programs

tackling those issues directly, for example, awareness about disasters, better warning systems, education, and access to services (Mallick et al., 2011; Mazumdar, Mazumdar, Kanjilal, & Singh, 2014).

Discussion

This review highlights the efforts of families to cope with disasters in the Asia-Pacific region. The review emphasizes the role that socioeconomic factors, sociocultural factors, and indigenous knowledge play. Health and financial status of a family play a crucial role, impacting significantly on their ability to cope with and recover from a disaster. Particularly when a family is coping with poverty conditions, this significantly adds to and entrenches another layer of complexity.

One of the most striking observations that this review brings to the forefront is the woeful lack of information on the perspectives of children and youth. Only three studies included children among their participants. Of them, only one study (Zoleta-Nantes, 2002) captured some of the experiences and challenges that children faced during disasters and in the aftermath, yet only nine children were part of the study while the rest of the participants ($n = 78$) were adults living in wealthy and poor neighborhoods.

Finances were a fundamental source of stress for families across studies examined in this review. The review found that families engaged in a plethora of activities to cope with the financial burden of a disaster, ranging from saving money or construction material ahead of time to children having to drop out of school in order to contribute to the family's income. Children dropping out of school to earn income is not uncommon, particularly in low- and middle-income countries such as those included in this review, and is understandable, considering the financial burden that such unexpected shocks put on families who are already burdened (Alston, 2007; Guarcello, Mealli, & Rosati, 2009). Borrowing money as a result of or in preparation for the hazard was observed in all studies. Additional findings indicated that borrowing exacerbated family debt levels and increased the risk of additional exploitation via labor or even loss of land. The review also highlighted the difficulties members of minority groups, and women, had in receiving relief materials. Women and girls are especially vulnerable to exploitation and domestic violence in these situations (Jones-DeWeever, 2007; Chew & Ramdas, 2005; World Health Organization [WHO], 2002). Stigma, shame, corruption, and unfair practices (e.g., discrimination by aid providers) created further barriers. In general, families didn't want to continually access such resources, especially financial support, due to stigma related to receiving that support or for the fear of increased debt making their already financially hard life even more difficult. This additional set of stressors and complicating factors after a disaster are known as Secondary stressors (Norris et al., 2002).

These secondary stressors are a major risk for families' recovery from disasters.

Families found that social bonds, social solidarity, and community activities assisted them to cope with disasters. The role of social and community support is of course supported, and robustly so, by much research (McFarlane, 1987; Norris et al., 2002, 2008). Not surprisingly, families that had higher education levels coped better, as they tended to be able to save money more readily, knew to watch for signs of and prepare for disasters, and were able to afford better building materials and other resources, highlighting the importance of the role of education in reducing disaster risk.

Limitations

This review includes a small set of studies and all are from LMICs, hence, the study is not representative of the Asia-Pacific region. Additionally, hydrological events were dominant in the selected studies; our search strategy included all types of hazards, but none of the studies about nonhydrological events fitted our inclusion criteria. The review is also limited by selecting only publications written in English. Finally, the review excluded the grey literature and hence might have missed potential coping strategies discussed in reports by community organizations who form an integral part of disaster response and recovery.

Future directions

There is growing evidence of the advantages of including children as active participants in disaster risk reduction (DRR; Ronan, Crellin, & Johnston, 2010; Ronan & Johnston, 2005; Wachtendorf, Brown, & Mickle, 2008), response, and recovery dialogue. Despite these efforts, this review shows how little their voices are heard. Further child-centered research focusing on those who live in complex situations like poverty, institutional care, or in other nontraditional family contexts is a priority.

Conclusion

The systematic review details the coping strategies that are employed by families living in poverty and subject to disaster experiences. The review showed that people living in poverty can be resourceful and prepared to fortify themselves against such crises. Indigenous knowledge, culture, and social bonding appear to play a key role in coping. Families use different strategies throughout the cycle of disaster in order to protect themselves not only from physical hazards, but also from the economic burdens that can accompany disasters. On the other hand, families face fundamental challenges at various levels from individual (e.g., lack of education) to

systemic (e.g., lack of access to free medical services or relief after a disaster). Common issues include finances, housing, and hygiene and sanitation, typically discussed in the studies in some detail. By contrast, there is a critical gap in consideration, and inclusion of, children's needs in this complex combination of poverty and disasters. This includes issues linked to major rights of children, including protection, participation, and equity (UN Convention on the Rights of the Child, 1989). Additionally, a focus on mental health and well-being issues in the included studies was also lacking. Women and girls are not only vulnerable to the risks of disasters, but also to exploitation and discrimination. Finally, the results make it clear that families' socioeconomic status is a major driver of coping strategies and ultimate coping success, including such issues as whether they had to reduce their food intake, or whether their children had to drop out of school to contribute to the household income.

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Appendix 1

SEARCH STRATEGY USED TO FIND RELEVANT PAPERS

Search terms for the present study:
disaster* or "natural disaster"* or "mass casualty incident"* or hazard* or flood* or fire* or cyclon* or earthquake* or tsunami* or "tidal wave"* or landslide* or drought or typhoon or hurricane or "environmental disaster"*
cope* OR copin* OR resilien* OR adapt* OR "Community resilien"*
poverty OR impoverished OR unemployed OR "non-employed" OR deprived OR disadvantage* OR disparit* OR underprivilege* OR inequit* OR inequalit* OR needy OR "resource poor"
Afghanistan or Australia or Bangladesh or Bhutan or "Brunei Darussalam" or Cambodia or China or "Cook Islands" or Korea or Fiji or India or Indonesia or Iran or Japan or Kiribati or Lao or Malaysia or Maldives or Micronesia or Mongolia or Myanmar or Nauru or Nepal or "New Zealand" or Pakistan or Palau or "Papua New Guinea" or Philippines or Samoa or Singapore or "Solomon Islands" or "Sri Lanka" or Thailand or "Timor-Leste" or Tonga or Tuvalu or Vanuatu or Vietnam or "Asia Pacific"
1 AND 2 AND 3 AND 4

Appendix 2

INCLUSION AND EXCLUSION CRITERIA

Inclusion Criteria
The study must:
report coping strategies employed by children or families in disasters (related to health or psychosocial aspects of children or families)
examine coping strategies employed by children and families living in poverty
be from the Asia Pacific region (list of countries found: http://www.ohchr.org/EN/Countries/AsiaRegion/Pages/AsiaRegionIndex.aspx)
be a peer-reviewed empirical article
Exclusion Criteria
Studies that are not:
evaluating coping strategies by children and families in disasters
evaluating these strategies in people who live in poverty
evaluating health or psychosocial factors related coping. For example: If the paper is exclusively discussing agricultural or forestry, or coping is primarily about biological factors (plants) or land, then such studies are to be excluded.
In the Asia Pacific region (any country not included in this list is to be excluded: http://www.ohchr.org/EN/Countries/AsiaRegion/Pages/AsiaRegionIndex.aspx)
peer-reviewed empirical literature, e.g., theses, conference papers, editorials and reports.

2.6 Impact of Disasters on Children

Children represent the largest population segment in LMICs, and so, it is not surprising that researchers identified them as the first and most affected group in natural disasters (Martin, 2010; Norris et al., 2002). In addition to being exposed to physical injuries and potentially traumatic events (Mitchell & Borchard, 2014; Norris et al., 2002), children can be separated from caregivers, families disrupted and therefore are vulnerable to exploitation or abuse (Taylor, 2014). They may be confronted with a lack of food, shelter, and social support (Babugura, 2008), and an inability to make sense of their surroundings, which lead to both a decreased ability to cope and increased vulnerability (UNICEF, 2006). Moreover, it challenges all levels of the socio-ecological system that the children are embedded in, making it hard for children to be able to make sense and cope with the event (Masten, 2014; Masten & Narayan, 2012). Girls are also considered a more at-risk group by both researchers and practitioners. However, there is not enough data on differential impacts on women and girls that are often driven by differential exposure and context-specific inequalities. A review of global disaster data (Brown, Budimir, Upadhyay Crawford, Clements, & Sneddon, 2019) found that there were huge gaps in disaggregated data globally with a near to total absence of the impact sex and age has on disaster preparedness and recovery. The authors report that one of the key learning from the Gender and Age inequality in Disasters report is the need for qualitative insight into differential impact focusing on specific groups such as children. They also caution against treating all children uniformly – i.e. not capturing how children with multiple vulnerabilities or marginalisation are impacted differently by disasters.

2.6.1 Physical impact of disasters on children

Children are different from adults, whether it is their bodies or their needs. Children are more at risk of being killed or severely injured and displaced in disaster situations because they tend to be weaker, have immature immune systems, and do not have direct control over the environment that they live in (Peek, 2008; Stanberry, Thomson, & James, 2018). Children's heightened risk in a disaster situation is further exacerbated by various factors such as low

socioeconomic status, low education level, and age – younger the child, higher the risk (Ahmed et al., 1999; Pradhan et al., 2007; Haynes et al., 2017; Rahman et al., 2017; Paul et al., 2018). In the 2004 Indian Ocean Tsunami, women and children suffered most fatalities (and in some places, one-third of the victims were children), possibly because they were most likely to be indoors when the tsunami occurred (Telford & Cosgrave, 2006; UNOCHA, 2005). In tsunami-affected regions of Sri Lanka, child mortality was three to four times that of young adults. The mortality rate of young children (under-five) was twice that of adults over 50 years of age (Nishikiori et al., 2006; Zahran, Peek, & Brody, 2008). In Tamil Nadu, India too, the youngest and the oldest suffered the highest rates of mortality, with no significant gender differences within these age groups (Guha-Sapir, Parry, Degomme, Joshi, & Arnold, 2006). Studies from major earthquakes also show that children are more prone to be killed from earthquakes compared to adults (Osaki & Minowa, 2001).

In addition to being at risk, children may have new disabilities in the aftermath of a disaster, as a direct consequence or due to inadequate care after a disaster (Mallick et al., 2010; Irshad et al., 2012). Children are also prone to illness as disasters can impede families' ability to provide nutritious food, access to adequate clean water, sanitation facilities, and primary health care, all of which are essential for children's growth and well-being. Malnutrition (Rodriguez-Llanes, Ranjan-Dash, Degomme, Mukhopadhyay, & Guha-Sapir, 2011), diarrhoea (Datar, Liu, Linnemayr, & Stecher, 2013) are common illnesses inflicting children in the aftermath of a disaster. Diarrhoea is one of the major causes of death for children under-5 years globally (Dadonaite & Ritchie, 2018). Accessing timely and adequate health care can be a barrier for children as Abramson & Garfield (2006) found, after hurricanes Katrina and Rita had ravaged multiple cities in the United States of America (USA). Where poverty was a factor, the inability to access support was a major factor in determining children and families' ability to prepare for and recover from disasters.

2.6.2 Psychological Impact on Children

Children can experience a range of emotional and behavioural consequences after disaster exposure – from brief emotional distress to long-term

psychopathology or impaired functioning (Norris et al., 2002). Although many children might recover from a traumatic experience such as a disaster without needing specialised support (Alisic, Jongmans, van Wesel, & Kleber, 2011), long-term mental health problems, for children, related to natural disasters have been documented, e.g. (Dyregrov, Yule, & Olff, 2018; A. C. McFarlane & Van Hooff, 2009; Peek, 2008). A meta-analysis (Alisic et al., 2011) found that about 9.7% of children and adolescents in their global sample exposed to non-interpersonal trauma such as disasters developed Posttraumatic Stress Disorder (PTSD). Depression and anxiety are other common child disaster outcomes with 2 – 69% prevalence rates of depressive symptoms in children (Lai, Auslander, Fitzpatrick, & Podkowirow, 2014). The severity of mental health symptoms in children in the aftermath of a disaster may depend on several factors including the level of exposure, socioeconomic factors, age, gender, personality traits, cognitive skills, and their home environment (Masten & Narayan, 2012). Children might feel powerless, frustrated, and afraid directly because of the disaster incident, in addition to being displaced, getting behind on their education, lack of space and avenues to play and food insecurity (Akhter et al., 2015; Lauten & Lietz, 2008; Quinn, 2016). Others' effective coping strategies enable children, especially if parents are flexible and sensitive to children's changing needs during a disaster, it has the potential to bolster children's capacity to cope with disasters (Wisner et al., 2018). However, parents might be unable to respond and meet the children's needs due to their mental health issues because of the disaster which might, in turn, lead to an increased possibility of mental health problems for children (Fothergill, 2017).

2.6.3 Social and Education related impacts on Children

In a disaster situation, children are more susceptible to be victims of abuse and exploitation (UNICEF, 2011). For example, approximately 500,000 of the 1.5 million children affected by the 2010 Haiti earthquake were vulnerable to violence and abuse (UNICEF, 2011). Violence against children tends to increase in the aftermath of disasters (Cerna-Turoff, Fischer, Mayhew, & Devries, 2019; Seddighi, Salmani, Javadi, & Seddighi, 2019; UNICEF, 2011). In some cultures, including in India, some adolescent girls are forced to enter an early marriage or exploited sexually to get away from poverty (Enarson, Fothergill, & Peek, 2007; Fothergill &

Squier, 2018). Children's education is often disrupted as schools might have to close and might not be able to re-open for many months following the disaster. For example, after hurricane Katrina, approximately 196,000 public school students in Louisiana, USA had to change schools (Pane, McCaffrey, Kalra, & Zhou, 2008). The impact of disasters on children's education in a high-income country such as the US is so significant that about 50,000 students did not return to schools for the rest of the year following Hurricane Katrina (Children's Defense Fund, 2009). One can only imagine what proportion of children's education is interrupted in LMICs such as India. Only a small portion of children returned to school after nearly a year following cyclone Phailin hit the state of Odisha in sIndia due to factors including damage to school infrastructure, roads to school, and children having to contribute to household income due to extensive crop damage (Iwasaki, 2016). A study in Zimbabwe (Mudavanhu et al., 2015) found that school dropout to support household or inability to pay their fees was common. A recent report (Chan, Leung, & Pulmano, 2020) found that access to education was one of the primary concerns for children in the Asia Pacific region about the future in a disaster situation.

Damage to school infrastructure is a substantial contributor to education interruption in the aftermath of a disaster. In 2017, 18,000 schools were shut following damage or destruction due to flooding across South Asia (Briggs, 2018). In 2005, during the Kashmir earthquake, 18,000 children lost their lives since they were trapped in their schools during an earthquake. This earthquake also caused 8,000 schools to collapse in various parts of Kashmir (UNCRD, 2009). Similarly, over 11, 600 schools were damaged due to the 2001 Gujarat earthquake (Shylendra & Bhirdikar, 2009). Often in a post-disaster situation, schools that are not damaged are frequently used as a temporary shelter for survivors causing further delay in schools being able to resume (Bild & Ibrahim, 2013). Furthermore, when children go back to school, they taught by teachers who are also traumatised. Traumatised teachers often face burn out and further traumatisation. However, they are also key to children' ability to heal from their trauma and prevent education interruption when they have specific training in identifying and being sensitive to trauma (Whitaker et al., 2019; Willis & Nagel, 2014).

While education interruption is an important issue, another issue of great importance was food. Food insecurity impacts children in more ways than just hunger, it also plays a part in children feeling insecure, anxious, malnutrition, interruption to education, early marriage, or engaging in labour in order to help their families in securing food (Mudavanhu et al., 2015). Girls and women in the family also share a more considerable burden because they are usually the first members of the family to start reducing their food intake (Krishna, Majeed, et al., 2018), as we found in our systematic review.

Overall, disasters have a multifaceted impact on children's lives – short and long term. Despite disasters' adverse effects on children, they can also be agents of change to make a difference in their, their families and communities' preparedness for and recovery from disasters. They can play an active and valuable role in the development and application of strategies and practices to minimise disaster risks and vulnerabilities (Amri, Bird, Ronan, Haynes, & Towers, 2016; Amri, Bird, Ronan, Haynes, & Towers, 2017; Ronan et al., 2016).

2.6.4 Children as the agents of change

According to a recent report by Save the Children (Chan, Leung, & Pulmano, 2020) which presents the views of nearly 10,000 children and youth from over 12 countries reported that children and youth considered climate crisis as the top concern of their future. This concern was also shared by 1,300 children from 17 countries across Asia, Africa and Latin America when they highlighted that their wellbeing, education and life, in general, were impacted due to disasters related to climate change (Bild & Ibrahim, 2013). Considering children are one of the largest segment of the population affected by disasters, they should play a critical role in the decision-making process at the local, regional, national, and global level (Morrissey, Mulders-Jones, & Petrellis, 2015; Seballos, Tanner, Tarazona, & Gallegos, 2011). Furthermore, the children's rights agenda, represented in the Convention on the Rights of the Child (also known as the CRC), a global pledge to advance the protection, welfare, and the rights of children regardless of their gender, race, religion, or ability, in addition to championing child participation by the UN General Assembly (UNCRC, 1989) requires children to be collaborators in activities related to their welfare and wellbeing. In order to ensure adequate child

participation in decision making related to things important to children's welfare, article 12 of the CRC states:

> *"Parties shall assure to the child who is capable of forming his or her own views the right to express those views freely in all matters affecting the child, the views of the children being given due weight in accordance with the age and maturity of the child."* (UNCRC, 1989 article 12).

The Sendai Framework of Disaster Risk Reduction 2015 – 2030 recognises children as innovative 'agents of change'. It encourages for their active participation in the design, delivery, implementation and scale-up of DRE programmes. Since the Sendai Framework of Disaster Risk Reduction's stand on children's involvement, over half the countries involved in the Hyogo Framework for Action 2005- 2015 reported that DRR was included in their national curriculum at one or more levels; from primary to tertiary education.

2.7 Child Centred Disaster Risk Reduction

Disaster Risk Reduction (DRR) is defined as, "The concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment and improved preparedness for adverse events" (UNISDR, 2009, pp. 10-11). Hore and colleagues (Hore, Gaillard, Johnston, & Ronan, 2018) in their research-into- action brief note that Child-Centred Disaster Risk Reduction (CCDRR) is defined as, "Recognising and drawing on the rights, needs and capacities of children in reducing risk and enhancing the resilience of communities and nations with the ultimate goal of safeguarding the rights of children relating to disaster risk. It focuses on actively involving children in DRR, both in DRR that is for children, and DRR that is with children (UNICEF, 2014a) while recognising that children's needs and capacities vary according to multiple factors such as age, gender, geography and socio- economic status". Amri and colleagues (2018) report that CCDRR has two key objectives: 1) to identify and address specific vulnerabilities of children to disaster risks and 2) to empower them by strengthening their DRR related skills and creating an environment conducive to playing an active role in DRR activities within their family, and community. Many

studies (Gibbs, Marinkovic, et al., 2018; Hore et al., 2018) argue that children are motivated to learn about disasters. These studies provide evidence to children's ability in being active participants in DRR and the potential for their participation to lead to better preparedness outcomes for them, their families and broader communities (Back, Cameron, & Tanner, 2009). Yet, children are often treated as passive recipients in a disaster situation. However, (Bartlett, 2008) indicates that children are maybe more resilient than adults in some cases.

Child-Centred Disaster Risk Reduction (CC-DRR) education or the Disaster Risk Education (DRE) programs have documented several benefits. One is families' better preparedness against disasters (Haynes, Lassa, & Towers, 2010; Haynes & Tanner, 2015; Mitchell, Tanner, & Haynes, 2009). Disaster Education for children not only improves their knowledge and skills related to DRR, but, also increases resilience (Back et al., 2009; Mitchell et al., 2009). Children's participation in DRR related activities has a positive impact on their wider community – from spreading awareness, identifying risks, communicating them to their adults, motivating community participation to even influencing policy. For example: in the Philippines, with the support of a local politician, children were successful in campaigning to their community for relocating a school that was prone to landslides to a safer area (Back et al., 2009). This example and other research provide evidence to the fact that when children have the right knowledge and tools and are supported adequately by adults, they can influence significant changes. Mitchell and Borchard (2014) argue that child-centred approach serves as an entry point to building a broader community understanding of, and action on climate change due to children's potential to influence change. When children are well informed and supported, they can be effective channels of information, role models and agents of change with potentially sustainable impact in the medium to long term (Turnbull, Sterrett, & Hilleboe, 2013, p. 19).

Although there is evidence that disaster resilience education programmes lead to beneficial outcomes for children and families, evaluation in programmes still tends to focus on knowledge gains rather than skills. A lack of focus on action and skills over knowledge gain, might hinder accurate recording and may contribute to reducing the impact of disaster education (Ronan, Alisic, Towers, Johnson, & Johnston, 2015). Lack of knowledge does not give us a good

understanding about the acquisition of practical skills and the usage of those skills by children in a disaster situation. The distinction between skills and knowledge is important since previous research suggests that knowledge acquisition by itself does not equate to applicable skills or practice or change in behaviours (Haynes & Tanner, 2015; Johnson, Johnston, Ronan, & Peace, 2014; Ronan et al., 2016; Ronan, Alisic, Towers, Johnson, & Johnston, 2015). Ronan and colleagues (2016) assert that to overcome the challenges of rote learning, participatory, and interactive disaster resilience education programmes might be the way forward.

2.7.1 Children's Participation in DRR activities and research

Research on children and disasters can be categorised into three main areas: a) the impact of disasters on children and their recovery, b) DRR education/ Disaster Resilience Education (DRE) and c) children's participation in DRR. The impact of disasters on children and their psychosocial recovery has been research extensively. More recently, and especially since the signing of Sendai Framework, DRR education and child participation in DRR have become priority topics in both research and practice. However, DRR studies have been a significant focus compared to studies on child participation in DRR. The number of studies focusing on children's participation in DRR remains minimal compared to other studies on children and disasters.

Amri and colleagues (2018) assert that DRR studies often focus solely on increasing knowledge at the cost of acknowledging children's wider vulnerability context leading to unsuccessful stakeholder engagement and inability to implement and scale-up DRR programmes. Key challenges to the success of DRE education programmes are adequate and continuous training of the teachers, buy-in from the schools and parents (Tatebe & Mutch, 2015). However, the involvement of important role models such as parents, teachers, and community leaders might bolster children's learning since positive parental and teacher engagement is a facilitator for better uptake of key DRR messages. On the other hand, DRR research indicates that parents and teachers are interested in their children's DRR related learning (Amri, Bird, Ronan, Haynes, & Towers, 2016; Webb & Ronan, 2014). Teachers are also eager to teach children (Amri et al., 2016; Johnson et al.,

2014) key DRR skills, once they feel confident of their own skills related to DRR messaging.

2.8 Gap in the literature

Most disaster research focuses on children's trauma and symptomatology, instead of their adaptive behaviours and the process of developing those adaptive behaviours. More importantly, little research exists on the role children play in their disaster preparedness and recovery processes. Children who have multiple and complex vulnerabilities such as poverty, low parental literacy, and living in high-risk neighbourhoods are even less represented in DRR research and practice. Tiernan and colleagues (Tiernan et al., 2019) and similarly, Mayer (Mayer, 2019) reinforce the need for attention to social aspects to resilience and urge to bridge the equity gap in the pre-existing conditions that makes some groups of people more vulnerable and less able to recover from disasters. This gap might be even larger when it relates to children in a disaster situation.

Previous research has highlighted the lack of active participation of children in the creation and implementation (Mitchell & Borchard, 2014) of DRE programs. The systematic review (Krishna, Majeed, et al., 2018) conducted as part of this PhD study also emphasises the lack of children's voice in DRR research. Although there is preliminary support for this stance of including children in DRR (e.g., Amri et al., 2017; Ronan et al., 2016), it has not yet translated into a larger scale, action-oriented, active involvement of children, worldwide, including in India (Jörin, Steinberger, Krishnamurthy, & Scolobig, 2018).

In the last decade, there has been an increased emphasis on teaching and learning methodologies that are participatory, experiential, critical and inclusive with a focus on building essential life skills for future (Petal, Ronan, Ovington, & Tofa, 2020), in a world where the occurrence of disasters is a common phenomenon (Anderson, 2010). Owing to the increased frequency of disasters, Bangay & Blum (2010) call for all channels – formal and informal, from primary to tertiary and beyond to engage in delivering DRR education.

More recent research has begun to acknowledge children's ability to contribute to DRR education not just for themselves, but, to their wider

community. Children's creativity can lead to the development of new methods or new approaches to assessing vulnerability and capacity. Furthermore, they are capable of developing innovative, low-cost solutions to real-world problems (Mitchell & Borchard, 2014). Involving children themselves in the development and testing of the common methodologies or interventions results in a more tailored and context-appropriate approach to DRR within the communities, since cultural and contextual appropriateness is crucial for the success of DRE messaging (Nastasi, Overstreet, & Summerville, 2011; UNICEF, 2014b; Yong & Lemyre, 2019). However, children cannot create and sustain the necessary change to continue DRR efforts by themselves. So, essential stakeholders in the form of parents, teachers, organisations that work for children's rights, development and DRR need to play a critical role in supporting children's DRR efforts (Tanner & Seballos, 2012).

2.9 Implications of the literature review on this thesis

This chapter highlights that reporting on children's experiences and empirical studies on child participation in DRR is woefully lacking. The literature review not only informs my research questions, conceptual framework and methodology, but also emphasizes the need for listening to children, and that research should focus on their needs and experiences as articulated by them. Therefore, in this thesis, I have focused on listening to children about their lived experiences and their ideas. Because of this approach I have worked with them to co-develop a DRE intervention; presented in Chapters 4 through 8. First, however, I present how theory has influenced this thesis in Chapter 3.

Chapter 3: Conceptual Framework

3.1 Introduction

This chapter focuses on the theoretical and conceptual frameworks guiding this PhD research – its design and implementation. First, participatory action has been a guiding principle throughout the design and implementation of the project. In addition, I have drawn from the socio- ecological model (Bronfenbrenner & Ceci, 1994) and the Comprehensive School Safety framework (CSS; UNISDR & GADRRRES, 2017) as general theoretical background, and from social-cognitive learning theory (Bandura, 1986) and principles of effective trauma interventions (Hobfoll et al., 2007) specifically within the design of the DRE intervention. According to Noar and colleagues (Noar, Benac, & Harris, 2007), interventions developed using strategies by combining multiple theories and concepts tended to have larger effects than those with one or no theoretical foundation. In the next section, I will present how each of these conceptual frameworks have influenced different parts of this PhD thesis.

3.2 Theories influencing the design and implementation of this PhD research

Participatory methods guided all the research activities in this PhD. Participatory methods are commonly known as action research, and participatory action research (PAR) involves the "systematic collection and analysis of data for the purpose of taking action and making change" (Gillis & Jackson, 2002). The origins of PAR can be traced to Paulo Freire, who believed that critical reflection was crucial for personal and social change (Maguire, 1987; Selener, 1997). According to Freire, the PAR approach focused on empowering marginalized members of society about issues related to literacy, land reform analysis, and the community (Freire, Ramos, & Penguin, 1970). It was originally developed in the backdrop of oppression to oppose local bureaucracies and imperial powers that often stood in the way of people being able to exercise power in matters that impacted them. Much of participatory research is to shift the concept of power and

give power back in the hands of the people to be part of the decision-making process for decisions that impact them.

Vollman and colleagues also defined participatory action research "a philosophical approach to research that recognizes the need for persons being studied to participate in the design and conduct of all phases (e.g., design, implementation, and dissemination) of any research that affects them" (Vollman, Anderson, & McFarlane, 2004, p. 129). Participatory methods provide an effective tool to engage children in all aspects of research, from the design to implementation of research projects and the dissemination of results (Alderson & Morrow, 2020; Hart, 1992; Shier, 2001).

Habiba and colleagues (2013) assert that for any DRR impact to be sustainable, the local community and stakeholders must be actively involved and committed. A recent case study (Chowdhooree, Dawes, & Sloan, 2020) in Bangladesh found that in order to enhance a community's resilience, it is vital to include the community in planning DRR activities instead of the usual tokenistic participation, which is the case often. A review of literature on community and disaster recovery (Mayer, 2019) found that collaboration within community or between communities with other stakeholders is essential for resilience. Only people in the ecologies that are being studied are able to fully understand and have any power to modify relationships or understand needs and lived experiences and not 'experts' from outside of those ecologies (Glassman & Erdem, 2014). Furthermore, PAR takes a non-hierarchical approach to research where all stakeholders are equally important – whether its problem solvers, thinkers and learners. This is different from conventional academic research, which paints researchers as experts and thus have the ability to solve problems they are studying using research tools. However, solving social problems requires a rigorous, iterative, and cyclical approach where the researchers would need to accept that they may not know or understand everything they think they do (Glassman & Erdem, 2014; Hall, 1992).

Participation by schools, community members, local NGOs and government bodies on the ground is important for any attempt at building resilience and enhancing a community's ability to prepare for and recover from disasters (Liu et

al., 2018; Oktari, Shiwaku, Munadi, & Shaw, 2018; Pandey, 2019). Coles and Buckle (2004, p. 6) suggest that resilience is best realized when the "community participates fully in the recovery process and has the capacity, skills and knowledge to make its participation meaningful". Bennouna and colleagues (2017) conducted a Delphi study to understand child participation in research following a humanitarian crisis, such as a disaster, all agree that child participation was crucial to understanding child experiences, and developing interventions. Assessing competencies of data collection staff, requesting informed consent continuously, creating clear protocols for data collection and being flexible/ adapting data collection processes to the feedback on the ground were some key 'good practices' of doing research with children in a humanitarian crisis. Disaster research has particularly identified the need for child participation in all stages of research for DRR to be successful (Peek et al., 2016; Pfefferbaum, Pfefferbaum, & Horn, 2018).

Hence, in line with the participatory approach, we[1] conducted an exploratory study in the first year of the PhD. We used the various elements recommended in the literature – brought different stakeholders to discuss their lived experiences – community members affected by the 2015 South Indian floods, staff members of the collaborating NGO, youth and finally families with children. We also ensured to keep the topic guides semi-structured and open to ensure their participation. This exploratory study was also helpful in getting a buy-in from the parents and community members to continue this research, since we listened to them and understood their needs. Consequently, the exploratory study set the research agenda for the rest of this PhD, which led to the development and delivery of the DRE intervention. Chapters 4-8 explains how participatory helped used to design the research studies; develop and deliver the DRE intervention.

3.3 Positioning this PhD Research

3.3.1 Socio-Ecological Model

Children are the primary participants in this research. The Socio-ecological model (Bronfenbrenner & Ceci, 1994) suggests that to understand human

[1] My supervisors and myself

development, the entire ecological system in which the human develops needs to be understood and considered. He theorized that the different circles of the environment that a person actively lives and interacts with and in influence development and socialization of an individual. The Socio-ecological theory has three assumptions (Bronfenbrenner, 1979):

a. a person is an active player, exerting their influence on their environment
b. environment compels a person to adapt to its conditions and restrictions
c. environment consists of different size entities (micro-, meso-, exo- and macrosystems) which are placed one inside the other, and have a reciprocal relationship with each other

Figure 3.1: Illustrates the Socio-ecological systems theory

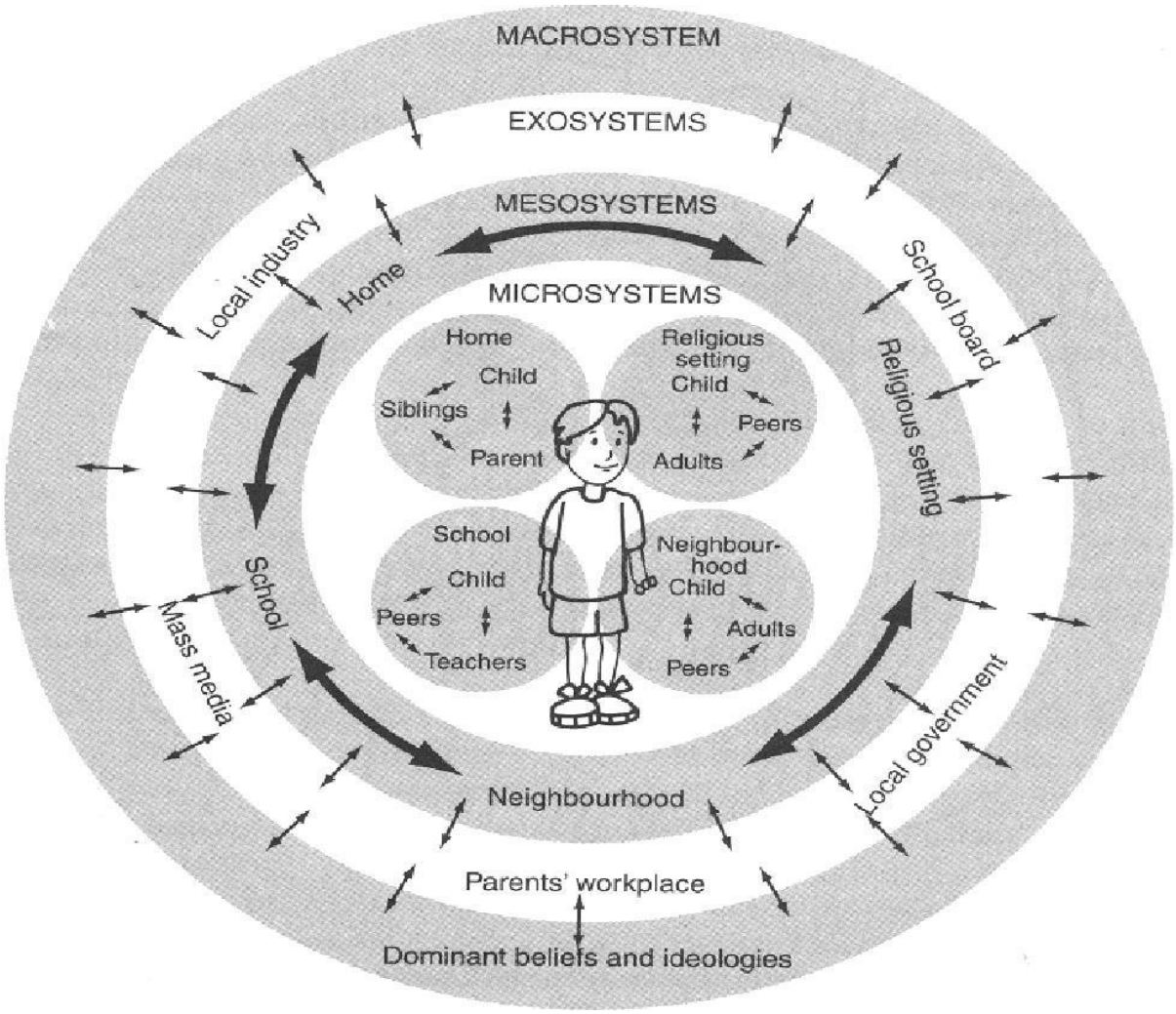

Image reproduced with permission (Penn, 2014, p. 51)

As fig 3.1 shows, the microsystem is the closest environment for a child and includes interactions between them, for example, this bidirectional interaction can be between the child, his or her parents, siblings at home, and teachers at school with these systems. The mesosystem includes the linkages and processes between two or more settings as it relates to the child; for example, mesosystem includes connections between the child's teachers, and the parents. On the other hand, the exosystem encompasses the relationship and processes between two or more settings, at least one of which does not usually involve the child himself/ herself. For example, the exosystem includes the relationship between a child and his / her parents and the parents' relationship with others in their community. In our preliminary study the influence of exosystem was exhibited when we found that

children didn't feel comfortable in some shelters because their parents were treated differently or looked down upon due to their caste or socioeconomic status. So, this led to the family choosing not to evacuate, but, they were also fearful of staying put in the house, which led to raised tensions and children feeling stressed for more things than the flood. Bronfenbrenner (1989, p. 85) suggests that events happening in the exosystem, as in the example above, interaction between their parent and the community can impact the child and their home environment (microsystem). Finally, the macrosystem consists of an overarching pattern of micro-, meso-, and exosystems characteristic of the culture, the broader social context that the child lives in. Although the macrosystem itself doesn't directly interact with the child, it influences the child's development as it includes cultural values, laws and traditions that the child grows up around. For example: it's not uncommon that girl's learning is not treated as important as their male counterparts. We found this in our study too. Girls were the first to be asked to miss out on our meetings or school, even though the same event or chore affected the male sibling in the family too. So, girls in our study expected to miss a few meetings even before we started the intervention development process. As a further development to these systems, the chronosystem was developed to include the impact of time across these systems.

This model of development has also been adapted to disaster management (Beaton et al., 2008) and it assumes that disaster planning, preparedness, response and recovery occur at various levels of the system – individual, familial, community, and beyond. Disaster mental health interventions also increasingly incorporate the socio-ecological perspective into their design (de Jong et al., 2015; Schölmerich & Kawachi, 2016), including in delivering multi-layered interventions to help psychosocial recovery following a disaster. Hence, 'teaching' children disaster preparedness in isolation without considering their entire ecological system – their family, and community is inadequate. Similarly ignoring the need for reciprocity in knowledge and interactive methodologies to learn disaster preparedness could lead to unsuccessful disaster resilience education. Thus, the Socio-ecological model (Bronfenbrenner & Ceci, 1994) is one of the guiding theories in how children are considered in this research – they are not considered in isolation of their family or friends or community. Consequently, this PhD research endeavoured to include children's family and community in the

intervention since children are an integral part of their community and vice versa. For example, the community and children not only contributed towards determining the research direction but, also participated in the development and delivery of the DRE intervention for this PhD.

3.3.2 The Comprehensive School Safety Framework

The Comprehensive School Safety (CSS) framework (UNISDR & GADRRRES, 2017) provides a comprehensive approach to reducing risk through education using child-centred, child-participatory and evidence-based efforts. This framework is a result of a global community-of-practice on the role of knowledge and education in DRR through the formation of the Global Alliance for Disaster Risk Reduction in the Education Sector (GADRRRES) (Petal, Ronan, Ovington, & Tofa, 2020). The shared goals of the CSS framework are (UNISDR & GADRRRES, 2017):

i. To protect learners and education workers from death, injury, and harm in schools
ii. To plan for educational continuity in the face of all expected hazards and threats
iii. To safeguard education sector investments
iv. To strengthen risk reduction and resilience through education

Three intersecting pillars addressed these goals:

a. Safer School Facilities
b. Schools Disaster Risk or Safety management
c. Risk Reduction and Resilience Education

This PhD research focuses on one of the goals (to strengthen risk reduction and resilience through education) and pillars (risk reduction and resilience education) of the CSS. A recent critical review of child-centred risk reduction and school safety practice by Petal and colleagues (Petal et al., 2020) identified that although there was inter-agency agreement on the goals of CSS, practice and research pathways to these goals differed greatly, impeding the progress towards these goals. The authors identified that DRR practitioners, researchers and policy-makers have been working in isolation from each other without a systematic way

to achieve these shared goals and thus leading to unsuccessful research-to-practice translation, capacity building and long-term goal achieving. Furthermore, this framework clearly lays out the importance of reducing risk and strengthening resilience through education. The intervention developed and delivered through this PhD is an example of fulfilling the goal to strengthen risk reduction and resilience through education. This research has attempted to close the gap between stakeholders, identified as a crucial barrier for DRR implementation in order to achieve the shared CSS goals by ensuring adequate and active consultation with community members, local NGOs, children, DRR researchers and practitioners.

3.4 Theories influencing the development of the intervention

3.4.1 Social-cognitive learning theory

Social-cognitive learning theory (Bandura, 1986) guided the intervention development in conjunction with Hobfoll's (2007) principles for an effective intervention following a traumatic event such as a disaster. Social-cognitive learning theory (Bandura, 1986) outlines several sources of behaviour change including receiving of verbal instructions on how to perform the behaviour, such as direct experiences (practicing the targeted behaviour), vicarious experiences (observing others perform the behaviour) and receiving feedback on one's performance. Lack of awareness of preparedness behaviours, as well as cultural, socio-economic and systemic issues, are some of the critical barriers to preparedness for hazards (Krishna, Ronan, & Alisic, 2018). Social-cognitive learning theory also emphasizes barriers and facilitators to behaviour change (Bandura, 1986; Michie et al., 2013). Barriers include individual, interpersonal or structural impediments to implementing desired behaviours. Facilitators include qualities, events or structural support to implement desired behaviours. Paton (2003) suggests that a disaster preparedness intervention should consider ways to motivate people to prepare for disasters continually, facilitate intention formation (of wanting to prepare), and continue to promote their intention to prepare to disaster preparedness itself.

Although not many DRE interventions can account for all three factors, Dalton and colleagues (2013), as well as Paton (2003), suggest that a DRE intervention should ideally include elements based on self-efficacy, problem-focused coping with strategies based on participation and empowerment. Benight & Bandura (2004) also emphasize the role of perceived self-efficacy in posttraumatic recovery following a disaster. They argue that people who believe in their ability to cope following a traumatic event such as a disaster despite rapid resource depletion (Hobfoll, 1991) have better outcomes than those who did not believe in their efficacy. Ronan and colleagues (2008) also highlight the need for DRE interventions to build 'self-efficacy' in participants in order to help them prepare for disasters. They also advocate for using interactive and participatory methods in intervention delivery for it to be well received and potentially be effective in disaster preparedness.

Self-efficacy is both an essential element in an education intervention as well as a consequence of that education, as evidenced by Hobfoll's five essential elements in an intervention following a traumatic event (Hobfoll et al., 2007) which also informs the development of this intervention. It focuses on promoting:

i. sense of safety
ii. calming
iii. self- and collective efficacy
iv. connectedness
v. hope

Gibbs and colleagues (2015) identified that safety and stability are crucial for children and young people's wellbeing in the aftermath of a disaster. Chapter 6 describes the process of intervention development. It also shows how all elements discussed in this section have been incorporated into the DRE intervention through a participatory approach.

3.5 Frameworks guiding the reporting of this PhD research

Intervention development and delivery processes are oftentimes underreported, especially in the field of disaster risk reduction. When an intervention is reported, it usually is reported without a comprehensive reporting guideline or in a standardized way which can pose a challenge in replication and scale-up. Thus, in this PhD thesis, the process of intervention development is reported using the guidance for reporting intervention development studies in health research (GUIDED; Duncan, O'Cathain, Rousseau, Croot, Sworn, Turner, Yardley, & Hoddinott, 2020). Similarly, a thorough examination of the underlying implementation processes – activities in the intervention allows researchers to assess how the intervention was implemented compared to the intended implementation. Furthermore, given the lack of consensus on how 'acceptability' is defined, we have used the Theoretical Framework of Acceptability (TFA; Sekhon, Cartwright, & Francis, 2017) and five characteristics of feasibility as defined by Orsmond & Cohn (2015). The Theoretical Framework of Acceptability (Sekhon, Cartwright, & Francis, 2017) includes seven constructs: affective attitude, burden, ethicality, intervention coherence, opportunity costs, perceived effectiveness and self-efficacy. The five characteristics of feasibility (Orsmond & Cohn, 2015) include examining procedures related to recruitment, data collection, acceptability of the intervention, resources to manage study implementation and finally evaluating participant responses to the intervention. Chapters 6 and 7 discuss these in detail along with the intervention development and delivery.

Chapter 4: Experiences and needs of communities affected by the 2015 South Indian Floods

4.1 Introduction & Preamble to Empirical Paper 2

This chapter answers the first research question of this thesis: What are the experiences and needs of communities living in poverty during the 2015 floods in Tamil Nadu, India? This chapter presents the second empirical paper of this thesis. Paper two, *'The lived experience of disadvantaged communities affected by the 2015 South Indian Floods: Implications for disaster risk reduction dialogue'* was recently accepted at the International Journal of Disaster Risk Reduction (IJDRR). IJDRR is a peer-reviewed journal that publishes original scientific research for a diverse audience intending to reduce the impact of natural, technological, social and intentional disasters. The Monash University Human Research Ethics Committee approved this project (Appendix C). The explanatory statements and topic guides for data collection with community members, staff members of the collaborating NGO used for this study are also included in the appendices (Appendix D - H). Finally, Appendix I is the debriefing form used for summarising notes after every interview. While the paper presented in this chapter exclusively reports on the lived experiences of the flood-affected community members, this chapter also includes a report on the community members' perceived needs using the World Health Organisation's (WHO) the Humanitarian Emergency Settings Perceived Needs Scale (HESPER; WHO, 2011).

4.2 Empirical Paper 2

Krishna, R. N., Ronan, K., Spencer, C., & Alisic, E. (2021). The lived experience of disadvantaged communities affected by the 2015 South Indian Floods: Implications for disaster risk reduction dialogue. *International Journal of Disaster Risk Reduction,* 54, 102046. https://doi.org/10.1016/j.ijdrr.2021.102046

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The lived experience of disadvantaged communities affected by the 2015 South Indian floods: Implications for disaster risk reduction dialogue

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ABSTRACT

Poverty and discrimination compound vulnerability to disasters. Yet, people who experience these are some of the least involved groups in Disaster Risk Reduction (DRR) dialogue and research. This study aims to fill that gap by narrating the lived experience of underprivileged flood-affected communities. We conducted in-depth interviews (N = 48) with community members (n = 36) and staff members of collaborating non-governmental organisations (n = 12). We also conducted focus group discussions with staff members of the same NGOs. The results describe how systemic issues entrenched with socio-economic and cultural factors impact a community's ability to prepare for floods. These communities received no warning or timely evacuation messages, and perceived the received support as inadequate and unfair. Communities recovered through their resourcefulness and thoughtfulness. They resented the government for its lack of action throughout the disaster cycle. Priorities for future efforts involve actively engaging th[illegible]oring DRR activities for them.

1. Introduction

Densely populated cities in the Asia Pacific region are at the highest risk of emergency because of natural hazards [1]. For example, heavy monsoon rains and floods during mid-2017 affected over 40 million people with more than 1200 fatalities across India, Nepal and Bangladesh. Many cities face haphazard urbanisation, leading to increased demands for healthy and affordable housing, employment, basic services, as well as better infrastructure [2,3] that are oftentimes unmet. In addition to these unmet infrastructure needs, factors such as age, gender, ethnicity, income, and living situation, influence vulnerability to hazards with a substantial impact on one's ability to cope after a hazard. Poverty is a major contributor to vulnerability. Although no direct connection exists between poverty and vulnerability, they are often highly correlated, and people experiencing poverty tend to suffer the most from disasters [4]. Social and cultural factors affect one's vulnerability to hazards. Yet, social and cultural factors do not receive enough attention from researchers despite their enormous influence on the success of Disaster Risk Reduction (DRR) activities [5].

A recent study [6] found that many communities across Africa, Asia, and Oceania, did not heed to early warnings even though such a system existed since the early warning systems and messages were incongruent with their cultural norms and beliefs. For example: when the Philippines was affected by Typhoon Haiyan in November 2013, even though early warnings were sent to the local DRR units the authors report that these warnings failed to create preparedness actions due to mistrust and miscommunication between social groups "owing to uneven distribution of control, power and welfare". Similarly, the 2015 Pacific typhoon season devastated the island of Saipan partly because of people not evacuating before the typhoon. One of the barriers to evacuation, as the authors reported related to their culture of 'staying together as a family' and that they do not 'rush' their elderly, which meant they didn't have a chance to evacuate before the storms hit. Since the early warning went unheeded, DRR early warning system, often seen as a protective factor, failed. This failure might be attributed to the lack of understanding of local culture before DRR related activities implementation. Another important reason for this failure could be due to the lack of involvement of the local communities in DRR activities from the start.

Research related to vulnerability seems to occur in a vacuum – either focusing on physical components of vulnerability and risk, while largely ignoring socio-cultural factors related to vulnerability or vice versa [7]. In the Indian context, where the current study is based, people belonging to the 'lower' castes who also tend to live in poverty are marginalised and discriminated to the extent that they lack access to assets, public

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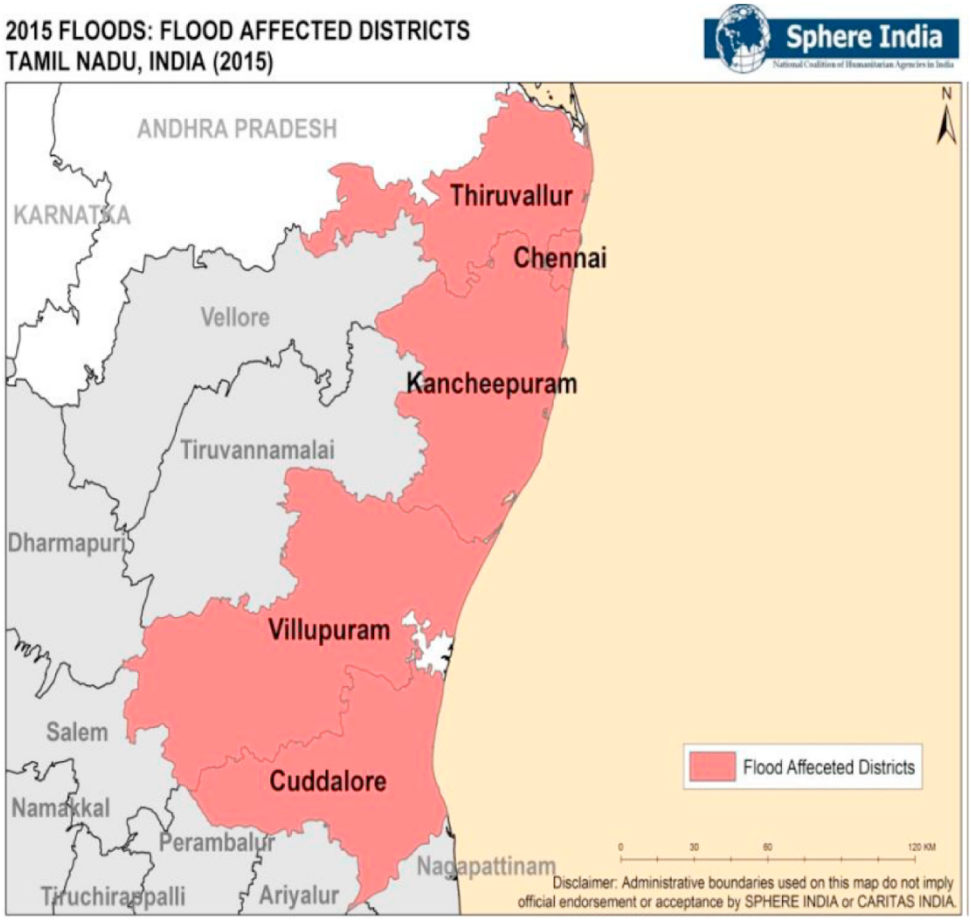
facilities and opportunities to improve their lives, especially in the face of disasters. Corruption, environmental degradation, and the resulting increased vulnerability of communities have significant consequences on the community's ability to cope with and recover from disasters [8]. Furthermore, since gender, poverty, caste and class have been identified as some of the chief drivers of vulnerability, one would think communities with these vulnerabilities would be actively involved in the DRR dialogue. Sadly, such dialogue is far from true, as these vulnerable communities are more often than not, the least involved in influencing disaster-related policy, and DRR activities [9–11], as evidenced by the lack empirical studies on the communities reported in this study.

Large gaps related to ethnicity, caste and religious affiliations in disaster-related data not only create an acute shortage of information but also impact our understanding of these issues. India specifically lacks scientific recordkeeping of disaster incidences [12] and thus no empirical record of how disasters such as the 2015 South Indian floods affected some of the most vulnerable groups such as, people living in poverty, children, and women. Thus, to understand disaster preparedness and recovery, it is vital that one that digs deeper into broader issues that affect vulnerability and coping of a community, including issues such as social injustice, and discrimination [4], some of which the current qualitative study aims to present through this manuscript.

Given the lack of research and involvement of communities with complex vulnerabilities such as poverty, high levels of illiteracy, perceived marginalisation in DRR dialogue, the current qualitative study aims to understand the lived experience of such communities during the 2015 South Indian floods in rural and urban areas of Tamil Nadu, India. We hope that this serves as the first step to involving these vulnerable communities in DRR activities, thus giving them and their children a better chance to preparedness for future hazards that affect their communities.

1.1. Study context

Globally, India is one of the most disaster-prone countries due to its geo-climatic conditions, population and its high degree of socio-economic vulnerability [13]. Tamil Nadu has the second-longest coastline in India. About 52% of Tamil Nadu's 72 million population live in rural areas [14]. Disparities related to class, caste, gender, inter-district and urban-rural living are prevalent [15,16]. The International Federation of Red Cross and Red Crescent Societies (IFRC) reported that over 1.8 million people were displaced and over 200 people lost their lives because of the 2015 South Indian flood in Tamil Nadu affecting five districts as shows in Fig. 1 below. Globally, the South Indian floods were one of the most expensive disasters of 2015 [17] with estimated damage and loss of over 15 billion US dollars. Heavy rains washed away road and



Source: Joint Needs Assessment Report Tamil Nadu Floods 2015 by Inter Agency Group, Tamil Nadu (https://reliefweb.int/sites/reliefweb.int/files/resources/jna-report-tamilnadu-december-2015.pdf)

Fig. 1. Shows the flood-affected areas of Tamil Nadu.
Source: Joint Needs Assessment Report Tamil Nadu Floods 2015 by Inter Agency Group, Tamil Nadu (https://reliefweb.int/sites/reliefweb.int/files/resources/jna-report-tamilnadu-december-2015.pdf)

several rail links, which hampered supply and evacuation efforts. According to the Tamil Nadu government, about three million families of low socio-economic communities suffered total or partial damage to their houses [18].

As Fig. 1 shows, both urban and rural areas were affected by the floods. The capital city of Tamil Nadu, Chennai, where some of the data for this study was collected was affected by this flood, and as expected, the flood had a much more adverse impact on low socio-economic groups. According to the joint needs' assessment report [19], Chennai's urban areas were faced with many challenges including sanitation with a ratio of approximately 1:100 (toilets: per user) thus increasing open defecation. Lack of waste management was an important issue identified in addition to many other critical issues such as lack of shelters, crowding in the limitedly available shelters, damaged properties, and safety for women and children. This was not very different from rural areas, however, damage to agricultural land, animals were added disadvantages, especially since many communities depended on their land and animals for livelihood and nutrition.

2. Methods

2.1. Participants and qualitative data collection

This manuscript is part of a larger study conducted from December 2016 to February 2017, about a year after the 2015 South Indian floods. The overall aim of the study was to understand the lived experience of flood-affected communities living in poverty, in the Chennai Metropolitan area comprising of three districts – Chennai, Thiruvallur and Kancheepuram, in Tamil Nadu, India. All community participants in the study were from low socio-economic background with multiple vulnerabilities including low literacy rates in the community, discrimination and systemic marginalisation from the government as perceived by the communities. In urban Chennai, the communities involved in the study lived in inner-city slums which tended to be over-crowded and not always registered, hence making some of their living quarters illegal encroachment of government land. The communities in rural areas lived in the fringes of their respective villages as they were not accepted by the villages (since these communities belong to lower caste and or were tribal communities) to live amongst them. Thus, they lived on land that belonged to the government making it illegal for them to live there. This led to the study communities' lack of access to proper sanitation, running water or electricity.

The research team obtained ethics approval from the University Human Research Ethics Committee. Collaboration with local Non-Governmental Organisations (NGOs) helped us gain access to the flood-affected communities and identify participants in the community. The NGOs reviewed University's approved ethics and data collection documentation in their internal ethics panels and approved this study. In line with qualitative methods, we chose 'Purposive Sampling' [20] to get diverse viewpoints by selecting communities from rural and urban settings and to ensure adequate representation of both genders and across the age range. Furthermore, some of the staff members of the collaborating local NGOs were included as participants in the study. We made sure that these staff members were not involved in the initial ethics review for this study (within the organisation) to prevent any biases that might arise from knowing the interview topic guides and the aim of this study. The local, collaborating NGOs, as well as the interviewer, provided comprehensive information about the study to the participants. Due to high illiteracy rates in the study communities, we recorded consent in audio format instead of in writing.

We conducted semi-structured, in-depth interviews with 36 flood-affected community members. We also interviewed (n = 12) staff members from the NGOs we collaborated with, in addition to, conducting two focus group discussions. Table 1 presents the demographic characteristics of the participants. RNK (the first author) conducted the interviews in Tamil at the participants' preferred venue, usually their houses or communal areas that provided some privacy.

Table 1
Demographic characteristics of individual, in-depth interview participants (N = 48).

Demographic Characteristics	Staff of NGO (n = 12)	Community members (n = 36)
Age (in years): mean, (range)	36.1 (26–55)	34.4 (19–67)
Gender (%)		
Male	3 (25)	14 (39)
Female	9 (75)	22 (61)
Marital Status		
Married	8	26
Unmarried	3	5
Divorced/Separated	1	1
Widowed	0	4
Number of Children (mean)	1.5	1.8
Level of Education		
Illiterate/no formal education	0	9
Primary School (grades 1 to 5)	0	12
Secondary School (grade 6 to 10)	2	5
Intermediate School (grades 11 to 12)	7	6
University	3	4
Employment Status		
Employed	12	22
Not employed	0	14
House Structure		
Concrete	N/A	9
Makeshift	N/A	17
Combination (e.g. concrete walls with makeshift roofs)	N/A	10

Topics explored in the in-depth interviews revolved around the community's lived experience during the floods, relevant support systems, and their thoughts on future disaster preparedness. The in-depth interviews lasted anywhere between 30 and 90 min. Focus group discussions (FGDs) revolved around the NGO staff members' observation of the communities during the floods as well as their views on future research directions. The focus group discussions were 90–140 min long. All focus group discussions and interviews were audio-recorded.

2.2. Analysis

Interview notes and de-briefing forms (completed after the interviews) were used to ensure that we achieved data saturation before halting data collection. We analysed the interview notes and de-briefing forms at the end of each data collection day to identify new/emerging themes. We created a list of themes with a count of how often same themes were reported. So, saturation, in this context was achieved when, with this diverse sample, the interviewer stopped getting new themes in the interviews.

At the start of formal analysis, the interviewer (RNK) then transcribed and translated all the interviews and focus group discussions into English. Later, RNK checked, rechecked the transcripts, compared them to the interview notes and debriefing forms to minimise any inaccuracies in the translation and transcription process. Grounded Theory [21,22], informed the qualitative analysis which used a constant comparison approach. We read and reread the transcripts to gain familiarity with raw data. The transcripts were then analysed using NVivo version (QSR International Pty Ltd, 2015). In the process of open coding, we identified new codes that emerged from the data and compared these with some of the themes/codes that we expected to see a priori. For instance, since we were asking the community members about their first thoughts and feelings when they found themselves in a flood – we were expecting to hear about fear, confusion, etc. Similarly, we were also asking about their preparedness and recovery – we expected to see themes related to those topics as well. Two authors (first and fourth authors) continuously discussed the coding strategy and the codebook

until these were finalised. Once we coded the interviews and focus group discussions, we sorted the data according to their appropriate themes and sub-themes to look for any errors or omissions in coding and recoded the data where necessary. The second author (KR) examined the final themes, codes, their supporting data (quotes) and relations, with discrepancies discussed and resolved among the authors.

3. Results

3.1. Communities' deepening disadvantage due to cultural, economic and social factors

Social, cultural and economic factors not only critically influence an individual's quality of life, they also have a profound impact on a disadvantaged community's ability to prepare for, cope with and recover from a disaster. Qualitative analyses of the in-depth interviews and focus group discussions in this study provide further evidence for the crucial role that social, economic and cultural factors play in times of crises. The results depict how systemic issues entrenched with social, economic and cultural factors impact a community's ability to prepare for the flood through six overarching themes:

a) No chance at preparing for the flood;
b) Fear, discrimination and lack of privacy among many impediments to safe evacuation;
c) Late, inadequate, unfair and inappropriate support obstructed coping;
d) Property damage, loss of livelihood, social issues – among barriers to recovery;
e) Community healed by helping each other - resource-poor but not thoughtless; and
f) Hope for future preparedness.

a. No chance at preparing for the flood

Although participants reported that it rained continuously for days, they received no warnings from the local authorities that this might or would lead to a situation needing evacuation. Community members had experienced ankle-deep water in the streets in previous years, but, on those occasions, floodwater had had not entered their houses and thus, on this occasion they did not expect the water to enter their houses. A 100% of the participants recruited in the communities reported that they were surprised by the flooding since they didn't have any official warning from the local authorities. To make things worse, their wet beds woke them up in the wee hours of the morning to rising floodwater and they saw their possessions floating around them when they opened their eyes, as this quote reveals

> "We received no warnings or alerts. There were no announcements that a flood was imminent. No announcement. It was raining. My husband is a car driver; when it rains heavily, he skips work. I asked him not to go to work (as the rains were quite heavy). There was no warning about floods coming." - A woman who would have been stuck with her two little kids in the flood had her husband taken the car out for work.

The floodwater started to rise quite rapidly – a family reported that they received less than 15 min warning to take all that was important to them and evacuate. This family wasn't alone in their ordeal, it was comparable with their entire community's experience. Several participants thought that their community was flooded because the floodgates opened in nearby dams in the early hours of the morning. For those participants (n = 12) living in a community where this was a possibility, 9 brought this up as the quote below shows. Since communities received no information about opening of the floodgates, it left the communities inundated, stranded, helpless and disadvantaged.

> "*The flooding at night – it was not due to the rains. It is the government's fault. They opened the floodgates of the lakes all of a sudden and so because of that we took in water in this village and even other villages here were flooded*. The water filled up till the railway line and the people of the community suffered a lot."

These participants suggested that the authorities who opened the floodgates wouldn't have opened them, if their neighbourhood wasn't socioeconomically disadvantaged. They opined that had their community been affluent, they would have had the resources and potentially connections within the system to advocate for themselves and campaign for their rights. This would have prevented the authorities from acting so thoughtlessly. However, since they were poor, their lives or how a hazard affected their lives were not reported and neither did they have the ability to make this known to the rest of the world. Many participants didn't have television or radios that could provide them with updates or news and thus were dependent on other forms of communication – whether it was the local authorities making community announcements or other families in their communities who owned a television and were able to let them know the news. Less than 10% of the participants (n = 3) reported receiving possible flood-rated warning through a news telecast. However, they reported that warnings such as these tend to be generic (i.e. without stating specific neighbourhoods or communities) and oftentimes don't come to fruition as according to their past experiences (for example: although there was flood predicted, the community didn't experience flooding) and this could have led those who did receive an early warning to ignore it, as illustrated in this quote by a staff member:

> *"This is the only thing I can think about. Sometimes, warnings provided by the government for example they say there is going to be a flood and it doesn't happen or that there is going to be a cyclone and it does not happen. So, it's not always taken seriously."* - NGO staff member who worked with the flood-affected communities

This attitude of 'it won't be that bad' was not exclusive to the communities in this study that were predominantly from a low socioeconomic background with high illiteracy rates, but, it was also prevalent amongst staff members of community organisations who advised the community members to prepare for an emergency. The following quote depicts how a staff member didn't take her own words seriously, even though she had participated in disaster-relief activities in the past and highlights the need for heeding and following warnings:

> *"It was very funny – I told my community to be well prepared. We asked them to buy groceries, save water and all that. Even with all that, I, myself didn't save any water. I was careless wondering if it really would be that bad and so, didn't end up storing any water."* – - One of the NGO staff during a Focus Group Discussion

This section demonstrates how the community's inability to prepare for a flood or cyclone or any other emergency was due to the fact that they knew little about hazards, early warning signs, or whether or not they had a shelter, let alone, where their designated shelter was. The communities reported feeling disregarded and uninformed by the government and authorities, which left them vulnerable and unable to prepare for impending emergencies – e.g. when they did not receive communication about impending floods, or the opening of floodgates in close proximity to their communities. They reported that their local elected representative should have given them a 'warning' which they would have trusted more than what was televised on news since the news might not be applicable for their community specifically.

b. Fear, discrimination and lack of privacy among many impediments to safe evacuation

About 33% of the community members (n = 12) in the study refused to evacuate since they wanted to stay together as a family. Elderly and

disabled people had a particularly difficult time during evacuation. The fear that girls and women might not be safe at the shelter was a major barrier to evacuation since the shelters tended to be overcrowded and unsegregated based on gender. Furthermore, while community members expected that their local shelter would only host people from their community (based on geographical boundary), but, that wasn't the case. This led families to fear evacuation shelters more – unknown people led to further lack of trust. Considering that these communities were already facing financial hardship, participants reported that they were in a dilemma between evacuating and protecting their belongings from potential theft. This dilemma is made clear through the following quote by a mother of two, who had to leave her husband behind, to guard their house when she took their children and evacuated to the local church:

> "I told my husband not to worry about us. 'We will be all right. You take care and stay alert. If things get too bad here, don't hesitate to come to the church. If we lose our belongings, let them go. We can work, earn and buy them again.'"

Of the three different communities included in the study, only a few participants (n = 5) in one community knew where they could evacuate to, after being informed by local NGOs. Others didn't have a designated shelter or didn't know of shelters they could use. Thus, they often used schools and offices as shelters. People belonging to the 'upper' castes occupied the few existing shelters and denied entry to many participants, who belonged to lower classes and castes, at the shelters.

Consequently, many 'lower' caste and class families were trapped in their houses. Some families eventually evacuated to shelters when they could no longer stay in their houses, however, felt that they were being stereotyped and mistreated. Yet, there were many families who were unsuccessful in seeking refuge at shelters due to discrimination for belonging to a lower 'caste' despite support from heads of the village as exemplified in this quote below:

> *" 'So what if they die; let them just drown. Why should you bother?' This is how people were talking about us. And this quarrel increased. He* [the head of the village] *almost got physically assaulted for taking our side* [advocating for those of lower caste/ class]. *Many came and told us that he was fighting against them for our sake."* - A community member who was discriminated against due to her caste and class.

When families decided to evacuate, they found it hard and scary to use boats. Although they had seen fishermen use boats in large water bodies like rivers, or seas, they were now being used to navigate tight urban spaces and this terrified the families. Since emergency services were not part of their 'evacuation crew', it made it harder for participants to trust fishermen who had no experience in these kinds of situations. It made them apprehensive about the possibility of the boat capsizing. An observing NGO staff member who, was also affected by flooding in her community, captures this fear in the following quote.

> *"In an ocean there is nothing to interfere with where the boat is going, but, here* [in the tight inner-city spaces]*, the boat kept hitting walls, corners, steps, etc., and because of this, the boats would shake and sometimes even capsize putting all the people on the boat in the flood water needing to be rescued* [again]*."*

Those who were able to evacuate had other concerns including their safety at the shelter. Participants reported that some shelters were starting to flood, making it difficult for them to stay safe there. Many shelters had no power, no food or water. Participants felt the government did not prioritise their safety and wellbeing. A staff member of an NGO provided an example of this lack of prioritisation - the authorities evacuated an entire community into a truck stop which became inaccessible as the floods started to worsen, thus cutting them off from supplies that were being sent to them. Evacuation to this truck stop was quite a challenge due to it being on boats, shelters were non-existent and later, where a shelter was made available, there were fights within the community of who can be allowed into the shelters making lives of people from 'lower' castes, class, and of the female gender harder than it already was. These stories of the lived experience elucidate how fear, discrimination and lack of privacy impeded safe evacuations.

c. Late, inadequate, unfair and inappropriate support obstructed coping

Over 50% (n = 19) of the community member participants reported that first 'help' took at least two days to arrive, which was quite hard on the families since they didn't have food, water, clothes or even a safe space to live. About 70% (n = 26) of the community members who participated in the study reported that local elected representatives overlooked their communities during crises. However, during elections local politicians reach out to these communities to gather votes. Thus, these participants resented local politicians and their lack of response throughout the emergency. This resentment was also resonated by the staff members of the NGO in the FGDs. Participants reported that they neither received warning to prepare for the flood, nor did they receive timely help from the government during evacuation, or accurate assessment of loss endured by the community after the floods. They felt that whatever little support they received was inappropriate; for example, food provided at the shelters wasn't the kind of food that community members commonly ate, and the clothes they received were inappropriate – so participants felt like the government and even NGOs didn't seem to truly care about their needs or wellbeing. Donated women's and children clothes were culturally inappropriate or provided insufficient layers to complete an attire appropriately. For example, a blouse is usually necessary in order to wear a saree, which is one of the most common attires for women. While women were given many sarees, not many blouses were given which meant that women still didn't have clothes they could use. Furthermore, they reported that girls and women were not given menstrual products and there wasn't an organised way for them to get them. This made asking for menstrual products awkward and made them vulnerable to bullying by prying men. Younger male participants in the study who helped their communities during the flood, identified that women had a particularly hard time with issues related to safety, hygiene, lack of privacy, and non-availability of menstrual products, or appropriate clothing and this is reflected in the quote below:

> *"They couldn't also ask for sanitary products – they were too embarrassed. Even if they did ask, they didn't know where to dispose of it. If there is a stain* [on their clothes]*, what could they do? Toilets – no privacy. Men were everywhere, how would they go to toilets, they couldn't even change clothes or underwear because of lack of privacy. So, they all struggled a lot."* – A male NGO staff member who worked hard to find menstrual products for his own family and other women in the community

Nearly all female participants and nearly 70% (n = 8) staff members of the NGOs reported feeling upset that men could procure alcohol from Tamil Nadu State Marketing Corporation (TASMAC), a company owned by the Government of Tamil Nadu, which operated as it would on any other day, leading to inebriated men harassing women, girls and volunteers. An NGO staff member was frustrated by the government's priorities by keeping TASMAC operational during an emergency as the following quote shows:

> *"There are a lot of children who said they did not get food, water, clothes, nothing but their father was able to get alcohol. That was available, even during the flood that was there."* – NGO staff member

Many community members in the study reported that they were unhappy that the promised financial aid was distributed unfairly. As the quote below discloses, participants (n = 4), including some of the staff

members (n = 3) of one of the collaborating NGOs pointed out that there were victims from the 2004 Indian Ocean Tsunami who were still waiting to be relocated or rehoused in their communities. They noted that most families who were still waiting for support from the government came from low social and economic backgrounds and cited discrimination against them and government's indifference towards them as the reasons why they had not been relocated or provided other support.

> *"Well, people need houses, and that is the most important thing. Many of the victims who were affected by tsunami what 12 years ago, still do not have houses. Yet, there has been no work towards rebuilding their houses. The government has not done anything towards it."* – NGO staff member who is also a victim of the 2004 Indian Ocean Tsunami

Nearly all participants from the communities reported that they received help from NGOs during the floods – they were provided with food, water, clothes, support with evacuation, and medical assistance after the floods. NGO staff members provided examples of how they sought funding through Corporate Social Responsibility (CSR) programmes in order to help the flood-affected families. The staff members felt that despite seeking support from CSR programmes, it was inadequate since they were able to reach only a limited number of beneficiaries and unable to help beyond providing bare necessities. The staff members of NGO particularly regretted their inability to provide adequate mental health support and support specific to women and children. Four participants of one of the flood-affected communities reported that it was not only people experiencing poverty who struggled, but, also families who identified themselves as 'middle-class' were severely impacted. They reported that these middle-class families who were not living in poverty, were largely ignored without much support from both the government and the NGOs. They opined that this might be due to organisations and government thinking that they are not in dire need, however, participants who considered themselves middle-class reported that they found it quite hard to cope during and after the floods as this quote below from a dad who lost the roof of his house to the floods explains:

> *"NGOs also didn't come and help us. Most NGOs help really poor people, but, many times they don't tend to help people who are not that poor. Our neighbourhood is not poor, but it's not rich either. You can see that from looking at our neighbourhood, we have a few comfortable cement houses and the rest are really struggling, but, they are not living on the road* [homeless] *and so NGOs do not help middle-class people very much."*

This father's experience illustrates how families who were experiencing poverty were not the only ones who have been deeply impacted by the floods. Families who were previously able to meet their financial needs were pushed into poverty due to lack of accurate needs assessment in addition to inadequate and inappropriate support. This only bolsters the fact that hazards like floods does affect everyone, but not equally and not every family has the same ability to recover from such events. Thus, careful consideration of inequities is crucial in order to give these communities adequate support to recover.

d. Property Damage, loss of livelihood, social issues - among barriers to recovery

Participants not only lost their belongings to the flood but many lost their houses too. Physical damage to properties and household goods pushed study participants who were experiencing poverty into a worse financial situation than prior to the flood, as the quote below depicts:

> *"One of the walls of our house had fallen. We just tied a bed sheet and lived through the flood just like that. We then patched it up with a wide plank of wood because we do not have the money to repair the wall right now."* – A young man in the community

Returning home after the water receded was reportedly just as hard as evacuation due to severe damage to their houses, which were filled with animals like snakes, and rats both alive and dead, along with solid waste – garbage, and human waste. Participants were distressed while talking about their houses, they stated that their houses looked like landfill when they returned. Families reported spending over a week just clearing their houses of all the solid waste. They reported a foul smell in the house that lasted for months. Mildew and algae in the flooded houses were common. A participant describes her house after the flood below:

> *"The floor and roof were completely black in colour. We had nothing left [in the house] – TV, fridge, washing machine. We cleaned to the best of our abilities and after a few months once the whole house was dry, they got the house painted because the stink didn't seem to go even after deep cleaning. This was not just in our house; it was like that in pretty much everybody's house."* – A woman in her 60s who lived with her disabled husband

Over 40% families (n = 15) lost their livelihood. For example, families whose only source of income was a vehicle (car, bike or three-wheeler) lost their vehicle making it nearly impossible to return to work or be employed. Families who operated small businesses were severely impacted; for instance – a small road-side food vendor would be hard pressed to restart their business having lost utensils and groceries as a result of the floods. Replenishing household goods damaged in flood was a challenge, despite receiving help. A participant narrated an example where a family lost valuable jewellery, expensive sarees (traditional south Indian attire) that they bought for their daughter's upcoming wedding. Families in India are known to save for years (nearly all their lives) for a daughter's wedding and such a loss would have been devastating.

Social problems were just as prevalent and frustrating as financial ones; participants gave examples of families where children dropped out of schools or where the sole earner in of the family (mostly men) abandoned their families to live in an area unaffected by flood, and may have even established another family. The staff members of NGO notably identified issues such as child marriage, trafficking and child sexual abuse as problems that tended to increase during the flood. Beyond the social challenges, systemic issues made it difficult for women and single parent households to recover from the flood. Families where women were heads of the household or where they were a single parent, had a much harder time despite the government's promise of help. For example, each flood-affected family was promised Rs. 5000/[1]- by the government of Tamil Nadu for losses incurred during the floods. However, in families where the husband and wife were separated, the husband or husband's family received the promised financial aid, while the wife didn't receive any compensation since she was still listed as part of their family in the 'ration card[2]'. Furthermore, a cost of living survey [23] identified Chennai as one of the most expensive cities in India. According to an online living cost calculator, the average living cost for a family is more than Rs.25,000, a month. So, Rs. 5000 relief fund after the flood wouldn't have been enough for a family, especially after they had endured floods because they might have lost their livelihood and suffered loss to their property. Many single-mother households operated small businesses such as selling flowers, or road-side food carts which were primarily run as a cash only business, and thus, these families didn't have bank accounts. But, the government provided compensation only to those who had bank accounts which led to many of these families unable to avail financial help or be compensated for their loss from the government.

Home insurance is not a common phenomenon in many parts of

[1] Rs.5000 in early 2016 was about US$73.

[2] A document issued to households by the State Government, in order to identify, and enable those living in poverty, purchase essential commodities such as groceries, fuel for cooking, etc. from fair price shops at a subsidised rate.

India, even among the wealthy. For communities in the study, who live in poverty, 'home insurance' is an unknown concept. Thus, when families' houses were damaged, there was no financial support for the families other than the one that government provided on the condition that the damage happened because of the flood with the onus of proving damages caused by the flood falling on the family. Thus, much of the financial costs of rebuilding were mostly borne by the families themselves since proving flood-related damages would have meant more strain on their finances with no guarantee of compensation. This led to a harder time financially after the floods with the additional pressure of replacing appliances, and other necessities for their house including building materials as the quote below from a staff member of a collaborating NGO shows:

> *"Not just during the floods, their houses are still in the same condition as it was after the floods. No change, maybe worse. The appliances that were damaged during the floods are still there, as they were because they do not have the money to repair them. They couldn't save them from the water because there was no place and now they have to make do with those appliances or without them as many do. Some of them do not have a house – they just live in makeshift structures."* - One of the NGO staff during a Focus Group Discussion

In the aftermath of the flood, NGOs recognised the need to help communities build better and more resilient houses, however, they felt helpless because building houses for communities required more financial and political resources than they had. Moreover, many communities belonging to lower caste or tribes, who lived in the outskirts of a village usually lived on forest land, making it illegal to build anything there. They weren't accepted within the village and yet, they couldn't legally build structures on land that belonged to the government. Thus, many of these families continued to live in the illegal structures that they had built themselves using materials that were non-resistant to hazards. Fig. 2 gives an example of the kinds of houses that these participants lived.

One of collaborating NGOs appealed to the government to help these communities acquire rights to the land they were living on; however, were unsuccessful as the quote below suggests. Most of these rural participants (n = 12) reported that the government didn't offer to resettle them and in cases where they did, they often overlooked their source of livelihood, culture and social needs making resettlement an unwelcome offer.

> *"They* [members of the community] *mostly asked for things related to their livelihood and some household goods, and we tried to help them with that, but, we couldn't build their houses. We even helped one village of 48 families rebuild their houses, but, we were able to help only one village. We really want to contact the government and help them* [the community] *rebuild* [their damaged houses]*."* – NGO staff member

These examples emphasize the importance of timely, adequate and appropriate support for an individual, family and community's successful recovery from an emergency.

e. Community healed by helping each other - resource-poor but not thoughtless

When participants were asked about their experiences during the floods, they not only talked about the shock, fear, and helplessness, they also highlighted how the community came together to help each other, as the quote below shows. Some participants (n = 4) mentioned that they had never before seen their community come together like that. Despite the lack of resources, families reported that they remained steadfast and that they could survive the floods. When parents saw their children or their husbands help others in the community, they were proud of them. Families were their greatest source of support and strength.

> *"The one good thing about the Chennai floods was that they* [families] *helped each other. If one house was not flooded then all the people from that street stayed at that house. There was a time when no one could actually provide relief materials into the community because by the time they reached the said street, all the things would be grabbed by people along the way. So, youth volunteers actually supported them by not letting anyone touch the van. It was completely organised and it ensured everyone got relief material, and everyone appreciated that."* - A community member who received such help from the community's youth

Families and friends of the flooded communities sent food, money, clothes during the floods and later on building material to help rebuild their flood-damaged houses. Many participants reported that regardless of a participant's gender, or socioeconomic status, they were all equally affected by the floods. However, they recognised, as the quote below reveals, that even though everyone was equally affected by the flood,

Fig. 2. House of a female participant in the study who lived with her husband and two young children.

not everyone's ability to cope with the floods was the same.

> *"… for people who have strong houses, it's okay, but, many people who live in huts had a very difficult time. They couldn't just pack/ take their stuff and get out, they were not able to save their things or their houses or themselves even."* – A community member

The community at large helped and supported each other and this was crucial for struggling families. They identified that others in their community, including children, helped in ways that made an enormous difference to them. Families helped each other regardless of their previously strained relationship. They emphasised that they had never seen members of their community being so caring and believed that floods brought their communities closer to one another and wished this kind of closeness to be present beyond the times of crises as the quote below shows:

> *"People really helped each other, but only during the flood. Other times, everyone is only looking out for themselves. But, during that time, they all worked together and that was very good. I wish that it was always like that and people didn't wait for a crisis to come together."* – NGO staff member

f. Hope for future preparedness

While all participants suffered due to the floods, they were hopeful about their ability to prepare for such an emergency in the future. Over 80% (n = 39) participants reported that it would be necessary for them to know of a possible impending hazardous event, as well as, how to prepare. They thought it was also crucial for their children to know of ways to prepare for emergencies. Some participants reported, as a quote below from an older male community member describes, that accepting fate was partly a way of dealing with the flood, whether or not one survived such an event is predestined and said that it would all play out as planned. Nonetheless, over 60% (n = 23) of the community members and all the staff members of the NGO thought that if they had a basic idea about how to prepare and if they got a warning at the right time, they could prepare for an emergency:

> *"Nothing can be blamed for this. What can we do? Whatever was going to happen was going to happen. All we need to do is have courage. Fear will not do any good – it's of no use to worry that the rain is going to wash this away or that the wind is going to blow this away. We have to accept whatever is, that's all."* – A community member who accepted flood as fate

Participants reported that they recognised the value of community cohesion and youth in their communities. They narrated examples of how youth and children in their community helped during the flood – they distributed relief materials, or youth stood guard for younger children and girls or physically evacuated families who needed to evacuate and finally, used their contacts to get more support and relief materials into the community. They also reported that they would not expect help from the government. Instead, they would take it upon themselves to be prepared, as a community member emphasises in the quote below:

> *"We have decided that next time when something like this happens, we are all going to work together as a group and help our community. We will not look forward to assistance from the government."* – A community member

Participants emphasised the need for community engagement – regardless of age and gender to be part of the preparedness dialogue in order to be able to prepare for future hazards adequately. The communities recognised that though they were deeply impacted by the floods, they found that they can be resilient and part of that resilience is to be prepared for such emergencies in the future.

4. Discussion

The present study gives voice to particularly vulnerable communities affected by the 2015 South Indian floods, especially since previous research has identified that these communities' voices are one of the least represented in both research and practice. The current study's findings demonstrate the detrimental impact social, economic and cultural factors have on creating and increasing vulnerability in and of a community. Equally, this study also highlights how enmeshed systemic issues affected the study communities. With no official warnings or early evacuation efforts, the communities felt like they had to fend for themselves, whilst being surprised at how quickly the water rose to dangerous levels. Class and caste system emerged as a major barrier to safety and access to relief material. Discrimination against these marginalised and vulnerable communities featured heavily in how they perceived the help they received and their own lived experience during the floods. In this discussion, we reflect on these key social findings and their impact on preparedness to and recovery from the 2015 South Indian floods.

The current study emphasises how one's social status determined the kind of aid participants received – living in poverty and with 'low' social status meant that they could be discriminated against and not receive the necessary support – financial or social. Social structure – race, ethnicity, caste and class play a key role in the ability to cope with and recover from disasters [24], and receive aid. For example, race was a crucial factor in the distribution of aid and subsequent recovery after Hurricane Katrina in that socially vulnerable communities usually had multiple vulnerabilities that included gender, race, socio-economic status, etc. and those who were socially vulnerable were less likely to receive adequate aid and thus have lesser chances at successful recovery [25,26]. This kind of discrimination is prevalent in India too, where people from lower castes received less financial and in-kind support and have worse outcomes after a disaster [27,28]. We found that many families belonging to lower caste and class could not evacuate successfully owing to the unwillingness of higher caste people to share the same shelter. These issues of caste and class go hand in hand with poverty and thus pushing them deeper into poverty compared to their financial situation before the flood [29]. A recent media report brought this to forefront by interviewing families who belonged to the Dalit castes (the lowest caste in the Hindu religion hierarchy) and reporting their plight since cyclone Gaja in November 2018 [30]. Since discrimination against communities belonging to lower castes is common, they tend to have higher illiteracy rates, live in high-risk areas, usually employed seasonally. These factors are added barriers to dissemination of early warning messages, awareness of preparedness activities that these communities can do and, or participate in any scheduled DRR activities.

Thus, it is also not surprising, as other studies have also found, that preparedness to hazards was not this study's communities' priority when ensuring basic necessities such as food, water, and a hazard resistant house for them and their families had been challenging enough [31]. Thus, creating a scenario where a hazard; such as flood or cyclone, is not as threatening as the monumental task of ensuring that they can continue living in the house, they are currently living in. Nevertheless, these families suffer the worst outcomes after a disaster due to lack of preparedness. This trend has been found true even in high income countries, where people from low socioeconomic groups tend have the worst outcomes and be the least prepared for disasters [32,33]. These families are also often migrating to places wherever job opportunities exist since they do not own lands, or have rights to own land, and need to move wherever jobs maybe regardless of their ability to do so, pushing them deeper into poverty and stripping them of all support possible.

The outcome worsens when gender is added to this mix – we found that women and girls were marginalised, their needs neglected. Women

from lower caste or class have a harder time recovering from disasters [34]. In addition to discrimination, lack of access to jobs, relief materials, and income replacement/generation schemes, women also suffer from lack of privacy, access to toilets, and increased risk of domestic violence, and sexual assault [35], further compromising their ability to recover.

The culture and attitude of people towards hazards and preparedness in this study played a significant role in household preparedness, as supported by previous research (e.g. Refs. [5,36]). The level of perceived risk influences the level of preparedness. For example, a study [37] found that trust in flood protection systems played an important role because it reduced risk perception and mediated effects leading to lower preparedness intentions. In another study [38], the authors found that communities in poverty were less likely to even be aware of the risks of potential flooding to their neighbourhood as well as underestimate the severity and impact such a flooding could have. In the current study scenario where there is no trust or a flood protection system, the communities are less likely to perceive flood risk and thus have a further decreased ability to prepare. Additionally, receiving timely information/warning is crucial for preparedness. While few participants received a warning about the impending floods, those that received warning didn't seem to heed the advice and prior research has found that this too is not an uncommon scenario [6,39] making a case for factoring in culture into warning systems to best suit the communities. Another factor that influences preparedness is the belief that one can indeed do something/prepare for such an event, and if not, they run the risk of feeling as if it is beyond their control and thus remain unprepared. Previous research [40] has shown that individuals, families and communities might experience a cognitive bias called the 'Optimism bias' which can lead them to believe that though negative events such as floods are common, they themselves are less likely to experience it, thus, leading to increased risk of unpreparedness and vulnerability. This bias was not uncommon in the community members we spoke to - they too didn't think their communities were going to be inundated with flood water. This bias tends to lead to fewer preparedness behaviours and consequently [41,42], worse recovery outcomes, as evidenced during the 2015 South Indian floods.

Despite these adverse outcomes, this study also highlights the potential impact a supportive social network, within and beyond one's community can have on families struggling to cope with disasters. Some participants noted that they had never seen their community come together to support each other like they did during the floods. Literature has examples of such support within the community. A recent systematic review [43] also reported how families found support amongst each other, their relatives and friends within and beyond their community to cope with disasters – whether it was by sharing resources such as food, clothing, or by helping build back together ([44]. Another study found that it was this network of support that was held together by shared cultural values was key in helping the Samoan people recover from the 2009 South Pacific tsunami [45].

4.1. Limitations

This study is limited by the fact that 65% of our participants were women, although we aimed to interview an equal number of men and women. Interviews being conducted during the day, a lower level of interest in participating among men, and the interviewer being a woman could be some of the factors for the lower participation rate among men. Furthermore, this study was conducted a year after the floods and hence could be affected by recall bias. Finally, the NGOs helped with recruitment of study participants and thus the sample might be biased having received aid from the NGOs or having been involved in the NGOs work previously. However, the researcher made all efforts to ensure that the interviews were conducted privately and confidentially so that the communities could discuss their experiences without restrictions.

4.2. Conclusion

The present study about the lived experience of disadvantage adds to the growing literature, calling for more studies to understand knowledge, beliefs and thus actions taken to prepare particularly vulnerable groups for hazards at various levels – individuals, household, community and systemic issues, in order to develop an intervention that empowers this population to prepare better for future hazard events. This study also highlights the importance of involving vulnerable groups in the DRR dialogue to make a difference in their preparedness and aid their recovery. For any DRR intervention to be successful, it needs to be tailored for, tested and implemented within a community's cultural way of life.

Simultaneously, an urgent need exists to build evidence towards developing and implementing key safety messages and behaviours with an actively engaged community for those key messages to be useful and implementable. Drivers of implementation of key messages such as DRR researchers, NGOs, and the government need to work together with all members of the community, especially those who are underrepresented to facilitate the implementation process.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

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4.3 Perceived needs of the study communities

The HESPER (Appendix J) assesses a community's needs in social, psychological and physical areas. HESPER provides a quick and reliable way of assessing the perceived serious needs of people affected by humanitarian emergencies, based directly on their own views. The needs are elicited by asking respondents about 26 potential problem areas such as availability of drinking water, food, income or livelihood, physical health, distress, education for children, care for family members, support from others, and information. The respondents are asked to identify whether each of these 'problem areas' are problems indeed with a rating of 1 or a 0; where a rating of 1 is the affirmation of the problem and 0 is identifying that it is not a problem. At the end of the survey, the participants also have an option to insert a problem area that was not included in HESPER, if the participant thought that it was a serious problem area. Once all the problems are listed, the participants select the three 'most serious' problems amongst all the identified problem areas. Research studies conducted across multiple countries have proven HESPER has good to excellent test-retest and inter-rater reliability (WHO, 2011; pg. 16).

In this study, the descriptive statistics and the analyses of the HESPER data was conducted in accordance to the recommendation in the HESPER manual (WHO, 2011). We used SPSS IBM Corp (2015) for the analysis. Participants (n=36) rated 25 of these 26 areas as serious problems (the lowest number was 0 and the highest was 27). Overall, this scale provides an overview of the needs of adults in the flood- affected communities living in Northern Chennai, as perceived by them. Participants ranked the three most serious problems amongst problems they had already identified as serious. 'Alcohol and Drug use in the community' was the most commonly identified serious problem, endorsed by 75% of the participants, followed by 'Drinking Water' by 63.8% of the participants. When asked to name any other serious problems not listed on the HESPER Scale, 10% of the participants identified the lack of community space as a problem, especially for children and youth. Table 1 shows the number of participants who rated each of the 26 HESPER areas as a serious problem.

Table 4.1: Number of participants (% in brackets) who rated each of the HESPER scale's problem areas as a serious problem, not a serious problem, or did not answer (i.e. not known, not applicable or declined to answer) (n=36). Areas are ranked and listed in descending order of serious problem ratings.

HESPER Item	Serious Problem	Not a serious problem	No answer
Alcohol or drug use in your community	27 (75%)	9 (25%)	0
Drinking Water	23 (63.88%)	13 (36.11%)	0
Place to live in	22 (61.11%)	14 (38.88%)	0
Income or Livelihood	21 (58.33%)	15 (41.66%)	0
Distress	20 (55.55%)	16 (44.44%)	0
Law and Justice in your community	20 (55.55%)	15 (41.66%)	1 (2.77%)
Toilets	17 (47.22%)	19 (52.77%)	0
Physical Health	15 (41.66%)	21 (58.33%)	0
Mental Illness in your community	15 (41.66%)	21 (58.33%)	0
The way aid is provided	12 (33.33%)	24 (66.66%)	0
Information	10 (27.77%)	26 (72.22%)	0
Health Care	9 (25%)	27 (75%)	0
Safety or protection from violence for women in your community	8 (22.22%)	27 (75%)	1 (2.77%)
Respect	8 (22.22%)	28 (77.77%)	0
Keeping Clean	6 (16.66%)	30 (83.33%)	0
Care for people in your community who are on their own	6 (16.66%)	30 (83.33%)	0
Safety	5 (13.88%)	31 (86.1%)	0
Education for your children	5 (13.88%)	22 (61.11%)	9 (25%)
Separation from family members	4 (11.11%)	32 (88.88%)	0
Support from others	4 (11.11%)	32 (88.88%)	0
Food	3 (8.33%)	33 (91.66%)	0
Care for family members	3 (8.33%)	32 (88.88%)	1 (2.77%)
Clothes, shoes, bedding or blankets	1 (2.77%)	35 (97.22%)	0
Being displaced from home	1 (2.77%)	35 (97.22%)	0
Too much free time	1 (2.77%)	35 (97.22%)	0
Moving between places	0	0	0

4.4 Summary of Chapter 4

The HESPER data clearly shows that alcohol and unavailability of drinking water as critical problems for these communities. The paper presented in this chapter indicates that the community members thought that their communities were discriminated against due to their caste or socioeconomic status. Furthermore, the paper highlights the lack of involvement of these communities in DRR or governance. However, this paper focuses solely on adults' lived experiences and not children's lived experience. Thus, the next chapter explores children's lived experience of the 2015 South Indian flood from the perspective of the adults surrounding them.

Chapter 5: Experiences of children affected by the 2015 South Indian Floods

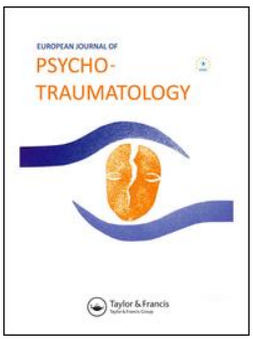
5.1 Introduction & Preamble to Empirical Paper 3

This chapter serves to address the second research question of this thesis – "What are the experiences of children experiencing poverty during the 2015 floods in Chennai, India?" It also presents the third empirical paper of this thesis. This paper examined the lived experiences of children during the 2015 South Indian floods through the eyes of their adults. Both chapters 4 and 5 (empirical papers 2 and 3) explore the experiences of the flood-affected communities. This study interviewed community members in both rural and urban Tamil Nadu, India, to capture their children's experiences during the flood. Paper three, *'Children in the 2015 South Indian floods: community members' views'* has been published in the *European Journal of Psychotraumatology's* special issue, *"Children and natural disasters" (Krishna, Ronan, et al., 2018)*. The European Journal of Psychotraumatology is a peer-reviewed journal that publishes original research articles on trauma and the special issue focused on children and natural disasters.

As indicated in previous chapters, the studies in this thesis have participatory or action research at its core. Thus, this particular study and the papers in chapters 4 and 5 set the research agenda for the thesis. The data for this study were collected in Nov/Dec 2016, about a year after the 2015 flood in the area. Appendices C, D, E, F, & G are relevant to this chapter as well.

5.2 Empirical Paper 3

Krishna, R. N., Ronan, K. R., & Alisic, E. (2018) Children in the 2015 South Indian floods: community members' views, *European Journal of Psychotraumatology*, 9(2), 1486122, DOI: 10.1080/20008198.2018.14



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Children in the 2015 South Indian floods: community members' views

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ABSTRACT

Little is known about children's experiences and involvement in disaster preparation and recovery, in particular in low- and middle-income countries. Eliciting community members' perspectives on the 2015 floods in Tamil Nadu, India, may generate useful insights for improving services in low-resource settings. This qualitative study aimed to understand how children in Chennai experienced the floods, as reported by the adults in their community, and to explore children's involvement in disaster preparedness, response and recovery efforts as reported from the adults' perspective. We conducted in-depth, semi-structured interviews (N = 48) with family members (n = 36), and with staff of non-governmental organizations (NGOs) (n = 12) who actively participated in relief and recovery efforts. We also conducted two focus group discussions (n = 14) with NGO staff about a year after the 2015 South Indian floods in Chennai, India. Six broad themes regarding children's experiences and behaviours during and after the floods emerged: (1) unexpectedness of the floods; (2) children's safety – barriers and facilitators; (3) parents' reactions – helplessness, fear and pride; (4) children's reactions – helping hands, fun and fear; (5) barriers to a return to 'normal'; and (6) a determination to be prepared for next time. Children and families were deeply impacted by the floods, in part owing to a lack of preparation, as perceived by the study participants. It was also clear from the data analysis that caste and socioeconomic status played an important role in the families' ability to evacuate safely. Helplessness on the part of the parents was apparent, as was children's concern over recurrence of the flood. Similarly, gender appeared to affect child safety, recovery and other outcomes such as continued education. Priorities for future efforts involve the development and evaluation of child-centred education about flood awareness, child participation and safety.

Niños en las Inundaciones del sur de la India en 2015: Visiones de los miembros de la comunidad

Antecedentes: Se conoce poco acerca de las experiencias de los niños y su participación en la preparación y recuperación de desastres, en particular en países de bajos y medios ingresos. La obtención de las perspectivas de los miembros de la comunidad sobre las inundaciones de 2015 en Tamil Nadu, India, puede generar reflexiones útiles para mejorar los servicios en entornos de bajos recursos.

Objetivo: Este estudio cualitativo apuntó a comprender a) Cómo experimentaron las inundaciones los niños en Chennai, según el reporte de los adultos en su comunidad, y b) explorar la participación de los niños en la preparación para el desastre, la respuesta y las labores de reconstrucción, según el reporte desde la perspectiva de los adultos.

Método: Realizamos entrevistas semi estructuradas en profundidad (N=48) con miembros de la familia (n=36), y con miembros de organizaciones no gubernamentales (n=12) que participaron activamente en las labores de ayuda y reconstrucción. También realizamos dos grupos de discusión (n=14) con miembros de ONG, aproximadamente un año después de las inundaciones del sur de la India en 2015 en Chennai, India.

Resultados: Surgieron seis amplios temas respecto a las experiencias de los niños y las conductas durante y después de las inundaciones: a) Lo inesperado de las inundaciones; b) Las barreras y facilitadores para la seguridad de los niños; c) La reacciones de los padres - impotencia, miedo y orgullo; d) Las reacciones de los niños – ayuda, diversión y miedo; e) Las barreras para el retorno a lo 'normal', y f) Una determinación para estar preparados para una próxima vez.

Conclusión: Los niños y las familias estuvieron profundamente impactados por las inundaciones, en parte debido a una falta de preparación, según la percepción de los participantes del estudio. También fue claro desde el análisis de los datos que el status socioeconómico y de castas jugó un rol importante en la capacidad de las familias para evacuar en forma segura. La impotencia de parte de los padres fue evidente, así como también la preocupación de los niños por la recurrencia de la inundación. Así también, el género

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child-centred disaster risk reduction; traumatic stress; vulnerability; low- and middle-income countries; youth; disaster recovery; disaster risk reduction; disaster resilience education

PALABRAS CLAVES
CC-DRR; estrés traumático; vulnerabilidad; LMIC; juventud; recuperación a desastre; reducción del riesgo a desastre; educación de resiliencia ante desastres

关键词
CC-DRR; 创伤性应激; 易感性; LMIC; 青年; 灾难恢复; 减少灾害风险; 灾难韧性教育

HIGHLIGHTS

- Disasters have negative impacts on children with gender caste and socioeconomic status playing an important role in the safety and recovery of the children and families from the floods.
- Parents felt helpless and were dismayed by their inability to provide children with basic necessities during the floods.
- Children worried about recurrence of floods and suffered from nightmares and from anxiety especially when it rained.
- Community members' suggestions are to involve children and themselves in the development and implementation of disaster resilience education programmes about flood awareness, preparedness, etc.

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Supplemental data for this article can be accessed here.

pareció afectar la seguridad, recuperación y otros resultados de los niños, como la continuidad en la educación, etc. Las prioridades para los esfuerzos futuros incluyen el desarrollo y evaluación de la educación centrada en los niños acerca de la concientización de las inundaciones, participación de los niños, y seguridad.

2015年南印度洪水中的儿童：社区成员的视角

背景：我们对于儿童在灾难准备和恢复的体验和参与度了解甚少，特别是在低收入和中等收入国家中。 社区成员对印度泰米尔纳德邦2015年洪灾的看法可能会为改善低资源环境下的服务产生有益的见解。

目标：这项质性研究旨在了解a）钦奈的儿童在洪水中的经历，是否正如其社区成年人所报告的那样; b）从成年人的角度来看，探索儿童参与防灾，应对和恢复的努力。

方法：我们与家庭成员（n = 36）和积极参与救灾和恢复工作的非政府组织的工作人员（n = 12）进行了深入的半结构化的访谈（N = 48），我们还在2015年南印度洪水后约一年时间内在印度金奈与非政府组织工作人员进行了两次焦点小组讨论（n = 14）。

结果：讨论得出了六个关于儿童在洪水期间和之后的经历和行为的广泛主题：a）洪水的意外发生; b）儿童的安全 - 障碍和促进因素; c）父母的反应 - 无助，恐惧和自豪; d）儿童的反应 - 援助，乐趣和恐惧; e）恢复到'正常'的障碍，f）决定下次做好准备。

结论：研究参与者认为，儿童和家庭深受洪灾影响，部分原因是缺乏准备。 数据分析显示，种姓和社会经济地位对家庭安全撤离的能力起着重要作用。 父母的无助表现，以及儿童对洪水会重新出现的担心都很明显。 同样，性别似乎影响到儿童的安全，康复以及其它结果（如继续教育等）。未来工作的优先考虑应以包括制定和评估以儿童为中心防洪意识教育，儿童参与和安全。

1. Introduction

Exposure to potentially traumatic events in one's lifetime is common. Age, female gender, low socioeconomic status, loss of income, racial/ethnic minority and education are key predictors of resilience (Bonanno, Galea, Bucciarelli, & Vlahov, 2007), in addition to the more commonly known elements such as a person's mental health history, severity of trauma, length of exposure and own appraisal of the event.

Children represent the largest population segment in low- and middle-income countries (LMICs) and are often the first and most badly affected victims in natural disasters (Martin, 2010; Norris, Baker, Murphy, & Kaniasty, 2005). In addition to being exposed to physical injuries and potentially traumatic events (Mitchell & Borchard, 2014; Norris et al., 2005), children can become separated from caregivers and therefore are vulnerable to exploitation or abuse (Taylor, 2014). They may be confronted with a lack of food, shelter and social support (Babugura, 2008), and an inability to make sense of their surroundings, leading to a decreased ability to cope and increased vulnerability (UNICEF, 2006). Furthermore, disasters challenge all levels of the socioecological system in which the children are embedded, making it hard for children to be able to make sense and cope with the event (Masten, 2014; Masten & Narayan, 2012). Long-term mental health problems related to natural disasters have been extensively documented (e.g. Dogan, 2011; McDermott & Cobham, 2014). Thus, it is important to prepare children for such events as well as increase their resilience. Any intervention that aims to foster resilience needs to have a multisystemic approach (Masten, 2014) in order to be effective, accounting for the complexity of children's environment, their experiences and other factors across various systems: biological, micro, meso, exo, macro and chrono (Ungar, Ghazinour, & Richter, 2013). A systematic review found that interventions that were culturally and contextually adapted resulted in creating a more positive impact on the recipients and their communities (Jordans, Pigott, & Tol, 2016).

The United Nations Sendai Framework has identified children and youth as agents of change and advocated for their active involvement in preparedness activities (UNISDR, 2015). Children can play an active and valuable role in the development and application of strategies and practices to minimize disaster risks and vulnerabilities (Amri, Haynes, Bird, & Ronan, 2017; Ronan et al., 2016). Although there is preliminary support for this stance (e.g. Amri et al., 2017; Ronan et al., 2016), it has not yet translated into larger scale, action-oriented, active involvement of children, worldwide, including in India (e.g. Joerin, Steinberger, Krishnamurthy, & Scolobig, 2017). To understand vulnerabilities and opportunities for active involvement of children in disaster preparedness and risk reduction, and for better support of their post-disaster mental health and well-being in LMICs, better insight into their psychosocial circumstances during and after disasters is needed.

1.1. Aims of the study

The current study aimed to generate insight into families' experiences of being affected by the 2015 floods in Tamil Nadu, India, with a specific focus on the circumstances of children in communities that

experience poverty. Secondly, we explore children's involvement in disaster preparedness, response and recovery efforts as reported from the adults' perspective. This study brings together the perspective of flood-affected community members and staff of non-governmental organizations (NGOs) who contributed to relief efforts after the floods. It is the starting point for a larger project on child-centred disaster risk reduction in Tamil Nadu.

1.2. Context: Tamil Nadu and the 2015 Chennai floods

Worldwide, India is one of the most disaster-prone countries owing to its geoclimatic conditions, high degree of socioeconomic vulnerability and population size. Tamil Nadu has the second longest coastline in India, which was significantly impacted by the 2004 Indian Ocean tsunami, causing 7793 direct deaths in the state. About 52% of Tamil Nadu's 72 million population live in rural areas (Indian Census, 2011), with an estimated 12 million people living on or below the poverty line. Moreover, problems with class, caste, gender, and inter-district and urban–rural disparities are common (Harriss, Jeyaranjan, & Nagaraj, 2010; Vithayathil & Singh, 2012). Children aged between 0 and 14 years make up almost a quarter of the total population (National Family Health Survey-4, 2015–2016).

The 2015 floods in Tamil Nadu were caused by heavy rainfall during the north-west monsoon season in November/December 2015. Over 200 people were killed and over 1.8 million people were displaced (The International Federation of Red Cross and Red Crescent Societies; IFRC, 2015). With estimates of damage and losses of over 15 billion US dollars, the floods were one of the most expensive disasters of 2015 globally (EM-DAT, 2016). Heavy rains and flooding washed away roads and severed rail links. According to the Tamil Nadu government, about 3 million families of low socioeconomic communities suffered total or partial damage to their houses (Parliamentary Standing Committee on Home Affairs, 2016).

2. Methods

This study was conducted in urban and rural flood-affected communities living in poverty, in Tamil Nadu, India. The first author (RNK) collaborated with three NGOs working in the field of mental health, building on an already established relationship with the flood-affected communities. We obtained ethics approval from Monash University Human Research Ethics Committee. All ethics and data collection documentation was shared with the NGOs for their review. We encouraged the organizations to ask us any questions that they may have, and encouraged their staff to play an active role by not only introducing RNK to the communities, or being participants, but also reflecting on the interview guide and suggesting changes. In addition, one of the NGOs had an internal ethics committee that assessed all materials before the study started.

2.1. Participants and data collection

We used purposive sampling to capture experiences of a diverse group of people in these communities. Participants included affected family members and staff of three NGOs who worked on providing relief during the floods. We conducted semi-structured, in-depth interviews with families and staff participating in the study between December 2016 and February 2017, a year after the floods. During recruitment, we provided comprehensive information about the study to participants. However, owing to high illiteracy rates in the study communities, we recorded consent in audio format instead of in writing.

Topic guides for the interviews (Supplementary files A and B) included key themes such as family members' and children's experience during the floods, relevant support systems and their thoughts on future disaster preparedness. Although the topic guides were developed in advance, the guide was flexible and modified as themes developed or depending on the context, as required. For example, in December 2016, the study areas were also impacted by Cyclone Vardah. Therefore, we asked participants about insights they gained from the floods and how they used them to prepare to mitigate the effects of the cyclone. To ensure adequate distinction between the two incidents, we used interview strategies such as clarifying timelines and follow-up questions. In addition to the interviews, we conducted two focus group discussions (topic guide, Supplementary file C), with staff focusing on their observations of the communities during floods and future research directions. The interviews were conducted in Tamil by RNK at the participants' preferred venue, usually in their houses or empty communal areas. Demographic characteristics of the participants are presented in Table 1. The focus group discussions lasted between 90 and 140 minutes and individual interviews were between 30 and 90 minutes. All focus group discussions and interviews were audio-recorded.

2.2. Analysis

All interviews and focus group discussions were translated and transcribed into English from Tamil. RNK read and reread the transcripts to gain familiarity with raw data. Since this study is part of a larger project, we used the data exclusively about children. Analysis was inspired by Corbin and Strauss's (1990) grounded

Table 1. Demographic characteristics of individual, in-depth interview participants (N = 48).

Demographic characteristics	Staff of NGO (n = 12)	Community members (n = 36)
Age (years), mean, (range)	36.1 (26–55)	34.4 (19–67)
Gender, n (%)		
Male	3 (25)	14 (39)
Female	9 (75)	22 (61)
No. of children		
0[a]	4	7
1–2	6	19
≥ 3	2	10
No. of participants with at least one child < 18 years	6	24
Age of children < 18 years (years), mean (range)	8.67 (3–17)	7.43 (0.5–17)

[a] All participants were either living with a child in a joint-family set-up or working closely with children, whether or not they had children younger than 18 years of their own.
NGO, non-governmental organization.

theory, using a constant comparison approach. Consistent with the grounded theory approach, we started to analyse the data as data collection progressed by creating a list of overarching themes which continued to be updated throughout the data collection and analysis process. This was aided by the use of interview notes and a debriefing form after each interview, which also included potential changes that needed to be made to the topic guide, observation of main themes and barriers to interviews. Next, the transcripts were uploaded into and analysed using NVivo version 11 (QSR International Pty Ltd, 2015) qualitative data analysis software. First, we started the process of open coding, by identifying new codes that emerged from the data. We then compared these new codes with some of the themes/codes that we expected to see a priori and merged them with the list of themes we had developed. All the coding and analysis of data were completed in NVivo. Two authors (RNK and EA) continuously discussed the coding strategy by looking at the coding summary report within NVivo for each node and the codebook until these were finalized. To avoid any data overlap with the other study, we used 'CH' (children) at the beginning of every node that was relevant and used for this study. During the coding process, we continued to develop higher and lower order codes and started to link them with one another as well, to prevent repetition within the codes as well as not miss relevant data. Once we had completed the coding process for all interviews and focus group discussions, we sorted the data according to their appropriate themes and sub-themes to look for any errors in coding and recoded the data where necessary. KRR examined the final themes and codes, and their supporting data (quotes) and relations, with discrepancies discussed and resolved among the authors.

3. Results

Six broad themes and a number of subthemes emerged regarding children's experiences and behaviours during and after the floods (Figure 1): (1) unexpectedness of the floods; (2) children's safety – barriers and facilitators; (3) parents' reactions – helplessness, fear and pride; (4) children's reactions – helping hands, fun and fear; (5) barriers to a return to 'normal'; and (6) a determination to be prepared for next time.

3.1. Unexpectedness of the floods

Most participants, community members and staff of NGOs alike, reported that the floods were a surprise; they happened unexpectedly and overnight, giving them no time to react. They reported that, although they are accustomed to ankle-deep water on their streets during monsoon, they had not expected water to enter their houses and to remain stagnant for days, despite the heavy rain for several days prior to the flooding.

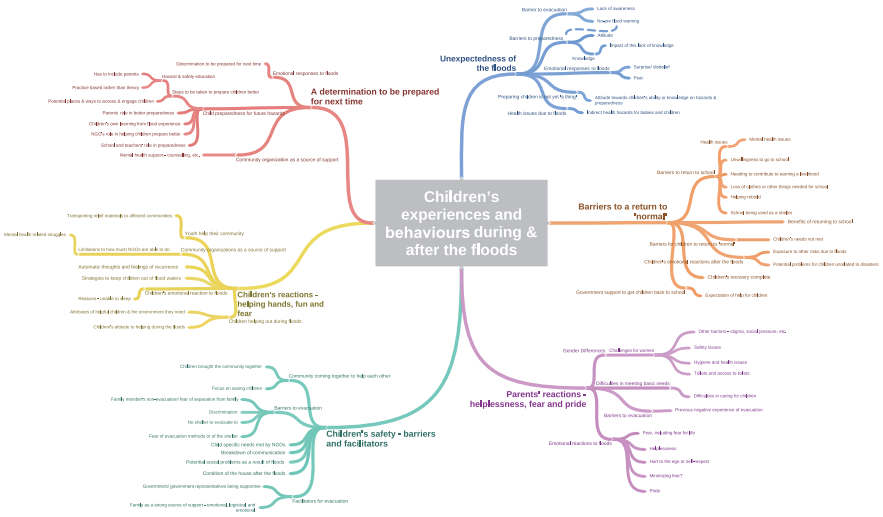

Figure 1. Children's experiences and behaviours during and after the floods as observed by community members.

> My mother and we were shocked that the water came inside our house. At 4:30am when we woke up there was water everywhere – my mother and everyone started exclaiming, 'there is water in our house, there is water in our house' like she was in disbelief. (22-year-old male in an urban community)

Consequently, not only was the community unprepared for the floods, but the floods also had a distinct impact on the children. They reported that preparedness for hazards was not common practice in the community. Attitude towards and knowledge about hazards were mentioned as barriers, especially by staff of NGOs. Specifically, many participants, especially community members, reported that they did not know how to prepare for floods, while some others thought that it was beyond their control and nothing could actually prepare them for it.

> My daughter said 'papa how will the water reduce? There is still lots of water on the streets'. But I told her 'nothing will happen, don't be afraid. The water will reduce. If it does not and if our time has come, we all have to die one day anyway. So, don't worry as everybody's life is still at stake. But we gave her courage and hope.' That's all I could tell her, nothing else. (55-year-old male from a rural community)

In fact, many staff of NGOs reported that they only received training about hazards and how to help their communities or prepare for such events after the floods. However, the staff also reported that they did not receive any particular training specific to helping children to prepare.

3.2. Children's safety – barriers and facilitators

Regardless of the community's preparedness, most participants reported that the community came together to ensure the children's safety. Community members as well as staff of NGOs reported and provided examples of times when children brought some of the families in the communities together despite their previously strained relationships:

> Let's say two neighbours don't talk to each other. They sent their kids to find out how the other family was doing and if they needed anything. If they needed something, then, the families sent it via the kids. So, they didn't necessarily talk to the other family, but, helped them nonetheless using the children. Many people did this. (Focus Group Discussion with NGO staff)

Despite this, some families reported struggling to ensure their children's safety owing to discrimination. The caste system in India, and the role it plays in the social hierarchy, meant that families were unable to move into evacuation shelters with other families in the village:

> A few people were brought to the community hall and the others there enquired about those people and why they have been brought to the hall and said that they have been insulted because those people were brought in … Even when those people [from a lower caste] requested to be allowed into the hall, they [the higher caste people] did not allow them. (25-year-old male from a rural community)

Nonetheless, in some cases, village heads or representatives provided support to the communities irrespective of caste, which was a significant facilitator for evacuation. Staff of NGOs reported the caste system being a significant barrier not only to safe evacuation, but also to the process of recovery.

> Initially, we were told that everyone was to stay in the hall. We do not belong to their community [caste] and so they were not accommodative of us. Later, the leader came and convinced them to share the hall with us. (25-year-old male from a rural community)

Those who could evacuate reported doing so by whatever means was available to them, whether it was walking or on boats; in children's cases, often, it was on the shoulder of their parents or family. Families reported evacuating to community halls or schools. Some families who could send their children to the house of relatives or friends who were unaffected by floods reported doing so, although this often led to worries about family members' safety owing to the interruption of telephone networks. In addition to discrimination, fear regarding the evacuation method (boats that were meant to be on the ocean were on roads, making sharp turns, etc.), fear of separation from family members and lack of an evacuation shelter were barriers to evacuation for children.

> My family told me that if something were to happen, then, it would be best to be together and go away [indicating death] together. So, my children didn't go to my in-law's house. (40-year-old male in a rural community)
>
> I saw many newborns, pregnant women, elderly all getting on the boat with much fear. In an ocean there is nothing to interrupt the boat, but, here, the boat kept hitting the walls, corners, steps, etc. and because of this, the boats would shake and sometimes even flip over, putting all the people on the boat in the water to be rescued. (46-year-old woman staff of an NGO)

Furthermore, waterborne diseases were mentioned as a threat, as homes were infested with snakes and insects after the water had receded. Finally, staff from NGOs reported that child safety and well-being were compromised by a cascading effect of secondary stressors, including discontinuation of education (which primarily affected girls owing to financial constraints), and child marriage as a way to protect the girl and to lessen the parents' financial burden:

> After a disaster, many times, the government goes around giving gifts [as financial support] – they give sarees and thalis [the sacred thread tied around a

> woman's neck during a marriage ceremony] to the affected families. They never stop and ask if the child who is getting married is 18 years old, do they? So, yes, when the families have consented, these things happen without much thought. (48-year-old woman staff of an NGO)

3.3. Parents' reactions – helplessness, fear and pride

Participants reported feeling helpless during the floods; they reported finding it incredibly hard to care for their children. Although many participants had been evacuated or had a dry place to stay, providing children with basic necessities such as food, water and safety was particularly difficult. Parents reported feeling despair and anguish as they and or their children had to 'beg' for food and water.

> We were hurt because we couldn't even feed our kids and were wondering which self-respecting person would stand in a queue to get food. (45-year-old woman staff of an NGO)

Parents reported generally being fearful for their own and their children's safety, especially since the floods were not something that they had expected. Despite these negative feelings, parents described feeling proud when their children helped them and others.

> My daughter didn't get scared at all – she was as good as a boy, full of courage. Not only did she manage to be safe, she also brought me out of the water. (45-year-old woman in an urban community)

Conversely, many parents seemed to minimize the fear that children felt:

> No, what's there to fear? She wasn't afraid. (55-year-old male in a rural community)

Gender differences stood out: women and girls were described as having a harder time in the shelters, with issues related to privacy, access to toilets and general safety. They were afraid to sleep, fearing kidnapping or sexual assault. Essentials such as clean clothes, menstrual products and privacy were not available. They were additionally challenged by societal gender roles and social stigma.

> In camps, women and adolescent girls didn't sleep at all because … they were scared of being sexually assaulted. They couldn't also ask for sanitary products – they were too embarrassed … Men were everywhere, how would they go to the toilet, they couldn't even change clothes or underwear because of lack of privacy. (46-year-old woman staff in an NGO)

3.4. Children's reactions – helping hands, fun and fear

Participants reported that many children thought it was fun to play in the water. They enjoyed the rain and wanted to play in the water, and were not as scared as their parents.

> Children were free, there was no problem. They were happy to play in the water. If they got whatever they needed (e.g. biscuits), they were happy. (52-year-old woman in an urban community)

In addition to being bridges between families, as reported in Section 3.2, children were reportedly eager to participate in the relief efforts. Participants identified characteristics such as being smart, active and brave, and having parents who helped, as influencing children's altruistic attitude. Participants reported that children (as young as 10–12 years old) contributed to the relief efforts by helping the youth to push three wheeled bikes to distribute relief material even when they were asked to stay home.

> The children, those who were over 12 years old (there are only three of them in our community) got into the water and helped the adults in moving and pulling boats and also made arrangements for food. (22-year-old male in an urban community)

When the water levels rose, children tended to be afraid. Many parents reported that their children had a difficult time after the floods when they lost their books, toys, pets and other things they might have held dear prior to the floods:

> Adults only worried about their families, but, children tended to worry about their books, things, laptops, certificates, etc. So, children really had a hard time. As adults, we tend to understand, but, children cannot understand and so, it was much harder for the children in general. (54-year-old woman from an urban community)

Parents recognized that keeping children out of flood waters was a hard task for them and had to resort to punishing them in order to keep them out of the water.

> I advised my child not to play in the water. But, he wouldn't listen to me – he'd come to the water and play. Since we have all the fear about the water as it would drown us, we try to beat the children to ensure safety. Yet children do not listen and they are only interested in playing in the water. (23-year-old woman from a rural community)

Many parents discussed how hard it must have been for children to see their parents in distress and their houses in disarray, needing to leave the house at a moment's notice and not knowing in what state they would find their homes upon return.

> They [the children] were scared that we might have lost all our things back home because none of us

> knew what would have happened. We only saw water [everywhere]. Not only were my younger kids worried, my older kids were also very worried. (45-year-old woman from a rural community)

A number of parents reported that children were scared and often found themselves experiencing nightmares about the floods and having trouble sleeping. In fact, many parents reported that every time it had rained since the floods, their children worried that their community might be flooded again.

> As they started seeing these kinds of things and even experiencing it themselves, they have developed a fear. This fear hasn't even gone away till today – if it rains, or there is strong winds, they ask me if it's going to be a problem again. The fear is still with them because of how much they were affected by it [floods] personally. (36-year-old male staff of an NGO)

3.5. Barriers to a return to 'normal'

Thoughts of recurrence were not the only barrier for children's return to normality. Children's ill-health (e.g. skin diseases, coughs, colds and fever) and loss of books, uniforms, etc., were common reasons for children's inability to return to school during or right after the floods. Other reasons included schools being used as a shelter, children needing to contribute to the family's livelihood and helping to rebuild their house, and children's unwillingness to go to school.

> I think it took them [children] about two or three months to get back to school. Though the attendance improved after giving them some books and uniforms, it still took them a good few months to get back to school. (45-year-old woman from an urban community)

Parents reported that when children returned to school, exams were nearing and children were often anxious because they were expected to perform well despite having lost their books. Staff of NGOs reported that they met with teachers to help the teachers deal with their own traumatic experience with the floods and be more understanding towards children and their situations.

> Teachers couldn't teach, if they taught, they would be strict – just like before. But, that is not possible right? They were mad at the students, and started to put pressure on the kids to study because of the half-yearly exams that were coming up. They wanted to complete the assigned syllabi before the exams and couldn't. (46-year-old woman staff of an NGO)

The staff of NGOs also thought that every agency, including the government, focused primarily on relief aid distribution and neglected mental health and well-being. They reported that their attempts to meet children's needs were insufficient.

> Everyone focused on relief material, but, not on mental health. I think schools should have counselling for children and that must have been a priority. Not just for the students, but for the teachers too. (46-year-old woman staff of an NGO)

On the other hand, children continued to be anxious about the recurrence of floods. This was especially clear when we asked them about the effects of and preparation for Cyclone Vardah, which had recently affected the communities. The children reportedly made their parents promise them that they would come and get them if it started to rain heavily. Parents reported that children took a couple of months following the floods to resume their usual routines. Many felt anxious after the floods, refusing to move back to their homes. Parents identified benefits to children returning to school; it helped children settle into their routines more quickly.

> Everything settled down after they went back to school and slowly they started getting over their fear. (52-year-old woman from an urban community)

As mentioned earlier, children were exposed to secondary stressors such as increased exposure to domestic violence, parental alcoholism, potential abuse and other problems that tend to emerge or be exacerbated during crises. Children's needs were reported to be largely unmet, even in the recovery phase. However, these were primarily identified and reported by staff of NGOs and not much by community members.

> Even in camps, girls suffered a lot of abuse. There are a lot of children who said they did not get food, water, clothes, or anything, but, their father was able to get alcohol. That [alcohol] was available during the flood, but, children's basic necessities were not met. (Focus Group Discussion with NGO Staff)

3.6. A determination to be prepared for next time

Parents and staff reported their determination to be prepared for future disasters.

> I have made some resolutions that if this were to happen again, I will be better prepared. (28-year-old woman from a rural community)

The community members suggested many ways to be better prepared for future floods. Participants reported that it would be beneficial for children to learn about disasters and emergency procedures as part of their school curricula. This included ideas about the form of education, i.e. children would benefit if they were practice based rather than lecture based. NGO staff emphasized that both children and parents should be educated in emergency procedures to minimize confusion. They also recommended using engaging methods

such as street plays, theatre and songs to teach children and the community about disaster preparedness.

> It's really easy to reach children compared to adults. They tend to understand things faster, retain them in their memories longer. So, through theatre, fun and games, we can disseminate the information … Parents and children need to be taught these things – when they both learn, then, when they face an emergency situation, their knowledge will be comparable and won't be doing different things. (Focus Group Discussion with NGO staff)

To reach children who do not attend school, participants suggested community-based activities and the use of tuition centres where children tend to gather for after-school activities.

Even though mental health was not something that the participants discussed in detail, they all agreed that it was important to ensure children's well-being. Their recommendations are shown in Table 2. Community members primarily suggested reassuring children and teaching them to help others as strategies to ensure children's well-being. NGO staff, however, recommended specific mental health-related strategies, including child-friendly dissemination of information (Table 2).

4. Discussion

The present study gave voice to communities affected by the 2015 Chennai floods, with specific focus on children. Although it had been raining for days before the floods, participants were surprised by the flooding of their communities. Class and caste system emerged as barriers to safety and access to relief material; however, children were instrumental in overcoming some communication barriers within communities. Similarly, gender issues stood out as shaping recovery experiences. While community members identified some mental health symptoms, they did not make explicit connections to mental health. Recommendations for future preparedness and mental well-being were mostly offered by NGO staff. In this discussion, we reflect on these key social and mental health findings.

The caste system is rooted in religion and has been linked with socioeconomic inequality, with worse outcomes for women and children (Jungari & Chauhan, 2017). Caste system, gender and socioeconomic status have a significant influence on health, life expectancy, and other important although less conventional health determinants such as urbanization, poor access to water and sanitation, food insecurity, environmental degradation, social stratification and income inequality (Patel et al., 2015). The caste system emerged as a factor that influenced children's access to relief and support after the floods. In India, people from lower castes have been identified as receiving less aid and having worse outcomes after disasters (Aldrich, 2010; Kumaran & Negi, 2006). Globally, social structure – race, ethnicity, caste and class – has been found to play a role in the ability to cope with and recover from disasters (Bolin, 2007), including receiving aid. For example, race was critical in the distribution of aid after Hurricane Katrina (Finch, Emrich, & Cutter, 2010; Fothergill, Maestas, & Darlington, 1999; Fothergill & Peek, 2004). We found that many families belonging to a lower caste and class could not move to a safer place because of the unwillingness of the higher caste people to share the shelter. These issues of discrimination based on caste and class go hand in hand with poverty, which is known to have a negative cyclical relationship with mental health (Patel & Kleinman, 2003) and building resilience (Masten, 2014).

This study also highlights the role of children and youth in overcoming communication barriers by bringing families closer, despite previous conflicts. Disaster research has identified children as effective communicators of risk (Mitchell, Haynes, Hall, Choong, & Oven, 2008; Plan International, 2010). Children's knowledge of their community and its needs can translate into enhancing the adaptive capacities needed to address disaster risk (Finnis, Johnston, Ronan, & White, 2010; Haynes & Tanner, 2015). This demonstrates that children's active involvement can potentially increase a community's overall disaster preparedness and reduce vulnerability.

When gender is added to the mix of risk factors, the outcome appears to be even worse: we found that women and girls were marginalized and their needs were neglected. Women from a lower caste or class have a harder time recovering from disasters (Ray-Bennett, 2009). In addition to discrimination and lack of access to jobs, relief materials and income replacement/generation schemes, they suffer from a lack of privacy in the shelters and access to toilets, and increased incidences of domestic violence and sexual assault (Enarson, Fothergill, & Peek, 2007). Our study highlights the need for relief materials and distributors to be sensitive to gender-specific needs and prevailing social norms. Importantly, attention needs to be paid to girls who might drop out of school or be married off because of financial constraints or other social issues. Education can serve as a protective factor against child marriage, which increases the risk of domestic violence, pregnancy, and childbirth at a young age and its related complications. Furthermore, education may provide the youth, especially girls, with the tools necessary to potentially break out of the vicious cycle of poverty and mental ill-health.

Mental health issues were not directly acknowledged in most of our interviews. Although most families identified symptoms akin to traumatic

Table 2. Community members' recommendations to ensure children's well-being and increased preparedness for a disaster.

Steps to ensure children's well-being and increased preparedness in a disaster	Relevant quotes by participants
Create awareness about the disaster in children in a child-friendly manner	'We need to tell children in simple terms and not scare them. We should tell them that if it rains too heavily, then, we might be flooded or even get washed away – but, we need to tell them this in a kind and child-friendly manner. This would make it easy for them to understand if not, they will get scared and upset.' (36-year-old male staff of an NGO)
Reassure children that things will be well	'I will give my child all the confidence to overcome [the flood] and tell her not to be afraid and be with me. That is what I could do.' (23-year-old woman from a rural community)
Pack toys and things that children are attached to ahead of time	'For example: her toys, or dolls or things like that. Even making sure that she had friends around – or kids of her age. It makes kids calm down better if they have things they like or friends.' (Focus Group Discussion with NGO staff)
Involve children in preparing for floods and use their disaster experience (e.g. floods)	'Several kids are quite resourceful as they have lots of ideas after they experienced these events recently. We can learn from them! They come forward and tell us!' (38-year-old woman staff of an NGO)
Help children pack their books and things they need	'Similar to the adults' things, whatever children need, needs to be kept safely, needs to be protected and added to that bag – for example: their certificates, their electronic things, etc. Parents can help children pack things and help think through things they may need.' (54-year-old woman from an urban community)
Instil a sense of generosity and altruism in children	'I will teach them when the time is right – they are still very small. Will teach them how to rescue people by swimming with the current – not against it – and pulling up people by their hair/head – not trying to lift or carry them.' (34-year-old male from a rural community)
Schools should provide mental health support – counselling for children affected by disasters	'It is extremely important because children's mental health is very important. These kids can only come up in life if they have the chance to education and being able to work hard. If they don't get their education on time, food and nutrition on time, then, it makes it hard for the kids to be well and bounce back. We and schools should help children by giving them counselling.' (Focus Group Discussion with NGO staff)

NGO, non-governmental organization.

stress (e.g. nightmares, anxiety about recurrence, general fear), they did not identify them as related to mental ill-health or needing help beyond reassurance by family members. For example: participants did not report any mental health issues as such; however, they reported their children having nightmares about being trapped in water, or not wanting to return to school unless their parents promised to come and get them if it started raining, especially during Cyclone Vardah. Regardless of families being able to connect these symptoms to mental health, they valued their children's well-being. In LMICs such as India, awareness about mental health is scarce and mental health problems are often stigmatized, while policies prioritizing mental health are largely absent (Khandelwal, Jhingan, Ramesh, Gupta, & Srivastava, 2004; Patel, 2007; Srivastava, Chatterjee, & Bhat, 2016). Consequently, there is an urgent need to make mental health a priority (Patel, 2007) and for more mental health research (Sharan et al., 2009), specifically traumatic stress research (Fodor et al., 2014; Schnyder, 2013), to be conducted in these settings. Interventions developed to suit this population would benefit from attuning to this attitude to mental health and design interventions adapted to this context. Cultural adaptation and keeping contextual factors at the heart of an intervention align with much of resilience research (Masten, 2014; Ungar et al., 2013), including helping children to build resilience in conflict and complex emergency settings (Jordans et al., 2016; Tol, Song, & Jordans, 2013).

This study is limited by the fact that children were not interviewed as part of this study. Although we aimed to interview an equal number of men and women, we found that 65% of our participants were women. This could be attributed to interviews being conducted during the day, a lower level of interest in participating among men and the interviewer being a woman. Finally, while this could provide a representative sample of the communities we spoke to, these findings cannot be generalized to other LMICs or even other groups within India.

This study has implications for both research and practice. A similar study to understand the children's experiences from the perspective of the children themselves will probably yield important information and the opportunity to further triangulate our findings. Our study adds to the growing literature calling for more research on traumatic stress from settings such as India in order to understand the unique cross-cultural perspective and to tailor interventions to suit this population. Future work could also build evidence around people's experiences and their attitude towards preparedness, and clarify their unique contexts in other settings in India. There is also a need to simultaneously build evidence towards developing and implementing key safety messages and behaviours, with children at the heart of this process. To facilitate key messaging, and children's safety and involvement, researchers, NGOs and government need to work together with children and communities. For such an intervention to be successful, it needs to be tailored, tested and implemented within a community's way of life.

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5.3 Summary of Chapter 5

Chapter 5 of this thesis aimed to answer research question 2 of this thesis. The empirical paper 3 presented in this chapter presents children's experiences of the 2015 South Indian flood through the eyes of their adults. It also provided a perspective on what the communities hoped would benefit their children in order to prepare for such hazards in the future. In alignment to the participatory approach, this paper/ chapter underpinned the rest of the research questions in this PhD thesis.

5.4 Summary of Phase 1 of this PhD research

Phase 1 (including empirical papers 1, 2 and 3) of the current research demonstrated the experiences and needs of the flood-affected communities and sets the research direction for the next part of this PhD thesis. It is clear that the communities prioritized their children learning practical ideas on disaster preparedness.

The systematic review reported earlier in this thesis and the qualitative study with the communities have together shown that communities that experience poverty are made more vulnerable to hazards with reduced ability to cope with and recover from them. Furthermore, their voices are frequently missing in DRR dialogue and the implementation of DRR messaging. As one can expect, families tend to focus on the more immediate physical needs such as food, clothes and a stable roof over their head, making ongoing DRR related activities a second priority. Papers 2 and 3 emphasize the need for quick, and practical knowledge on disaster preparedness for children in these communities. These papers also highlight the willingness on the community's part to engage in DRE initiatives.

The need for children's involvement in DRE intervention development and implementation as well as the community's enthusiasm for their children to be involved in DRE forms the basis for the rest of this PhD research. The next chapter focuses on the development and delivery of the DRE intervention.

Chapter 6: Co-development of the Disaster Resilience Education in Chennai, India

6.1 Introduction & Preamble to Empirical Paper 4

This chapter aims to answer research questions 3 and 4 of this thesis:

a. How can a DRE intervention be developed to best prepare children and families living in poverty against future hazards relevant to the area?
b. What are the processes of developing such an intervention with children? How can a participatory approach/ co-design approach be used to engage children in the development and delivery of a DRE intervention?

Children can play an active role in reducing risks and increasing their family's and community's resilience to disasters. However, adults continue to determine program content even in child-centred DRR education programmes. Thus, often, these programmes do not meet children's specific needs or engage them as active participants. The lack of peer-reviewed accounts of disaster preparedness education interventions, their development process, and effectiveness hampers progress in this domain.

The empirical paper presented in this chapter describes the intervention development, which adopts a participatory approach at its core, using active and interactive learning strategies to convey and retain key preparedness messages, informed by key principles of psychological disaster recovery. Ethics approval for this phase of the research along with informed consent forms are included in the appendices (Appendix K). The process of intervention development consisted of expert consultation workshops (relevant material attached as Appendix P), a scoping literature review, and inclusion of children's own experiences and perspectives, through discussions and hands-on activities. This process resulted in a five-session DRE intervention. This paper has been returned to us for a revision to be resubmitted at the International Journal of Disaster Risk Reduction (IJDRR)'s special issue: Exploring paradigm shifts in researching long-term disaster recovery.

6.2 Child co-developed DRE intervention: describing the process

Krishna, R. N., Spencer, C., Ronan, K., & Alisic, E. (Under review). Development of a Child co-developed Disaster Resilience Education Intervention in Chennai, India.

Development of a Child co-developed Disaster Resilience Education Intervention in Chennai, India

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Abstract

This study aims to describe the process for co-developing a Disaster Resilience Education intervention with and for children in the inner-city slums of Chennai, India. Although child-centred approaches to Disaster Resilience Education (DRE) have gained traction in the last decade, adults continue to determine program content, often not meeting children's specific needs. The lack of peer reviewed accounts of disaster preparedness education interventions, their development process, and effectiveness hampers progress in this domain. Participatory methods were at the centre of child engagement. The process of intervention development included expert consultation workshops, literature review, and children's own experiences and perspectives, through discussions and hands on activities. The resulting five-session intervention uses an interactive and practical approach to disaster preparedness. This study highlights how child participation can be achieved in disaster risk reduction (DRR) within the context of a community that is already experiencing multiple and complex vulnerabilities. This study also serves as an example of the children's ability to promote community preparedness. Moreover, it provides a template that can be tailored, and replicated in other settings.

Keywords: Community Preparedness; Disaster Preparedness; Child Participation; Disaster Risk Reduction (DRR); Poverty; Resilience

Introduction

In disaster situations, children's specific needs are often overlooked, treating them as passive recipients of support. Recent research has challenged the concept of children being passive recipients during emergencies, instead, calling for an approach where children's perspectives, agency and capacity to act in times of emergencies are recognised in both research and practice [1-3]. The UN CRC Convention protects children's right to participate in decisions that affect them so that their needs are identified and addressed [4]. Yet, child engagement remains inadequate [5] [6].
A recent literature review [7] describes how child-focused organisations, in mostly developing countries, have piloted Disaster Risk Reduction with children at the centre of those programs. The review demonstrates that children can make a substantial impact on building resilience, serving as risk identifiers, risk communicators, and agents of change [7-13]. The studies in the review highlighted the lack of active participation of children in the creation and implementation of these programs. The current study aims to fill that gap through the co-development of a Disaster Resilience Education (DRE) intervention with and for children.

A community's recovery from disasters can be one of the most protracted elements in a comprehensive approach to disaster management – due to the interconnections and overlaps between prevention, preparedness, response and recovery [14], rather than a perceived separateness. Vulnerability and inequity are two major roadblocks to a community's long-term recovery in the aftermath of a disaster. A key reason for inequity and vulnerability is also a lack of involvement of those communities in all stages of disaster management – from preparedness to recovery [14]. Winkworth and colleagues [15] suggest that definitions of 'recovery', 'resilience' and 'community capacity' can be considered as interchangeable concepts. A literature review by the Gender and Disaster Pod [16] in 2018 identified that literature related to long-term disaster recovery was scant. However, this has started to change; for example: a research project at Melbourne, Australia is looking at 10 years beyond the 2009 bushfires. This study is another step towards contributing to the long-term recovery through building children's, therefore community's resilience to disasters through disaster preparedness, one that strives to include and engage the children and communities.

A health intervention describes 'any activity undertaken with the objective of improving human health by preventing disease, by curing or reducing the severity or duration of an existing disease, or by restoring function lost through disease or injury' [17]. Similarly, according to the Department of Health, Missouri, USA, an intervention is a combination of elements or strategies designed to produce behaviour changes or improve health. The intervention described in this manuscript is an 'education program' where children teach their peers disaster preparedness, specifically to floods and cyclones. The children participating in this study developed and delivered the DRE intervention. Understanding the various elements of an intervention is critical for replication, implementation, and evaluation of that intervention. The underreported nature of the intervention development process is a significant barrier in the ability to understand and unpack the various elements of a given intervention. On the rare occasion that the intervention development is reported, it is not in a consistent manner since there haven't been many guidelines about reporting intervention development processes [18]. In this study, the process of intervention development is reported using the GUIDance for rEporting intervention Development studies in health research (GUIDED) [18]. GUIDED provides a14-item checklist to help scientists report the intervention development processes in a consistent manner to aid in increasing the quality, consistency and potential implementation of an intervention.

Study Context: Chennai, India & 2015 South Indian Floods

India is the seventh-largest country by area, the second-most populous country in the world. It is one of the most disaster-prone country due to its geo-climatic conditions as well as its high degree of socio-economic vulnerability. Tamil Nadu is one of the states on the eastern coastline, which receives nearly 80% of the total cyclones of that region. The National School Safety Project of India mandates the inclusion of disaster preparedness activities such as awareness about hazards, training and mock drills in school curriculum is implemented in selected districts of 22 states. However, Tamil Nadu is not one of the included states even though disasters routinely affect Tamil Nadu. Chennai is the capital of Tamil Nadu and is one of the fastest growing cities in India with a population of over eight million people [19]. Chennai has over 2000 slums, one of which was the site of the current

study, and hundreds more 'objectionable' slums that face the threat of eviction [20]. In 2001, 26% of the city's population lived in slums [21]. Lack of safe and clean drinking water, inadequate space, housing vulnerable to hazards, and poor sanitation are key issues that obstruct children and families' wellbeing. Furthermore, many of the slums are located on the city waterways which make them vulnerable to floods and cause increased water and land pollution [20].

The International Federation of Red Cross and Red Crescent Societies (IFRC) report that the 2015 South Indian floods killed more than 500 people and over 1.8 million people were displaced[22]. According to the Emergency Events Database (EM-DAT), the 2015 South Indian floods were one of the most expensive disasters of 2015 globally with estimates of damages and losses of over 15 billion US dollars [23]. According to the Tamil Nadu government, about three million families suffered total or partial damage to their houses.

Aims of the current study

The aims of this study are to describe the:

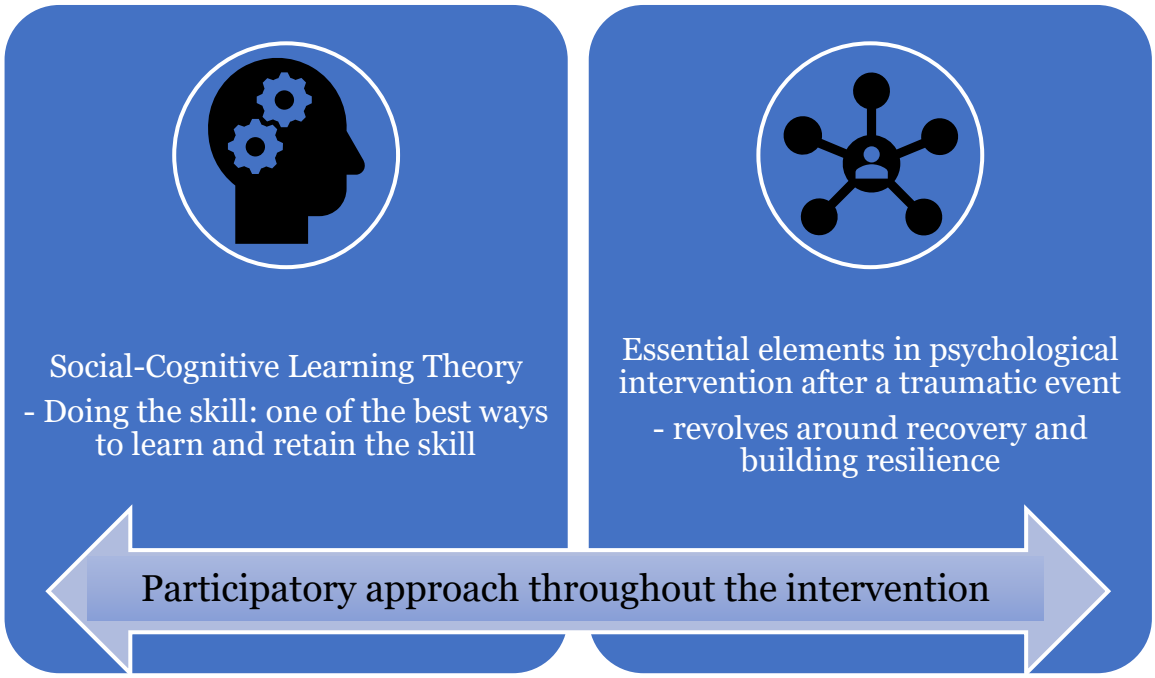
a. DRE intervention development process where children co-developed the intervention.
b. DRE intervention developed during this study.

Children's active participation was at the core of the intervention and its development process.

Theoretical Constructs for Intervention Development

Research suggests that interventions with an explicit theoretical foundation are more effective than without. Interventions that are developed using a combination of multiple theories tend to be more effective than those with one or no theoretical foundation [24]. The current intervention development process has been influenced by theories including participatory approach, Social Cognitive Learning theory, and Hobfoll and colleagues'[25] key elements for successful psychological intervention following mass traumatic events. Figure A highlights the two key theories that influenced the intervention and the application of a participatory approach throughout the intervention development process.

Figure A: Theoretical underpinnings of the intervention and its development process



The intervention development process explained in this manuscript adopts a participatory approach at its core. We use active and interactive learning strategies to teach and learn key preparedness messages. Participatory Action Research (PAR) has been defined as "a philosophical approach to research that recognizes the need for persons being studied to participate in the design and conduct of all phases (i.e., design, implementation, and dissemination) of any research that affects them" [26]. According to Paulo Freire, the originator of PAR, this approach specifically focuses on empowering marginalized members of the society [27]. Participatory methods provide an effective tool to engage children in all aspects of research, from the design to implementation of research projects and the dissemination of results [28-30].

Social-Cognitive Learning theory outlines several sources of behaviour change; including receiving verbal instructions on how to perform the behaviour, direct experiences (practicing the targeted behaviour), vicarious experiences (observing others perform the behaviour), and receiving feedback on one's performance. Lack of awareness of preparedness behaviours, as well as cultural, socio-economic and systemic issues are some of the major barriers to preparedness for hazards [31]. Social-cognitive learning theory also emphasizes barriers and facilitators to behaviour change [32, 33]. Barriers include individual, interpersonal or structural impediments to implementing desired behaviours, and facilitators include qualities,

events or structural support to implement desired behaviours. This study reports on the barriers and facilitators related to the intervention development process.

Finally, Hobfoll and colleagues [25] proposed five key elements for successful psychological intervention following mass traumatic events such as disasters. These elements involve promoting a sense of safety, calming, sense of self- and collective efficacy, connectedness, and hope. Not only are these essential elements for psychological recovery, but they are, by extension, also important for preparedness activities.

Methods

The aim of this study was to co-develop a Disaster Resilience Education intervention with children who would be delivering the DRE intervention to other children of similar ages.

In order to understand critical elements of a DRE intervention – content, context, and delivery related specifics, etc. we took a multi-pronged approach. We conducted:

a. Expert consultation workshops in both Australia and India,
b. A scoping literature review (both peer-reviewed and grey literature) and
c. Focus group discussions with children, who would eventually be involved in developing the intervention.

The data from this pre-preparatory phase led to the development of the DRE intervention through regular meetings with the children participating in the development of the intervention. The intervention development process as well as the intervention itself is described later in the manuscript.

a. Expert consultation workshops

Through the authors' network, we invited DRE experts – both practitioners and researchers with years of field and research practice experience – to be part of an expert consultation workshop. RNK conducted three such workshops to develop the intervention – one in Melbourne, Australia in November 2017 and two in New Delhi, India in December 2017 (see Appendix A for participant information and workshop documentation). In total, 23 Disaster Risk Reduction (DRR) experts (5 in Australia and 18 in India) were consulted. The workshops consisted of a 'pre-mortem' exercise and the use of a devil's advocate technique. In a pre-mortem exercise [34] experts

imagine a future situation in which the project under development has failed and, in a guided way, brainstorm all the reasons for this failure. The team then develops plans to mitigate these reasons for failure. In addition, we included the devil's advocate technique in the last step to reduce groupthink, the situation in which the desire to conform to the group interferes with good decision-making. The workshops in India also honed-in on contextualising the intervention, including ways to engage children locally. Each of these workshop sessions took about two-and-half to four hours. The workshops were audio recorded, transcribed and summarised.

b. Scoping literature review

As one of the first steps, we conducted a scoping review to capture the essential elements of an effective DRE intervention. We consulted both practitioner and academic literature in order to get a good understanding of the existing DRE interventions. Keywords such as 'children, disaster, prepare, DRR, DRE' were used to search for peer reviewed literature related to DRE interventions. A recent systematic review [35] on how children and families experiencing poverty coped with disaster in low- and middle-income countries highlighted the lack of children's voice in the literature. Since some of the authors of this manuscript conducted the systematic review, relevant studies from the search results for the review were included in this scoping review. Furthermore, the first author (RNK) consulted experts to get examples of published DRE interventions.

c. Focus group discussions with children

RNK and the collaborating NGO (a local organisation in Chennai, India that focuses on eradicating child labour, and works on issues related to children's mental wellbeing, and their participation in governance) preferred to contact and include the communities who participated in the 2016 exploratory study (see [31]) since they had expressed interest in their children being involved in DRR activities. Thus, the staff members of the NGO who worked closely with these communities led the task of recruiting children and introducing the researcher (RNK) to the communities. We requested the staff members to invite children between 9 and 17 years old for the development of the intervention.

The research team obtained ethics approval from the Monash University Human Research Ethics Committee (MUHREC 2018-8979- 25039), Melbourne, Australia.

The NGO reviewed Monash University's approved ethics and data collection documentation in their internal ethics panel and approved this study. Prior to going into the community, RNK trained NGO staff members and explained the research project and the relevant documentation. Due to a high level of illiteracy in the community, we chose to do a verbal, audio-recorded consent process. RNK further explained the project and encouraged the community members to ask questions and suggestions on how to engage their children in this project. Once parents gave consent for their children's involvement in the study, RNK met with the children separately.

The first meeting with children involved the NGO staff members who introduced RNK to the children and the community. Many of the children already had met RNK making it easier to establish a good rapport and upon that, build a trusting relationship. RNK explained the project, what their participation in the project might look like and encouraged the children to ask questions, raise any concerns, or make suggestions. Following this discussion, RNK asked the children if they were willing to participate in the study and audio recorded their consent before proceeding. The consenting children were then invited to participate in two rounds of focus group discussion (N=21). These children were also informed that, if they wished, would be involved in the development and delivery of the DRE intervention. The focus group discussions were similar to the adult interviews that were conducted in these communities previously (see [31]). The children were asked about their experiences during the flood and how they coped during the flood or what could have been done to prepare them for such hazards. Both focus group discussions were audio recorded and later translated and transcribed. The focus group discussions lasted about 90 minutes.

The interviewer (RNK) with the help of a transcriptionist, transcribed and translated all the interviews and focus group discussions into English. The transcripts from the interviews and focus group discussions were then analysed using NVivo version 12 [36]. In the process of open coding, we identified new codes that emerged from the data and compared these with some of the themes / codes that we expected to see a priori. Two authors (RNK & EA) discussed the coding strategy and the codebook until these were finalised. Once RNK coded the focus group discussions, the data

were sorted according to their appropriate themes and sub-themes to look for any errors or omissions in coding and recoded the data where necessary.

Intervention development process

The intervention was developed over a period of over nine months. Following the initial analysis of the focus group discussion, children and the facilitator (RNK) met weekly in an office space within the community. The meetings usually lasted about three to four hours. The meetings were casual and; usually started off with checking in with each other, deciding the agenda for the day, progressing with the agenda, setting up the next time for meeting – led by the children. The initial meetings focused on building rapport, learning various concepts related to hazards. We used videos, and conducted science experiments to learn many of these concepts. We also did hands on activities such as walking around the neighbourhood to identify potential risks and potential safe spots during a flood. In short, these hands on, engaging meetings were active and free from lectures. As meetings progressed, the focus was on intervention content, and delivery strategies.

The children set the pace for intervention development. The children and the facilitator used charts and boards to keep track of ideas that they discussed so that they did not miss important things over time. Two sessions were developed face-to-face and the rest were developed over video calls with the children. These meetings mostly focused on practicing how the children would develop and deliver the sessions, and continuing the process of developing the rest of the three sessions – most elements of which everyone had decided upon before the facilitator left for Australia. The children usually continued to discuss the intervention, elements of it and activities that they could include, etc. amongst themselves outside these meetings, which led to changes in sessions or order of activities or the role a particular child played in a specific activity. Children discussed and sorted these activities at the beginning of the next meeting progressed.

Results

The current study uses GUIDED (Appendix B) as a framework to report the intervention development process.

Expert Consultation Workshops

Premortem exercise with the inclusion of the devil's advocate technique were primarily used to find and mitigate potential problems that might create barriers for the development and delivery of the DRE intervention. Key suggestions from the expert consultation workshops conducted in Australia and India to aid intervention development were:

i. Intervention development should be participatory, taking adequate steps to ensure that the participation is not tokenistic.
ii. The intervention should be interactive, fun, engaging since the research targets children so that children learn by doing.
iii. The communities need to engage with the process of intervention development. Although the intervention and the study itself focuses on children, the community at large needs to engage if kids in the community are meant to develop and deliver this intervention.

The experts identified many issues large and small such as child participation being tokenistic due to adult interference, the development of the intervention might be participatory, but, not the intervention itself, and practical issues such as time and space to develop an intervention with children, etc. Experts also provided potential solutions to these issues by focusing on those that could be mitigated through the community and children's active engagement. The solutions usually focused on steps that the researcher could take to solve proactively issues that risk project failure. Table 1 reports on the key results from the premortem workshops and the corresponding experiences in the field during intervention development.

Table 1: Key reasons for potential project failure, mitigation strategy and field experience.

Top reasons for failure	**Recommended mitigation strategy**	**Field experience**	**Mitigation strategy used in the field**
Development of intervention was participatory, but, not the intervention itself	Actively engage children and communities to ensure participation. Pay specific attention to activities in the intervention to make it participatory to the recipients too.	The children in the intervention development team were quite enthusiastic about the development of the intervention, but many times children suggested activities that made recipients passive receivers.	Intervention co-development facilitator (RNK) reminded and redirected the children to make activities more interactive. RNK was mindful of how she was making suggestions not to impede participatory nature of the intervention development process.
Lack of awareness, motivation, prioritisation, willingness and enforcement of the intervention – no political will.	Engage the stakeholders – NGO, community members, elders and children in active dialogue to get their buy-in	The staff members of the collaborating NGO had other priorities and that came in the way of meeting the children or the community members.	The intervention facilitator took a more flexible approach. Since the space used to meet with children and community members was an office space used by the NGO, use of that space created a challenge.

			Resolved when RNK met with the children on weekends. Similarly, RNK met with the staff members of the NGO to engage them and get their buy-in for intervention development and delivery.
Intervention development is discrepant from intervention implementation	Proper planning of intervention delivery is crucial for the implementation of the intervention as planned	Intervention development was not very different from its implementation, however, since children were the intervention delivery agents, implementation sometimes differed and other times they were followed almost rigidly.	The children were encouraged to deliver the intervention as planned. However, they were also encouraged to make minor changes if they felt it was necessary.
Not enough time / space to reflect on the intervention and adapt accordingly	Take time to develop and adapt the intervention.	In order to develop the intervention, RNK met the children over weekends for about four months. When RNK had to return to Australia at the	When the intervention development was not complete at the end of RNK's visit, the intervention development continued

		end of one of the intervention development trips, RNK continued to meet the children virtually so that the intervention development could continue. The intervention was developed over 8-9 months.	virtually, over video phone calls. These calls happened over evenings and weekends using the NGO staff members' cell phones since the children did not have access to phones and internet.
Intervention is not as participatory as it should be due to adult intervention	Adult intervention needs to be kept in check. Adult intervention needs facilitate children's participation and not hinder it.	Many times, staff members of the NGO would try to direct children's participation, their ideas and activities, taking on a more directive approach.	RNK made efforts to encourage children to openly state their ideas and thoughts. RNK also made sure to meet the children over weekends by themselves so that they did not feel any pressure to hide or change their views. RNK also held meetings with the staff members of the NGO often to keep them updated about intervention development

			and took the opportunity to talk about participatory approach.
Intervention could not be delivered as intended or intervention development could not be completed	Have a detailed plan of intervention development and delivery. The intervention development and delivery should take both groups of children (those participating in the development as well as recipients) into careful consideration before the completion of intervention development.	The intervention was developed and delivered with children. The process of intervention development took over 8-9 months. The intervention development pace was set by the children developing the intervention.	The intervention development took well over 8-9 months. Although the first author (RNK) had to move back to Melbourne, Australia, we decided with the participating children and the staff members of the NGO to continue intervention development over video calls. Flexibility on the part of all those involved played a key role in the completion of intervention development as well as delivery, since RNK only participated in the delivery of the first two sessions.

Age appropriateness of the intervention was not a priority and thus intervention was either too generic or inaccessible by certain age groups	The intended recipients and developers of the intervention – their characteristics must be pre-determined, before the start of intervention development in order to ensure appropriateness of the intervention.	The staff members of the collaborating NGO were involved in selecting children they thought would be interested and engaged in the development and delivery of the intervention. The age range and gender distribution of the children for this was also predetermined by the NGO, which helped the project.	N/A
Only theory-based learning and so, the children didn't learn anything they could 'use'/ apply	Use of active and interactive strategies including theatre, play, art, etc. are important for the development and delivery of the intervention, so that both intervention co-developers and recipients of the intervention learn DRR through active and interactive strategies.	Children led the intervention development. Non-interactive strategies were not appealing to them and thus, usually not chosen by them and the facilitator. For example: while discussing a concept, if some of them suggested it be delivered via a non-interactive method, other children and the facilitator	Children taking the lead as well as the facilitator taking an active role in facilitating the intervention development by urging the children to think a bit more about how it would be delivered as well as imagining themselves as members of the audience seemed to make the

	usually asked them to show how this could be achieved and if they would like that method if they were going to be in the audience, the methods would be changed to a more 'fun/ interactive' one.	difference in using passive or active & interactive strategies in the intervention.

During one of the workshops, an expert re-emphasized that, “the DRE intervention is not for you to provide a solution; but, it is to create a space for the community and children to come up with their own solutions.” These workshops provided a roadmap of potential issues related to intervention development and delivery. Having mitigation strategies brainstormed by the experts during these workshops, prior to the intervention development, made it easier to implement these strategies early on providing the best chance for the successful completion of intervention development.

Scoping Literature Review

The scoping review contributed to the intervention content and highlights the lack of peer reviewed studies that report on disaster preparedness education interventions as well as their development processes. Hence, both academic and practitioner literature informed the intervention development. The literature helped contextualise, innovate and improvise on existing intervention elements without re-inventing the wheel. Literature specific to India and other similar low- and middle-income countries were prioritized since they were closest to the context for whom the intervention was being developed. Many activities to introduce concepts such as vulnerability or start discussions about different ways a hazard affected children were inspired by the manuals and toolkits developed by organisations such as Save the Children, Plan International, UNICEF. Peer reviewed literature discussed the effectiveness or barriers and facilitators of implementing a DRR intervention. However, these studies seldom provided adequate details about the intervention and even less information about the process of intervention development.

Focus Group Discussions with children

Children were acutely aware of the issues they faced during the floods and this was evident when we discussed initial ideas about how this project might evolve. They reported that they wanted to share their experiences, and help other children and families. The children reported that it was important for them not to be scared. According to them, in addition to not being scared, knowledge on how to prepare for hazards in the future was critical. The children reported that getting information ahead of an impending hazard, such as a flood or a cyclone, was important to put these preparedness plans into action. Children asserted that knowing basic first aid skills was also important. Children described issues related to health they, their family, and friends suffered during the 2015 floods including skin related issues,

cuts, bruises, snake and insect bites. They recalled that when anyone in the family got sick, the adults around them usually panicked and felt helpless since they didn't know what to do about these infections and bites or have the resources (i.e. a first aid kit) to tend to them. They recounted that their only option was to go to a hospital which wasn't practical because of the floods. So, first aid was a critical element in a disaster preparedness intervention.

While brainstorming ideas related to key preparedness messages and their delivery, the children reported that the intervention would need a structure. However, the style of delivery would have to be dissimilar from a classroom style of delivery for it to be engage them and their communities. Children expressed that a DRE intervention would need to include practical and actionable things that they could do to prepare for hazards. The children reported that they were excited that they would be actively developing the intervention, which they would deliver themselves; instead of an adult led intervention, as would normally be the case. They were confident that they would come up with 'fun' ways to help their peers and their community learn about disaster and preparedness.

In summary, DRE experts, relevant literature, and the children who participated in the focus group discussions influenced all elements for a DRE intervention. Table 2 provides an overview of the essential characteristics of a successful DRE intervention according to the three sources of data consulted influencing intervention development.

Table 2: A comparison of the essential characteristics for a DRE intervention

Essential DRE Intervention Characteristics	**Experts**	**DRE Literature**	**Children who participated in the program**
Interactive & Fun	✓		✓
Using theatre, art & music	✓		✓
First aid related Information			✓
Action-oriented (learning by doing)	✓		✓

Repetitive	✓		
Simplest language – no jargon	✓		✓
Mock drills	✓	✓	
Risk Mapping/ Hazard hunt	✓	✓	
Knowledge about floods & cyclones	✓	✓	✓
Knowledge about evacuation centres	✓	✓	✓
Knowledge on 'where and how to get information'	✓	✓	✓

As Table 2 reveals, children and experts agreed that delivery of the intervention and its style would be just as important as the content of the intervention. All three sources – the DRE literature, experts as well as the children agreed that knowledge about hazards, evacuation centre and sources of information during hazards are important. However, the literature was less informative about how to develop and deliver those critical elements of an intervention, especially with children taking an active role in the development and delivery of the intervention. More importantly, however, children were the only source who thought knowledge of first aid was a critical element of a DRE intervention, highlighting that children are better at identifying issues that matter to them to ensure a DRE it.

Description of the DRE intervention

The DRE intervention was designed to be delivered by the children who developed the intervention in 5 sessions. Key elements of the intervention are described in table 3 below. Children who developed the intervention delivered each of the sessions described below to children and community members of a neighbouring community that was also affected by the 2015 South Indian floods and the 2016 cyclone Vardah. After the first session, every subsequent session included a recap and usually had an activity that children could complete at home. The five sessions were engaging and 'hands on' as much as possible. The intervention included the critical elements identified by the children who developed the intervention, bolstered by evidence through literature and experts – where the first session introduced the concepts of hazards, vulnerabilities and preparedness through skits and games. The following

sessions dove deeper into preparedness activities by not only identifying safe spaces within the community, but, also by identifying common risks that might become hazardous during a flood or a cyclone, much of which were practiced during the session and taken home as 'homework'. The fifth session didn't introduce any new concepts, instead practiced and recapped all that was learnt in the past sessions to reinforce the ideas and concepts.

Table 3: Description of the DRE Intervention

Intervention Session	Aim of the session	Key Session Activities
Session one	To introduce hazards, vulnerabilities & preparedness	• Introduction to the team & floods through a song written by the children & staff • A skit to represent their experiences during the floods • A game of dumb charades – kids play out the concepts and the team guess what concept it is. • Introduce floods and cyclones through discussion led by the intervention delivery group.
Session Two	To Start with preparedness	• Skit to display the difference in a prepared vs. an unprepared household. • Stop and go skits – show how one can be prepared and stop to discuss it with the audience. • Introduce 'risk assessment' of households through a game. • A quiz and discussion-oriented game to know dos and don'ts in a flood (just the children)

Session Three	Discuss household risks and preparedness in a flood situation	• Bringing common household items and thinking about where and how they are stored – in non-hazard times and during hazards. • Create a risk map – done at home (homework from previous session & will be of this session too). In the session, taking a walk as two groups and identifying risks. Come back and draw up the map and the rank the risks according to the threats they might pose in a hazardous event. Also identify a place (building that they could access) that might be safe to evacuate to during a hazard such as floods. • Practice of calming (deep breathing) skills and support seeking skills - thinking of their relatives or friends they feel comfortable to reach out to during an emergency and or when they are scared.
Session Four	Create a preparedness plan for common and relevant hazards	• Discussing the risks identified last session/ risk map of the house or street • Discussion on what things families can do with regards to each risk in order to be a prepared household

		• Discussion with the group on how to create a plan – different ways to create a plan – a board and marker game led by the children • A stop and go skit with detailed discussions on how this household prepared for floods
Session Five	Practice & Recap	• Discuss vulnerabilities they identify within their communities, especially in the event of hazards through a game of 'I Spy'. • Play a roll of dice and discuss what strategies could help them with preparing for hazards – each roll has a different scenario and priority. • Create a risk map of a house and street • Identify a safe place for evacuation and discuss a plan for evacuation. • Practice calming skills including breathing and relaxation skills. • Discussion on ideas of what they'll do next time there is a flood.

In summary, since children who had experienced hazards co-developed the DRE intervention, it focused on issues that the children thought were most important to them. However, in order to ensure it was evidence-based, continuous literature and expert consultations were at the foundation of key DRE messaging.

Discussion

The current manuscript aimed to describe a child co-developed DRE intervention and the process of developing the intervention using GUIDED (see Appendix B) as a framework to report the intervention development process. We consulted relevant literature, experts and participating children throughout the development of the intervention. The intervention development was further influenced by social cognitive learning theory, and Hobfoll and colleagues' [25] essential elements in an intervention following a traumatic event. Participatory approach was at the core of the intervention development as children who participated in the focus group discussion were the co-developers of the DRE intervention described in this manuscript.

While practitioner literature provides few examples about children's participation in DRE interventions, there is a paucity of peer-reviewed literature that actively involves children in the development or delivery of a DRE intervention, despite support for active child engagement including family's better preparedness for hazards [37, 38]. A thorough understanding of the wider socio-cultural and environmental context surrounding the children is crucial for successful child participation [39]. A participatory approach is key to child engagement [40, 41] as it builds collaborative relationships within a community by empowering all participants to be involved in the decision-making process that affect their own lives [42, 43].

Furthermore, the current study demonstrates that a 'bottom-up' approach to disaster preparedness within a community is possible. According to Coles & Buckle ([44] p.6) resilience is achieved when the "community participates fully in the recovery process and has the capacity, skills and knowledge to make its participation meaningful". Yet most disaster preparedness plans are not participative and promote a top-down approach with predetermined preparedness actions [38, 45] which tend to unsuccessfully translate preparedness actions on paper into real actions. Resilience

to disasters is an important priority globally in order to reduce the adverse impacts of disasters and to strengthen communities [46, 47].

A recent systematic review on the definition of community resilience by Patel and colleagues [48] found, that despite a lack of consensus on its definition, nine core elements could be identified. These common elements of resilience included local knowledge, community networks and relationships, communication, health, governance and leadership, resources, economic investment, preparedness, and mental outlook. The communities involved in the study have multiple and complex vulnerabilities such as low levels of literacy, high levels of poverty, perceived systemic and social discrimination along with living in cramped conditions, in houses that are not resilient to hazards and oftentimes with issues surrounding alcohol, domestic violence, struggling to meet the daily needs of the family. The community members reported felt like they were more often than not neglected by elected officials and thus by extension, by the government [49]. Although around elections, the elected officials promised communities land, electricity, water and other amenities provided the campaigning political party wins the elections, they were often not honoured regardless of the election outcome. The collaborating NGO and other similar organisations who work in the community on various issues related to health, sanitation, education, etc. are usually not equipped with resources – human, financial and other kinds to work on DRE related issues, especially when there are more pressing issues such as food, clean water, and livelihood. Thus, it was particularly important that any intervention developed in the study would not need the research team's presence for delivery, and re-use. Since children were the co-developers of the DRE intervention in this study, the intervention remains with the children and the collaborating NGO to adapt and re-use as and when necessary. Engaging children in DRE activities leads to children taking ownership of the intervention and community empowerment, which in turn leads to not only better preparedness, but, more importantly to better long-term recovery outcomes [14, 50-52].

This study has strengths and limitations. In terms of strengths, the intervention developed includes the perspectives of DRE experts, the literature and the children themselves. Furthermore, children co-developed the intervention and shared

decision-making processes related to the content, style and delivery of the intervention. Use of theory to inform elements of child engagement, intervention development and learning strategies improves the generalisability of the findings [53], in this case, making this intervention adaptable to engage other vulnerable communities. However, we are also aware of the limitations in this study. First, the collaborating NGO involved in the study chose the children and communities since they knew which communities would be most interested and therefore we were unable to assess whether there was any bias in this selection process. While children's participation was voluntary, there were times when staff looked for them to rally them those who didn't show-up for pre-arranged meetings. This might not truly embody the ethos of participatory approach. However, children usually reported that they had forgotten about the pre-arranged meeting or that they had lost track of time since they were playing. With no way of setting-up a reminder system for children, the facilitator (RNK) relied on NGO staff members to help. However, after the initial meetings, and once we moved these meetings to Sundays when staff members were not around, children took it upon themselves to ensure as many of them attended as possible. Usually, one child took on a leader's role and reminded others about the meeting or brought them along– children rotated the leader's role amongst themselves. Finally, time and other logistical constraints such as school holidays, homework schedules and festivals limited the intervention development process.

Future research could build upon this study's intervention to include more hazards. Additionally, studies to observe and document the use, adaptation and replication of the DRE intervention developed in this study might be useful to future research that engages children and communities actively.

Conclusion

A top-down approach to disaster preparedness and recovery is not designed to be inclusive of local stakeholders, thus widening the vulnerability and inequity gap [54] which worsen when children are considered. Children from all cultures have the ability to conceptualise and analyse risk [11, 55] as appropriate for their age. Likewise, they have a right to express their views about the development of disaster

risk reduction and climate change adaptation [3, 4]. The current context provides a timely opportunity to involve children in the co-development of DRE. This study shows how adults supporting children can help them to express their views, provided child-centred learnings and influence change within their communities [12]. Children can mobilise themselves and their community to co-develop and deliver a DRE intervention successfully when they actively engage with the appropriate adult support in their disaster preparedness and recovery efforts.

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6.3 Extension of the DRE intervention development process

Although paper 4 describes the DRE intervention development process in detail, this extension to that paper aims to show some of the material/activities that emerged during the intervention development period over eight to nine months.

6.3.1 Snapshot of the Scoping Literature Review

As the paper describes and Chapter 3 (literature review) also identified, there is a dearth of peer-reviewed literature focusing on the development, delivery and essential elements to unpack successful DRE interventions. Table 6.1 provides an example of the empirical studies or in grey literature that provides details of a DRE intervention and describes how each of those sources influenced the intervention development in this PhD research.

Table 6.1: Snapshot of Scoping Literature Review for the DRE intervention development

Reference (key: * indicates non-peer-reviewed literature)	**Source**	**Key elements of the intervention (if applicable)**	**Influence on intervention development**
Benson & Bugge (2007)*	Save the Children	5 essential components: a. Context and Partnership b. Capacity building and awareness-raising c. Program Implementation/ Activities	Ideas on DRR activities – both content and style of delivery.

Reference (key: * indicates non-peer-reviewed literature)	**Source**	**Key elements of the intervention (if applicable)**	**Influence on intervention development**
		d. Monitoring and Evaluation, Learning and Documentation e. Advocacy	
Child-centred DRR Toolkit*	Plan International	• Builds capacities of children in DRR by introducing concepts of hazard, vulnerabilities, capacities, risks and identifying risks • Tailoring of information to the particular community – seasonal hazards and disaster history of the community • Disaster Causes and impacts • Transforming vulnerabilities into capacities through the practice of preparedness activities	DRR activity ideas for various age groups, varied methods of conceptualising difficult concepts and DRR terminology
Johnson et al., (2016) Improving the impact and	Risk Analysis, 36(11)		Provides theory-based evaluation and a basis for considering the

Reference (key: * indicates non-peer-reviewed literature)	**Source**	**Key elements of the intervention (if applicable)**	**Influence on intervention development**
implementation of Disaster Education: Program for children through theory-based evaluation			importance of theory-informed intervention development and delivery.
Mitchell & Borchard, (2014) Mainstreaming children's vulnerabilities and capacities into community-based adaptation to enhance impact	Climate and Development, 6(4)		Provides examples in the form of short case studies of child participatory DRR programs. It also includes lessons learned from the implementation of those programs.
Ronan, Alisic, Towers, Jonhson & Johnston. (2015) Disaster Preparedness for Children and Families: a Critical Review	Current Psychiatry Reports. 17(58)		Provides information on important elements of a good DRR intervention including active ingredients, key DRR messages, and challenges in implementing these interventions.
Journey of School Safety: A Guide for School Communities to contribute to safe learning environments*	UNICEF	School safety using an all-hazards approach by focusing on hazards according to seasons. It also heavily depends on multiple stakeholders	Provided ideas on contextualising DRR intervention activities. Highlighted the importance of

Reference (key: * indicates non-peer-reviewed literature)	**Source**	**Key elements of the intervention (if applicable)**	**Influence on intervention development**
		within the school system for successful DRR implementation.	stakeholder engagement in successful DRR implementation
Webb, & Ronan (2014) Interactive Hazards Education Program for Youth in a Low SES Community: A Quasi-Experimental Study	Risk Analysis 34(10)	A 5 session intervention in a classroom setting, includes seasonal hazards and uses discussions as a primary method of intervention delivery.	Provided an example of a DRE intervention for young people in low SES communities.
Amri, Bird, Ronan, Haynes, & Towers (2017) Disaster risk reduction education in Indonesia: challenges and recommendations for scaling up	Natural Hazards and Earth System Sciences		This manuscript underscores some challenges in the implementation of DRR programs, with a specific focus on child centered DRR.
Zhu, & Zhang (2017). An investigation of disaster education in elementary and secondary schools: evidence from China	Natural Hazards		Discusses the impact of disaster education on children in schools. It also highlights the importance of teacher and school buy in for DRR programs to be successful.

Reference (key: * indicates non-peer-reviewed literature)	**Source**	**Key elements of the intervention (if applicable)**	**Influence on intervention development**
Wisner, Paton, Alisic, Eastwoord,Shreve, & Fordham (2018)	Current Psychiatry Reports		Highlights strategies of communicating DRR to and with children.
Bernhardsdottir, Musacchio, Ferreira, & Falsaperla (2016)	Bulletin of Earthquake Engineering		Discusses DRR implantation in schools, especially in the context of vulnerable groups.
Tatebe, & Mutch (2015)	International Journal of Disaster Risk Reduction		Reviews diverse DRR research related to DRR in the context of education, children and young people, outlines key concepts, frameworks commonly used in DRR implementation with children. Also identifies gaps in research about the role of education in DRR.

It is evident from this table that not only is there a gap in the scientific literature relevant to disaster education interventions' development process and unpacking them, but, also a more significant gap exists in child participation in the development and delivery of those interventions.

6.4 Summary of Chapter 6 & Phase 2 of this PhD research

Phase 2 of this PhD research focused on answering the third and fourth research questions of this PhD – the development and delivery of a DRE intervention with, by and for children in flood-affected communities in the inner-city slums of Chennai, India. Phase 1 highlighted the need for active child participation in DRR and emphasized that voices from marginalised children were mostly missing from DRR research and practice. So, Phase 2 of this thesis involved children actively in the development and delivery of the intervention, in addition to making efforts to bridge the gap in relevant peer-reviewed literature.

The next phase, Phase 3, focuses on the acceptability and feasibility of this intervention. Furthermore, Phase 3 will also report on the perceived impact of child participation in the DRE intervention development and delivery on their mental wellbeing and resilience.

Chapter 7: Acceptability and Feasibility of the child co-developed and delivered Disaster Resilience Education in Chennai, India

7.1 Introduction

This chapter presents the results from in-depth interviews and focus group discussions with multiple stakeholders about understanding the acceptability and feasibility of the child co-developed DRE intervention, along with exploring the facilitators and barriers to child participation. This chapter aims to answer the fifth question of this PhD thesis: What are the barriers and facilitators to the acceptability and feasibility of the co-developed DRE intervention?

7.2 Acceptability and Feasibility in the implementation of an intervention

A thorough examination of the underlying implementation processes – activities in the intervention allows researchers to assess how the intervention was implemented compared to the intended implementation. Furthermore, it provides a clearer understanding of the barriers and facilitators that influence replication and scale-up, particularly if the intervention has multiple components (Sekhon, Cartwright, & Francis, 2017). Even though intervention studies reporting on acceptability and feasibility is a common phenomenon, no consensus exists on the definition of what 'acceptability' of intervention means (Sekhon et al., 2017). After a systematic review, Sekhon and colleagues (2017) proposed the Theoretical Framework of Acceptability (TFA) comprising seven component constructs:

a) Affective Attitude: defined as "how an individual feels about taking part in an intervention"
b) Burden: defined as "the perceived amount of effort that is required to participate in the intervention"
c) Ethicality: defined as, "The extent to which the intervention has good fit with an individual's value system"
d) Intervention Coherence: is defined as, "The extent to which the

participant understands the intervention and how it works".

e) Opportunity Costs: is defined as, "The extent to which benefits, profits or values must be given up to engage in the intervention"
f) Perceived Effectiveness: is defined as, "The extent to which the intervention is perceived as likely to achieve its purpose"
g) Self-efficacy: is defined as, "The participant's confidence that they can perform the behaviour(s) required to participate in the intervention"

Feasibility of an intervention answers an important question – 'can this be done?'. So, feasibility of this intervention is explored through five characteristics as laid out by (Orsmond & Cohn, 2015):

i. Evaluation of recruitment capacity and resulting sampling characteristics
ii. Evaluation and refinement of data collection procedures and outcome measures
iii. Evaluation of acceptability and suitability of the intervention and study procedures
iv. Evaluation of resources and ability to manage and implement the study and intervention
v. Preliminary evaluation of participant responses to the intervention

7.3 DRE Intervention

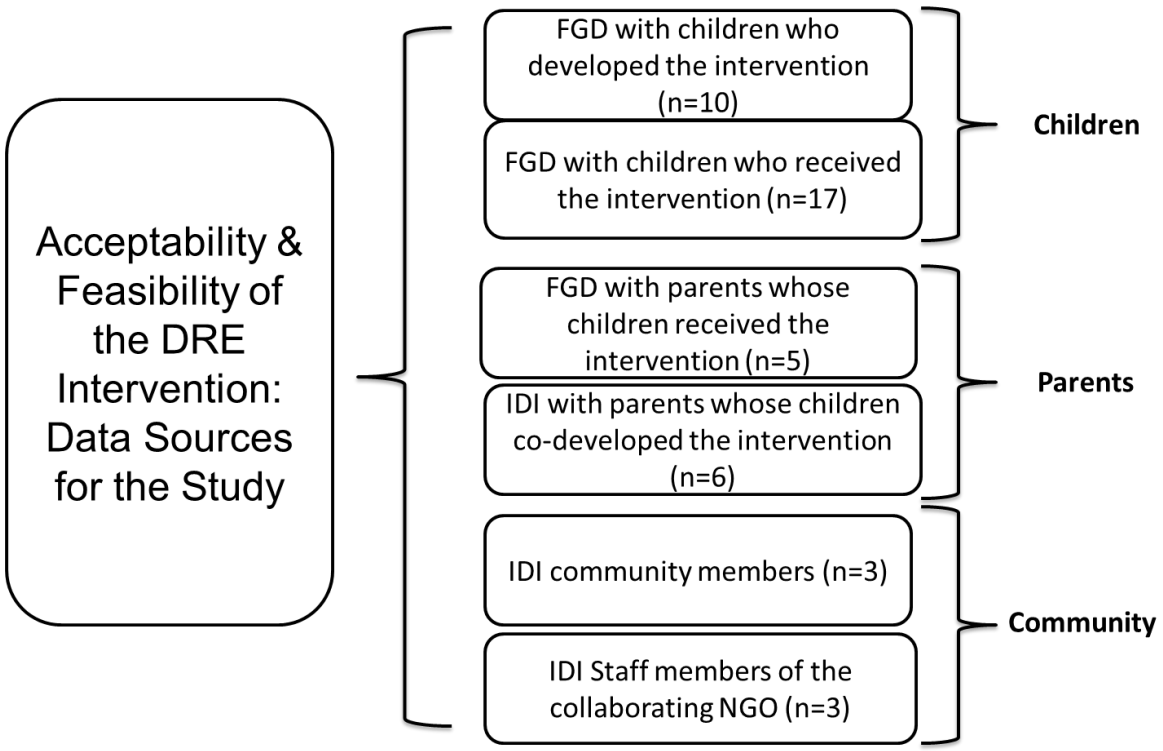
The five-session DRE intervention was co-developed with children who were affected by the 2015 South Indian floods as well as the 2016 cyclone Vardah over about eight to nine months. The children who co-developed the DRE intervention also delivered it to their peers, who were similar aged children in a different neighbourhood. Chapter 6 describes the intervention development process in detail and includes a scoping review of literature, multiple professional expert consultation workshops in India and Australia, and focus group discussions (in addition to ongoing engagement) with children. The focus group discussions and continued child engagement ensured to keep the focus of the intervention on issues important to the children as identified by them.

Children co-developed and delivered this DRE intervention to children and community members of a neighbouring community that had also experienced the 2015 South Indian floods and the 2016 cyclone Vardah.

7.4 Data collection for this study

Although the intervention includes five sessions, due to practical and time constraints on the part of the researcher, we collected data to assess the acceptability and feasibility of the intervention at the end of the second session of the delivered intervention. Monash University's Ethics committee approved this project (Appendix K). We conducted in-depth interviews and focus group discussions with all the stakeholders involved in the study to ensure an in-depth analysis of the intervention development and delivery processes. Figure 7.1 provides the breakdown of the data collected for this study.

Figure 7.1: Participant groups of the Acceptability and Feasibility study of the DRE intervention



*FGD – Focus Group Discussion; *IDI – In-depth Interviews

I conducted the interviews and focus group discussions in Tamil at the participants' preferred venue, usually their home or communal areas to provide some privacy. The topic guides for the in-depth interviews and focus group discussions included questions about each stakeholders' experiences throughout this PhD research relevant to them. Each in-depth interview and focus group discussion took between 50 and 140 minutes. Focus group discussions with staff members of the NGO revolved around their observation of the children's experiences developing and delivering the intervention. It also included their observation and feedback from the children who received the intervention and their parents and community members who observed the intervention delivery, but, could not be interviewed due to their non-availability. All focus group discussions and interviews were audio-recorded.

7.5 Data Analysis for this study

With the help of a transcriptionist in Chennai, India, the place of data collection, all the audio recorded interviews and focus group discussions were transcribed and translated into English. Later, we checked, rechecked the transcripts, and compared them to the audio-recorded interviews, notes and debriefing forms (Appendix I) to minimise any inaccuracies in the translation and transcription process. We read and reread the transcripts to gain familiarity with raw data. The transcripts were then analysed using NVivo version 12 (QSR International Pty Ltd, 2015). Initially, we open coded the data. Once the data was coded, we applied the Theoretical Framework of Acceptability and the Feasibility Frameworks to sort the codes, identify new codes. We discussed the coding strategy and the codebook until these were finalised. Once the coding was complete, the data were sorted according to their appropriate themes and sub-themes to look for any errors or omissions in coding and recoded the data where necessary.

7.6 Results

The results of this study on acceptability for the DRE intervention is reported through the Theoretical Framework of Acceptability comprising seven component constructs from the perspective of different stakeholders involved in the study. Feasibility of this study is explored through five essential elements of feasibility. Within each of these constructs, we also discuss the barriers and facilitators as they relate to the construct from relevant stakeholders to examine the feasibility of intervention implementation. However, there is a fair bit of overlap between acceptability and feasibility constructs. To avoid repetition, I refer to the acceptability constructs as necessary, and present these first.

7.6.1 Acceptability of the DRE intervention

a. Affective Attitude: Children, both the co-developers as well as the recipients of the DRE intervention enjoyed participating in the intervention. The children who developed the intervention were excited to make new friends, met with them weekly and had ‘somewhere’ to go to, which, made them happier about their participation in the intervention, as the quote shows below. The children

who developed the intervention specifically reported enjoying and learning practical preparedness activities. By participating in the co-development of the intervention, children were able to learn about disasters, how to prepare for them and as one of the children describes below, they were proud of the fact that they took ownership of the development process.

"I liked the program very much. I was very happy and excited about seeing how the programme developed, make friends and have fun."

Children who received the intervention reported that one of the most enjoyable aspects of the intervention was that peers delivered it and not adults, as would usually be the case. Since children delivered the intervention, they believed that the intervention was more relatable, fun and relevant.

The parents of the children who developed and delivered the intervention reported that they noticed that their children were excited to be part of the programme. The parents also reported that they were happy that their children were learning practical tips related to disaster preparedness. They reported that children learning disaster preparedness would be making them and another community stronger and more resilient, as shown in a quote below. Parents were happy to see that their children made new friends and felt a sense of connection to their community. Since it was common for parents to have multiple jobs, children were often unsupervised, and the parents reported that they feared that children would not be making the right kinds of friends. However, through their participation in this programme, the parents reported that their children were able to make friends where they learnt useful things together.

"We were happy to know they have learnt to do these things and permitted them to attend the meetings. It is important to learn. Since we were not educated, and now the kids can understand and explain things to us as to how to handle the situations, we feel happy that they are aware of these things."

The parents of the children who received the intervention reported that they were pleasantly surprised to see children of similar age of their own children delivered the intervention. They were even more surprised when they learned that the children who delivered the intervention also co-developed it. They reported that

they were happy that their children were receiving the intervention. Similarly, staff members of the NGO reported that children were happy to be part of this programme. The community members of the intervention recipient group also appreciated that the children in their community benefited from this intervention. They reported that since the children in their community were helpful and eager to help during the 2015 South Indian floods, knowing how to prepare for such disasters was only going to make them better community members in the future. They expressed hope that this intervention was going to help the community overall.

b. Burden: The children, although enthusiastic about participating in the development and delivery of the intervention, had to be reminded multiple times about upcoming meetings. Staff members of the NGO reported and perceived that these reminders and having to fetch them from their houses or playgrounds for the meetings was a barrier for intervention development as shown in the quote below.

"Maybe they were occupied with studies or were playing. The parents also say that its good if we can go call them for the meetings, but, it is hard that we have walk all over the neighbourhood, to each of their houses or even other communal spaces to find them. It would be easier if they remembered when their meetings are."

Initially, these meetings happened with a staff member present to help build a strong rapport between the children and the researcher, as well to ensure admin support. Furthermore, picking up and dropping off kids meant that girls could take part in this programme, without which many would have been not allowed to participate. However, this was time-consuming and onerous on the staff members as this added to their workload. Nevertheless, the children's parents found staff members' action of picking up and dropping off children very reassuring, as the quote below shows.

"Yeah, they told me that the classes are about the floods. Moreover, as they said, they would pick and drop him back, I was okay with that."

Once the parents and children got comfortable within the programme, there was more openness to different days and times when the children could participate in this programme. So, the meetings were moved to Sundays, which was a school holiday. The parents felt better about meetings on Sundays since the children could go to and back from the meetings together. Since the meetings were conducted during the day, it took away the stress of children being out in the evenings as the quote below from a mother shows.

"My kids said that you were able to come to meet with them even on a Sunday. You did not take holidays and made sure that you came whenever it was convenient for the kids."

The parents also reported that since they were busy generally, it was hard for them to keep up with all the things that the children were learning. They reported being worried that they did not and could not ask their children often about whatever they were learning/ doing in the meetings. Other times, children were also not openly sharing their day, including the meetings, as this parent expressed in her quote below. The parents suggested that this was why it was essential to ensure that they trusted the research team and having the staff members of the NGO and meeting the facilitator (RNK) in person, helped ease those worries.

"They will never tell me what they do or what happens when they go out with (NGO name) *staff members. But I think that if the staff members are taking my children, I trust them that they will do something good for the children. So, I don't force my children to tell me everything that happens. And I don't have much time either."*

Although the children were happy and excited to be part of the intervention development and delivery, they reported that at times, they missed having free time as they did before their involvement in the programme. The children who received the intervention, on the other hand, did not think that they had to exert too much effort to be part of the programme. They were able to attend the sessions quickly because they were delivered in their community. However, since they were conducted in the evenings, they tended to pose a challenge, especially for girls. Nevertheless, since the sessions were conducted right on the street that they lived in, parents were able to keep a watch or even come for the sessions which

minimized the fear related to evenings. A bigger barrier for the children was the fact that one of the intervention delivery sessions clashed with weekly water schedule for the community. Water rationing occures in many parts of India, and these communities receive drinking water in an assigned communal tap, a few hours once a week or delivered in a water truck once a week. If a family misses collecting water when it is released or when the truck arrives, then, that family will have no drinking water for the week. So, a clash in this schedule was identified as a barrier for intervention delivery as a community member stated in the quote below.

"Maybe if the programme did not clash with the time that the metro water is released for storage, we would have no problem in attending the programme. Otherwise like this, we will try to come and sit to see the program, but, not be able to pay attention or spend much time."

Overall, both groups of children – the intervention developers, as well as the recipients, reported that their participation in the intervention was enjoyable and useful.

c. Ethicality: All stakeholders in this programme specifically discussed their support to the idea that children will be helping other children and communities to prepare for future floods and cyclones. The children specifically reported that one of their biggest motivation to participate in the programme was their eagerness to help themselves, their families, friends and communities prepare for and cope better from disasters such as the 2015 floods that impacted them significantly. They even identified communities and parts of communities that might benefit from it, especially those who have an increased vulnerability as one of the participating children identifies in the quote below.

"It is not enough to just tell our parents or close friends, I think it is important to tell others too. In [name of the street] *people are even more vulnerable because they are very poor and usually not even educated. They were badly affected during the floods. So, we need to tell them about this also."*

Children who received the intervention reported that it was great to see and hear from their peers about DRR instead of a lecture from adults who would

commonly 'teach' such issues. They also suggested that it would have been great if they could also participate in the development of the intervention and be able to deliver the intervention as their peers did. The parents of children who developed the intervention said that they were proud that their children were participating in a programme that would eventually, not only help them, their family, but also others in the community and even families from other communities. Similar to the parents, the staff members of the NGO reported, as the quote below shows, that children learning DRR was something for which they were most happy and keen. They reported that children's participation in the development of the intervention bolstered their own ideas and views of child participation and gave them newer ideas about how to involve children in other governance-related activities. The staff members of the NGO reported another facilitator and motivator – they reported that they were pleased that the intervention was going to stay with the children instead of needing researchers and experts to be present for its continued use.

"They are telling us as to what things they need to do in flood times. Like what things need to be packed, how to switch off the electric appliances, and such. So, kids themselves know many things, and everyone can prepare for floods in the future because the kids know these things."

All stakeholders – children and adults reported that children's participation in the DRE intervention is key to their, their families and communities' preparedness for disasters.

d. Intervention Coherence: The children co-developed and delivered this intervention. The children in the development group, with the help of the facilitator (RNK) spent time understanding and learning various concepts related to disasters, risk, vulnerability, and preparedness. We used videos, experiments, hands-on activities such as walking through the neighbourhood to identify risks, and safe places for evacuation as methods to learn about these concepts. Children identified the 'walk through their neighbourhood' to spot risks were some of the most enjoyable activities. Figure 7.2 shows a risk that is common in the communities where the intervention was developed and delivered. Families dry their clothes on telephone cables.

Figure 7.2: Clothes drying on telephone wires – a common sight in the study areas in Chennai, India

Chapter 6 describes in detail the process of intervention development. Children who received the DRE intervention reported that since their peers co-developed and delivered the intervention, it was relatable and easy to understand. However, the same factors also acted as a barrier to understanding the intervention since children who delivered the intervention, were not always flexible and able to change the structure of the intervention based on the audience responses. The recipient children also felt conscious about answering questions, in fear of getting it wrong or ridiculed, as one recipient children states below. The children who delivered the intervention also reported this as a barrier, because a change in the planned ways to deliver the intervention, or the audience not engaging as hoped made it hard for the children to engage with each other and deliver the intervention well.

"I did not like the questions asked. I didn't know the answer, so I did not like it. What if they laugh at me if I got the answer wrong? So, I didn't answer many questions, and I saw how they [children delivering the intervention] *found it hard to continue when there was just silence instead of discussion".*

Community members, parents and staff members of the NGO observed this and wondered if an adult's involvement would have helped overcome, as one parent reported below.

"My children did not speak a word and were quiet. I think they were very shy to express their views. But, sometimes if this programme was not all run by children, then, maybe it would have been easier to make these kids speak more. Who knows?"

However, children who received the intervention, as well as parents, staff members of the NGO, reported that eventually, children got comfortable in their respective roles and were able to communicate with each other comfortably. The methods such as art, theatre and games helped break the ice and make intervention delivery easy and content more comprehensible. All stakeholders appreciated these methods of intervention delivery. In fact, some parents reported that their children learned more about disaster preparedness through this intervention than from school, where disasters are part of the curriculum, as the parent described below.

"See, my children told me that at their school they had a similar programme where they were taught about the flood, but it was boring, and they did not understand much. So, they were feeling irritated when they asked them questions at the end of the lecture. But, like you did, if there was a drama and songs like you had in your programme, I think kids would have been happy and also be able to understand what is being taught."

Parents of intervention recipient children were most appreciative for the impact alternative methods of teaching DRR messaging had. As a parent quoted below, it not only helped with engaging the children but also relayed key DRR messages to adults who were bystanders as well.

"I liked everything in the play. Though they were kids, they were able to express their views and create scenarios perfectly to help others understand. Even people who were not aware of it (how to prepare for floods) *would know by now through this play; even I did not know so many things."*

Although this intervention focused on children learning DRR, the adults present during the intervention delivery also benefited from it. They recognised that their children were now empowered with the knowledge on how to prepare for floods and cyclones.

e. Opportunity costs: The DRE intervention was developed over 8-9 months. During this period, most of the time, children who co-developed the intervention took the time to meet the facilitator in person or over video calls. This time commitment meant that at times they missed family activities or play and other after-school activities. However, the children reported that they did not mind, since they saw their friends and the intervention development process was fun most of the time. The children who developed the intervention reported that they tended to get bored when there was repetition while learning concepts or discussing plans.

"Sometimes the same thing was repeated, which we felt was boring."

The children who received the intervention reported that while they enjoyed the sessions, they were reluctant to fully engage and participate because they worried about other children ridiculing them for not knowing responses or saying the wrong things. However, once they embraced the session and enjoyed the games and other interactive activities, they soon forgot their worry. Parents of children who developed the intervention were worried about their children's commute – although the meetings usually happened after schools or over weekends, it was a time when they were away from their parents and since they had no cell phones or any other way of contacting them until they returned home, the parents worried.

f. Perceived Effectiveness: All the stakeholders in this study reported that it was important for children, families and communities to learn about disasters, as the children reported in focus group discussion.

"It is important that we learn how to prepare. We have to learn how disasters like floods or cyclones happen, we must know as to how to protect ourselves from it, and we must know as to what we have to do to safeguard ourselves."

The children who co-developed the intervention reported that they not only learned about disasters, its effects, but, they also learned how some groups of people could be more vulnerable to disasters and its impact than others. They also reported learning practical tips to help them prepare for future floods and cyclones.

"The programme focused on how to prepare ourselves for a flood and a cyclone. What things are important to take with us and where can we go if we need to evacuate. We also know that people like the elderly, babies, disabled and pregnant women can be affected by disasters more than others."

The children who co-developed the intervention, as well as the children who received it, reported that the intervention was useful in helping them prepare for disasters. They discussed practical actions they could do, either by themselves or as a team with adults in their household to prepare better for disasters. They also reported that key learning for them was to know where and how to get information about an emergency – before, during and after a disaster. Some of the key learnings through this intervention as reported by each stakeholder group is reported in Table 7.1. They reported that the importance of news telecast was a vital learning from this intervention. Another crucial skill they gained was first aid. The parents and staff members of NGO who had frequent contact with the children co-developing the intervention also reported that first aid was a skill that was one of the most impactful and immediately applicable skill as a parent describes in a quote below. The parents and children reported that the children often had the opportunity to use a first aid kit and they used them, having had no access to a first aid kit or first aid skills before they participated in the DRE intervention.

"Initially, when he came home, he showed me the first aid kit that was given in the class. Whenever he gets any minor injury, he will use the kit. Similarly, if anyone else around him is injured, he will quickly use the kit. We are very impressed with how much he knows now. He even reminds us to put away cleaning supplies or other things that can fall/ break/ hurt his younger siblings."

The parents and staff members of the NGO observed that the children were more observant of their surroundings and were more aware of common practices or behaviours, or how community spaces posed a risk. For example: people tended to use telephone cables as a rope for drying clothes, and the children identified that this wasn't a recommendable practice. A child provided examples of things they learned through the DRE intervention below.

"There might be ditches and things like that on the street which will be covered with water when there are floods and so we should know that. We have to put away phenol bottles [domestic cleaning solution], *and that is one of the things I learned from the programme."*

Parents, staff members of NGO, and community members, in general, all believed that children had learned more about disasters and disaster preparedness through the DRE intervention. The learnings were not exclusive to disaster risk or vulnerabilities, but also preparedness, including steps children could take, actions they could help their parents take and even take on an important role in planning evacuation, and preparing for recovery after a disaster. The adult and child stakeholders, alike, felt confident with their ability to prepare and help one another.

Children and parents did not always get a chance to discuss issues during the intervention development phase. Whatever little discussion happened between parents and children regarding DRE, it appeared that parents thought that they too learnt new skills. The parents reported that when they discussed children's learnings with them, they were reminded of important things to prepare for in the face of a disaster as the mother of a child who participated in the intervention development expresses in her quote below.

"Though I have been living here for 57 years, I was not aware of a few things. It was the program that taught us as to how we need to preserve Adhar card, ration card, birth certificates in a box and keep in safe areas. It also taught us to keep essential things like candle, matchbox, clothing in preparation for a flood. These things I was not aware of preserving earlier. Since we cannot predict the future and at least during such a crisis, we need to preserve a few things and rush to safety. This is something we learned through you in this project."

Safety and the importance of gathering relevant information was a critical issue that children learned because of the DRE intervention, as they reported in a focus group discussion.

"We cannot enter floodwater, even if we know swimming. We should stay in the boat or a high place. We might find a snake or something in the water too. If there are any insects in the water which are poisonous and if we get bitten, we might get sick. Moreover, we can even be electrocuted if we enter the floodwaters."

"Watching the news and being aware of what is going on around us is another thing we learned. Before we would just use mobile phones to play, but, now, we even listen to news once a day."

Table 7.1: Key lessons learned through this intervention according to each stakeholder group

Key learnings	**Children: co-developers**	**Children: recipients**	**Adults: Parents**	**Adults: NGO Staff members**	**Adults: Community Members**
Risk / Hazard Mapping	*There might be ditches and things like that on the street which will be covered with water when there are floods and so we should know that.*	*I really liked the idea of making and using of map and chart. We got to walk around the neighbourhood and explore what risks can appear during the flood was fun.*	*We have four rooms in the house, and the wires usually hang around the room. If my kids go on the top, they will not be able to sit there and so we have to be cautious while being there in the house, safeguarding ourselves from the wires.*	*The children really liked risk mapping. Walking around the neighbourhood just to identify risks on the street gave us an idea of all the risks on that street when we would have otherwise not even observed.*	*It was great to see children draw these maps. They have learned and taught us so much. Sadly, our streets are so full of risks, but, at least now our children and we know these risks, and maybe we can do something about it.*
Key DRR skills learned	*Safekeeping documents and books, storing food*	*Safekeeping documents and books, storing food*	*Documents and precious/ expensive things*	*Remind the parents and children about the different roles*	*Looking out for one another, safekeeping of documents and*

	and water, first aid kit, remembering not to enter floodwaters, listen to news telecast, make an emergency plan with family	*and water, first aid kit, remembering not to enter floodwaters, listen to news telecast, make an emergency plan with family*	*safekeeping, food and water storage, ensuring the health of the family, ensuring to keep up with the news*	*they can play to prepare for disasters.*	*encourage children to learn DRR messaging*
Evacuation	*I know where to go if there is a flood tomorrow. But, first, we need information and need to ensure we pack all the important things.*	*We should evacuate to a safe spot before the floods become dangerous.*	*We must try to reach the safer places taking the kids along with us. Moreover, when it floods, many may come forward to help by giving things like food, tea, coffee etc.*	*After seeing how families struggled to leave their houses on boats, evacuation needed to happen sooner. It's great that it was included in the intervention.*	*Selecting a good place to evacuate to is essential. We might not get along with some people. So, we will try to find houses of known people who could help us out beforehand so that we know where we can evacuate to.*

Not using telephone and electricity cables for hanging clothes, etc.	*We have understood the risk of using wires (telephone/ electricity) to dry our clothes, and earlier we have been doing this without knowing it.*	*Those houses that are on the first floor or second floor, it is common for them to use the wires for drying their clothes, but, now, we know that it can be risky and we should not do it.*	*We never even thought about it. Everyone does it and it is so close to our walls. But, our children told us, and we also saw it on the map where they marked that it was a bad thing to do.*	*We know of families who have lost children because they got electrocuted – not just during floods, but, even when it rains heavily. This is an important thing for us all to learn.*	*My neighbour's son nearly lost his legs because he stepped into a puddle with electric wire. We were glad nothing happened to him. However, since then, we are always scared and keep reminding children that they should not go jumping in the puddles in the rain.*
Putting away poisonous objects such as cleaning supplies	*We will try to keep our essential items safely. We should keep Petrol, kerosene in safe places. Similarly, cleaning items.*	*Cleaning items should be stored carefully out of reach.*	*My son said that we have to store everything that we use to clean and other medicines that we use for rats, and other things have to be*	*It is common that people here use poisons for rats. So, it is great that the intervention includes putting away cleaning supplies and*	

			put away – especially at the time of any disaster such as floods or cyclones.	*poisons. This precaution should not be just during disasters.*	
Storage of Food and water	*I will try to store the rainwater in my terrace either using a pipe or a barrel so that it can be used when we need it. Also, buy dry fruits in advance and preserve it for future use.*	*We cannot cook with fire in the house during such a crisis. So, we can try to save and store things like dry snacks like biscuits. We should also be preserving water for 2-3 weeks.*	*Drinking water and food – my children stressed that we should have enough drinking water and dry food that does not go bad if there is going to be a flood.*	*These people do not have the money to store a lot of food and water is hard to store when they get it so infrequently and have only so many vessels to store them in. But, I think whatever money they have, they should store – even little at a time, so that they can actually put some food away for this purpose.*	*Food was an important aspect during the flood. Even my daughter says if we do not have clothes during the flood, it will be ok, and we can manage with wet clothes. But food and water to drink are the most important things.*

Safe Keeping of documents	*When my parents lost the ration card and things like that, we had a lot of trouble – it was hard to get food, and my school also could not give me my certificates*	*I know that we have to keep our documents safe – we have to remind our parents to store important documents*	*Adhar card[1], ration card[2], community certificate[3] and these documents are important, and we are going to have to keep them safe. Another thing that is very important is the kids' books.*	*We keep reminding them that they need to keep their documents safely. After the tsunami and now the 2015 floods, the government replaced cards, but, I doubt they will continue providing these things – you may be left without food if you do not have those documents well.*	*Ration card, other bills are necessary and has to be safeguarded. We need to safeguard those things. We lost everything [to the flood] and had to organise these things once again. So, these things are to be safeguarded first.*

[1] A national identity document introduced by the Government of India in 2016
[2] An official document issued by state governments in India to households that are eligible to purchase subsidise good grain from the public distribution system.
[3] A document that certifies your caste, especially necessary for those belonging to 'lower' castes and tribes if one wants to claim employment in government agencies, secure admission to educational institutions, etc. as reserved for these castes in order to increase access for these communities that have been historically marginalised and discriminated against.

Not entering the floodwaters	*We cannot ever enter the water. There can be anything – we can get electrocuted. We can get bitten by snakes.*	*The play we saw showed that we should not enter floodwaters eve if we know swimming. I thought if you knew how to swim, you are okay, but, there are so many other things that might actually be in the water making it dangerous.*	*When we are crossing the floodwater, we must observe where the electric current is passing through that area must be noted. So, its best we do not cross the floodwater at all.*	*Parents must tell the kids not to go in the water when there is a flood, as there may be electric wires in it, it might be deeper than it seems and drainage holes may be open.*	*No one, especially, kids cannot go in the water and so packing and keeping everything ready in advance is important.*
Gathering information – e.g. listening to/ watching news	*Watching the news and being aware of what is going on around us is another thing we learned. Before we would just use mobile phones to*	*We will also watch out for warnings and will listen to radio news. Parents and neighbours might have gone for work and if we watch we*	*We watch news definitely, and she has been going to the meetings to learn about floods. So, my child is aware of these precautious things.*	*Kids are always busy playing on the phone if they ever get their hands on one – or they are watching videos. However, now, the parents say that*	

	play, but, now, we even listen to news once a day.	*can inform them about it.*		*children watch the news, especially when it is raining.*	
Having an emergency plan discussed ahead of time with all members of the household	*We must be alert before the flood comes. And if they make any announcement, we need to collect the essential things like snacks, documents and keep in a safe area.*	*Because of this, we even have a plan when we are in school. I will wait for my parents till they come to pick them up.*	*They told me that first, we need to have a plan in the house for situations like this. They said in the plan; we should decide what we are packing, where we are going to go if we need to move away from our home and have emergency contacts and things like that.*	*Parents and children have to have a plan. We want to help children and their parents create a plan to ensure they know what to do. It is good that the intervention gives ideas on how to do that.*	
Using theatre/ games as a	*By introducing games, I think we*	*We all saw the play and understood it well. Even my*	*The programme's song has helped my kids also know*	*If you perform in a play, kids will learn things faster and*	*I too felt happy seeing the programme and how kids from one*

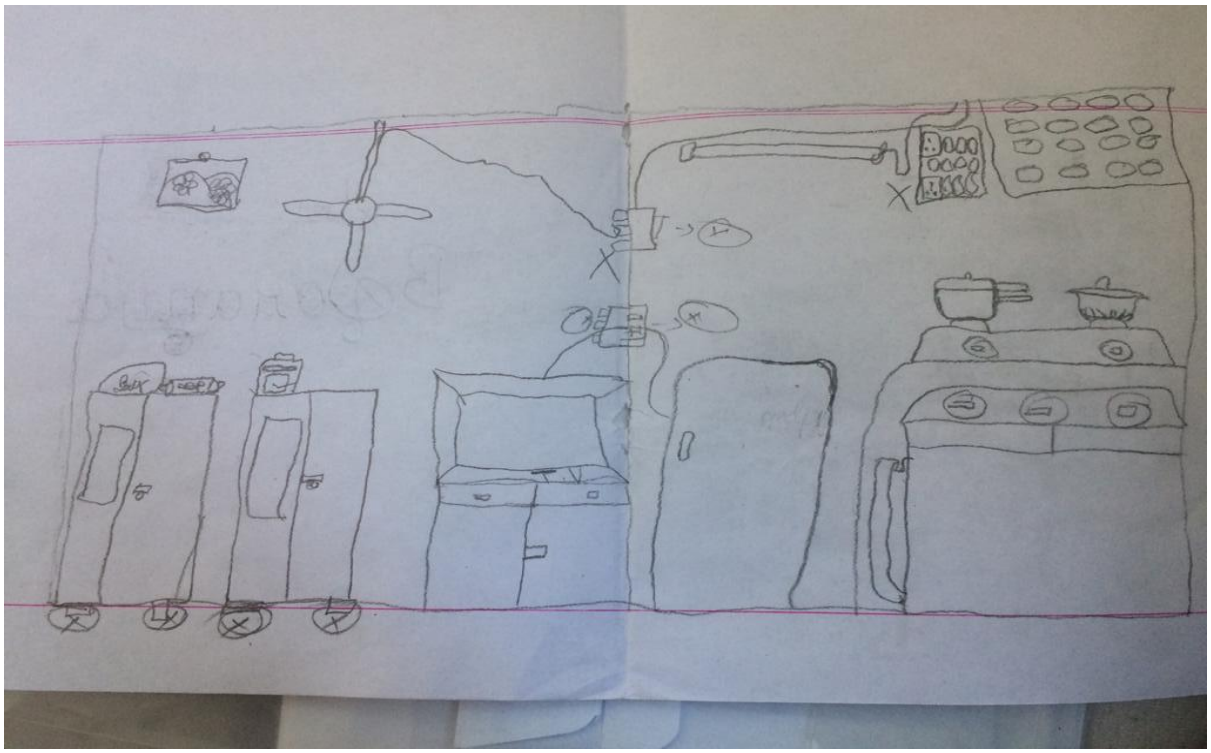
method of intervention delivery	*make this whole thing enjoyable.*	*sisters and brother fully understood. We told daddy about the things we saw in the play.*	*which these documents are to keep safe and how to keep them. I keep these collecting that carefully in one place.*	*easier, and this will be spread across many areas. So, art is a medium through which you can spread information and teach them these really important things related to DRE.*	*neighbourhood were helping kids from another neighbourhood.*
Increase in the confidence of children to prepare for floods and cyclones	*We know what we should do to in flood. We should also help others.*	*My children know what to do now. And, we are very happy that they are more outgoing and confident, not just about disasters, but also in their extracurricular activities.*	*My kids told me that they are confident with doing first aid. They also feel confident in knowing how to prepare for a flood, and what things to pack, how to react in these scenarios.*	*They were clear in knowing things like what all they need to do, going to relatives' house, what all they have to switch off during crises like electric wires, what were the essential things that have to be preserved*	

				like the first aid kit etc	
Decrease in anxiety related to hazards in children and adults	*Now, I am not that scared about the floods like I was.*	*I used to be scared and thinking about floods a lot. But, now, I feel like I know what I can do to help myself, my family and friends.*	*They wanted me tell some solution for all the disasters they were imagining would happen and I was turning up blank, it was very helpful for them to participate in this and learn what things can even happen here in Chennai and how we can be ready for them.*	*The children used to be afraid every time it rained. But, since they know what they can do to prepare and that they can actually do something to prepare for floods, so, now, they actually feel much better and are not that afraid anymore.*	
The motivation for children	*Next time there is a flood, we can not only prepare our*	*We want to learn about drama and perform like that.*	*Definitely! I will come. My house was totally under*	*I will organise and unite all the kids in a street corner and as*	*I usually invite those children who are not going to school and*

to participate in DRE programmes	*families beforehand, but we will also try to help others out.*	*Our friends at school also can use training like this. It was fun!*	*during the flood. We built our house on a higher ground now, so that our houses do not drown. So, there is no one more than me who must learn these things. I am fully aware of the importance, and when you conduct such programs again, I would definitely come and attend the program.*	*you did, I will announce the details using a microphone and will request all the parents to send their kids to participate in the program.*	*make them attend their classes. And things like these [DRE programmes] are very important. So, I will see to it all the children around my area participate and get to know the details through such programmes by making them attend it.*

As children in table 7.1 report, creating a hazard/ risk map of their respective houses provided them with a unique opportunity to not only assess their house for commonly posed risks, but also discuss with their parents how to create a plan for emergencies. Fig 7.3 shows an example of a risk map drawn by one of the child participants of the study. The child participant has used cross (X) to indicate a potential risk.

Figure 7.3: A hazard map of a house by one of the child participants



Overall, children reported that this DRE intervention would help them prepare for disasters. Parents, staff members of the collaborating NGO as well as community members believed that this intervention was successful in teaching children practical disaster preparedness actions.

g. Self-efficacy: Children reported their confidence in their skills to practice not only the key DRR messages but, also in their ability to 'teach' DRR to other children and their families. The children reported that learning first aid had a significant impact on them since they did not know anything about first aid or would not have been able to afford first aid kits before they participated in the intervention. Children also reported instances when they had used the first aid

kits. The children reported that they were also confident in other areas of life – such as being able to collaborate, participate in team activities outside of school, or be more vocal/ express their ideas/ thoughts/ feelings better within their family, school and their community. They reported that their families and communities took them more seriously than before as they saw this intervention developed and delivered. However, the children who delivered the intervention felt that it was hard for them to deliver the sessions when sessions didn't go according to their plans. They found changing course and picking a different activity to do then with the audience was hard and reported that they would like to see more support from the facilitator in the actual delivery of the intervention. They also suggested that, perhaps, the facilitator could run through different scenarios in intervention development and help find solutions to some commonly faced challenges. The children were pleased when they reported that the adults in their life taking them seriously, and, listening to them gave them confidence, feelings of self-efficacy and assuredness. The perceived impact on children's mental wellbeing was a result of their participation in the development and delivery of the DRE intervention and reported in Chapter 6.

Parents and staff members of the NGO reported that confidence in their own ability to prepare for floods and cyclones in both children and adults alike had increased. The parents also reported that children had much less anxiety related to hazards than they did before the intervention. The parents reported that they felt confident that they and their children could work as a team to prepare for disasters, instead of having to know and do everything on their own. They reported that now, their kids tended to remind them of the things that they might have forgotten to pack or switch off, as the mother describes below.

"My kids came home from the meetings and discussions about the things they learned, with each other. For example: how to safeguard themselves from flood, what they need to pack – clothes, food, water to drink, books, documents, etc. Another thing they discuss is how they can help others etc. I am proud when I hear them talking about this. They also remind me that we should keep things packed, including their first aid kit. Their father and I ask them about what they have learned and even listen to the news together with them."

The parents and staff members of the NGO reported that the impact of participating in the intervention not only helped children feel confident about preparing for disasters, but, it also gave them confidence in other areas of life, such as making new friends, participating actively at school. It also encouraged them to participate in extracurricular activities, and better communication with other members in the family.

Overall, all stakeholders reported that the intervention content and style of delivery was acceptable. The children reported that their participation in this programme was a positive one.

7.6.2 Feasibility of the DRE intervention

We report on the feasibility of the DRE intervention through five characteristics as laid out by Orsmond & Cohn (2015). In order to minimize repetition, where there is overlap between acceptability and feasibility constructs, I refer to acceptability construct previously presented.

i. Evaluation of recruitment capacity and resulting sampling characteristics: The collaborating NGO played a critical role in the recruitment of children. The NGO had worked closely with the community for years. Moreover, we previously conducted preliminary research in these communities and they had expressed interest for their children's involvement in the study. Staff members from the NGO reported that they found children were keen to participate. They also reported that due to the interest in this programme, children who were not actively involved with the organisation were linked up which they found beneficial, as the quote below shows.

"New kids have got the chance to come into the scheme. Many were in child welfare programme, but few new kids also have the chance to come in to this and so into [name of the organisation]*."*

ii. Evaluation and refinement of data collection procedures and outcome measures: Due to this project being small in scale and is part of a PhD thesis, all data was collected by me, the research student. However, staff members from the NGO helped ensure that the children attended meetings or

discussions. They also took me to meet every parent personally. Due to the small-scale nature of this project, it was doable; however, if this intervention were scaled up, this method could present a barrier for completion of data collection.

iii. Evaluation of acceptability and suitability of the intervention and study procedures: Section 7.6.1 reports on the acceptability of the intervention and study procedures using the Theoretical Framework of acceptability.

iv. Evaluation of resources and the ability to manage and implement the study and intervention: The development of the intervention could be resource-intensive. However, the delivery of the intervention was not resource-intensive. Although, no other formal evaluation of resources was undertaken, the coding related to 'Burden' in section 7.6.1 report on the resources to manage and implement the intervention.

v. Preliminary evaluation of participant responses to the intervention: Much of the information related to this construct is presented in the acceptability framework through: intervention coherence and perceived effectiveness (section 7.6.1).

Involving children in participatory processes requires the researcher to not only carefully consider ethics, but, children's safety and wellbeing will have to be prioritised above all, especially where marginalised children are involved in the context of a disaster (Barker & Weller, 2003; O'Mathúna, 2010; Sime, 2008). That said, children's active participation is key to ensure that their issues, which are different from issues that adults label as child-related issues in the context of disasters, are adequately and appropriately addressed through a DRE intervention. Research has established the need for and benefits of active child participation in DRE research and practice dialogue (Amri et al., 2018; Gibbs et al., 2014; Gibbs, Ireton, Block, & Taunt, 2018; Ronan et al., 2015; Ronan et al., 2008). Our study adds to that growing literature base, proving that children are not only eager but, also capable and confident of their ability to participate in DRE. Our study also shows that child participation in DRE can potentially make a

difference not only to their and their families' disaster preparedness but, also create confident and less anxious children in the face of disasters.

7.7 Implications of Chapter 7 on this PhD thesis

Considering that the intervention was found to be generally feasible and acceptable by all the stakeholders, especially since the constant presence of the researcher was not required to continue intervention delivery, the staff members of the NGO reported that they were keen to continue this intervention, even after the completion of the delivery of the five sessions. They envisioned reaching out to different communities and at different times – may repeat this intervention closer to when rains commonly arrive. This study also highlights the role of adults as a pivotal one. The staff members of the NGO recognised that they needed to play a role in setting up a space for intervention delivery, to build interest within the community, take care of scheduling issues. In addition to ensure that the children felt supported in delivering the intervention – including in its content and delivery. The role of adults is an integral part of the successful DRE intervention implementation led by children (Gibbs, Ireton, et al., 2018). Children and adults reported that everyone had a role to play in the disaster preparedness of their families and communities. They acknowledged that children knowing preparedness activities only bolstered their skills, confidence and ability to prepare for and recover better from disasters. The upcoming Chapter 8 explores the perceived impact of child participation in DRE intervention development and delivery had on children's mental wellbeing and resilience.

Chapter 8: Child Participation in Disaster Resilience Education – Potential impact on their mental wellbeing and resilience

8.1 Introduction & Preamble to Empirical Paper 5

Children can play an active and valuable role to minimise disaster risks and vulnerabilities. However, peer-reviewed literature on child participation in DRE is lacking. This chapter aims to bridge that knowledge gap through a paper focusing on the potential impact of child participation in DRE on their mental wellbeing and resilience.

This chapter presents the fifth empirical paper of this thesis. This paper/ chapter answers the secondary question of this thesis: How does active child participation influence mental health outcomes, e.g. self-efficacy, adaptive coping skills and problem-solving skills? This paper provides a multi-stakeholder perspective on the perceived impact of child participation on their mental wellbeing and resilience. The children in the inner-city slum of Chennai, India who participated in the development and delivery of the intervention, the recipient children of the DRE intervention, and the adults surrounding them all reported that children showed a decrease in the anxiety about disasters. They also reported increased confidence in their ability to prepare for disasters. This paper is currently under review at the Disaster Prevention and Management for their special issue, 'Emerging voices and pathways to inclusive disaster studies' where it is currently under consideration.

8.2 Paper 5: Child Participation in Disaster Resilience Education: Potential impact on child mental wellbeing

Krishna, R. N., Spencer, C., Ronan, K., & Alisic, E. (Under Review). Child Participation in Disaster Resilience Education: Potential impact on child mental wellbeing.

Child Participation in Disaster Resilience Education: Potential impact on child mental wellbeing

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Abstract

Purpose: Children can play an active and valuable role to minimise disaster risks and vulnerabilities. Yet, peer-reviewed literature on child participation in DRE is lacking. This knowledge gap is larger in low- and middle-income countries with vulnerable communities. The current study explores how child participation in developing and delivering a DRE intervention is associated with their mental wellbeing and resilience.

Methodology: This qualitative study is part of a larger project where a DRE intervention was co-developed and delivered by children in the inner-city slums of Chennai, India. We conducted interviews and focus group discussions with children who co-developed the intervention (n=10), their parents (n=6), and staff members (n=4) of a collaborating NGO.

Findings: The children involved in the development and delivery of the intervention reported that not only did they learn the skills necessary to prepare for hazards in the future, it also increased their confidence, self-worth, and self-efficacy. This was also observed by parents and staff members of the collaborating NGO, and reported that they felt proud of the children and applauded their ability to communicate key DRR messages with assertiveness.

Originality: This study presents a multi-stakeholder perspective on child participation in its potential impact on children's mental wellbeing and resilience. The DRE intervention was co-developed and delivered by children in the community making it unique in its development process as well as the context it was developed in – inner-city slums.

Keywords: Child Participation, 'Disaster Resilience Education', Children, 'Disaster Preparedness'

Introduction

Children were identified as "the group most affected by disasters each year," (UNISDR, 2011) including in low and middle-income countries (Martin, 2010; Norris et al., 2002). Children have a range of emotional and behavioural consequences to their disaster experience – from brief emotional distress to long-term psychopathology or impaired functioning (Norris et al., 2002). Although many children might recover from a traumatic experience such as a disaster without needing specialised support (Alisic, Jongmans, van Wesel, & Kleber, 2011), long-term mental health problems, for children, related to disasters have been documented e.g (Dyregrov, Yule, & Olff, 2018; McFarlane & Van Hooff, 2009; Peek, 2008). A meta-analysis (Alisic et al., 2011) found that about 9.7% children and adolescents of their global sample exposed to non-interpersonal trauma such as disasters developed Posttraumatic Stress Disorder (PTSD). Depression and anxiety are other common child disaster outcomes with 2 – 69% prevalence rates of depressive symptoms in children compared to 1 to 9% in adults (Lai, Auslander, Fitzpatrick, & Podkowirow, 2014).

Despite adverse effects of disasters, children can also be innovative agents of change. They can play an active and valuable role in the development and application of strategies and practices to minimise disaster risks and vulnerabilities (Amri, Bird, Ronan, Haynes, & Towers, 2017; Ronan et al., 2016). The United Nations' Sendai Framework has recently identified children and youth as agents of change and advocated for their active involvement in preparedness activities (UNISDR, 2015). Child-Centred Disaster Risk Reduction (CC-DRR) education programs have documented a number of benefits including families' and communities' better preparedness against disasters, increase in awareness which in turn decreased anxiety related to disasters (Back, Cameron, & Tanner, 2009; Ronan, Alisic, Towers, Johnson, & Johnston, 2015). However, there is a dearth of empirical studies that include children's active participation in the creation and implementation of these programs (Back et al., 2009; Carr, 2018; Pfefferbaum, Pfefferbaum, & Horn, 2018), including in India (Jörin, Steinberger, Krishnamurthy, & Scolobig, 2018). Given the lack of empirical studies that report on children's participation in DRE, the current study aims to fill that gap by describing the perceived impact of child participation in developing and delivering a DRE intervention on their mental wellbeing and

resilience from a multi-stakeholder perspective. The DRE intervention development process of the intervention is described elsewhere.

Methods

This qualitative study to explore the impact of child participation in the development and delivery of the DRE intervention in Chennai, India, from a multi-stakeholder perspective was approved by the Monash University Human Research Ethics Committee (MUHREC 2018-8979- 25039), Melbourne, Australia as part of the larger PhD project. Collaboration with a local Non-Governmental Organisation (NGO) helped us gain access to the flood-affected children and communities. The NGO reviewed Monash University's approved ethics and data collection documentation in their internal ethics panels and approved this study.

The DRE intervention discussed in this study was co-developed and delivered by children in the inner-city slums of Chennai, India, where the communities experience poverty, perceived marginalisation from the government and high levels of illiteracy. Participatory approach guided this research. So, children played an active role in not only developing the intervention, but, they were also co-decision makers on the content, structure, and format of the intervention, including its delivery. Appendix A presents Table I describing the sessions with an example of the activities in the session.

For this qualitative study, we conducted in-depth interviews and focus group discussions with children who co-developed the intervention (n=10), their parents (n=6), and staff members (n=4) of the collaborating NGO. With the help of a transcriptionist in Chennai, India we transcribed and translated all the interviews and focus group discussions into English. Later, the first author checked, rechecked the transcripts, compared them to the audio-recorded interviews, notes and debriefing forms to minimise any inaccuracies in the translation and transcription. We used NVivo version 12 to analyse the data. A coding tree was developed based on some of the themes that we expected to see a priori and we added new codes as they emerged. Once the first author completed coding, the data were sorted according to their appropriate themes and sub-themes to look for any errors or omissions in coding and recoded the data where necessary.

Results

The current study describes the perceived impact of child participation on children's mental wellbeing and resilience from a multi-stakeholder perspective in Chennai, India. The results were triangulated across the diverse stakeholders' perspective in three broad themes: life skills, children's own view of self and adults in child participation.

a. Life skills: Parents remarked that one of the most noticeable changes in their children was the reduction of anxiety, specifically about disasters. Children were worried about possible flooding every time it rained, often interfering in their ability to sleep well, focus at school and even temporarily be separated from their parents. Through their participation, children not only learned practical skills on disaster preparedness, but, also felt reassured in their ability as this parent describes below. Furthermore, children talking to their peers and sharing their experiences with each seemed to have alleviated some of that anxiety and recognising that their reactions are common.

"After the flood, it seemed like my kids were constantly worried about being flooded again or something else happening. Being part of this programme and understanding how floods and cyclones happen, what we can do to prepare and talking about it week after week with you and with other kids really helped them."

Furthermore, children became confident in their own skills, including in their first aid skills, as reported one of the parents here.

"My kids told me that they are confident with doing first aid. My neighbour's daughter even treated her brothers after they had an accident with her first aid kit. They also feel confident in knowing how to prepare for a flood and what things to pack, how to react in these scenarios."

This confidence led to children's eagerness to share their newly learned skills, and knowledge with others. Parents reported that children were more assertive than before and attributed it to their participation in the study. They reported that their participation gave them the confidence to express themselves as these two parents report below.

"They are definitely learning to face things boldly. For instance, if any kid troubles my daughter, she should be bold enough to defend herself. I feel that kids should know how to…. I think the program has made them bold. My kids didn't take part in discussions if there were lots of people and would not be assertive, but, now they are."

"My child is quiet, and not many friends… Earlier she was upset and crying about having no friends. But now she is accepted as a friend by other kids in the class. I feel that she has become bold enough to speak to people. She has achieved this by attending your meetings."

Parents and staff members of the NGO observed that children were not only being assertive at homes and but, also taking on more activities in the community and participating in sports. They also displayed good communication, problem solving skills. The children were also mindful of their quieter peers and ensured that they also had an opportunity to contribute.

"I feel the kids are ready and well prepared to handle crisis situations. They are very clear in their views and are able to deliver the message to others. They also form a good team and when they see that there are other kids who are silent, they try to encourage them to talk and participate."

b. View of self: Children reported their experience in the intervention development gave them confidence about their preparedness skills and their ability to contribute positively to their family's and community's preparedness to disasters. Their confidence in learning disaster preparedness led to more active participation at school, as this 12-year-old girl who participated in the intervention development reported.

"When the teacher asked the class about disasters in my geography class, I could explain it well in class. You taught me this, so I was able to explain in class confidently."

The children reported that they felt proud of themselves for the role they could play in their family's disaster preparedness. They also reported that this program not only helped in their families' preparedness, but also made them more empathic towards others in the community. It made them eager to help others in the

community, especially those who might need be more vulnerable as a group of children reported in a focus group discussion below.

"We didn't do anything last time during the flood, but, this time, we can be prepared and help our parents in prepare… We must try to help others if we can, especially elderly or younger children and other situations."

c. Breaking barriers around child participation: In this study, children were keen to participate in and contribute to the DRE intervention which led to them feeling empowered and resilient as a parent and a staff member of the NGO report below.

"The children wanted me to give a solution for all the disasters they were imagining would happen. I was turning up blank. It was very helpful for them to participate in this and learn what hazards they might actually face here and how they can prepare for them."

"Even at this young age, children are trying teach others about disaster preparedness. Sometimes children understand things better than us. We can be pre-occupied with so many things in life and so can't focus on disaster. But it's great to see that kids can understand these things well; enough to even teach others."

A common barrier for child participation in DRR is adults thinking that DRR might be too complex to grasp. The parent below in their quote report their observation is contrary to that belief.

"I think this programme is useful. Even if we don't know what to do, my kids tell us what we have to do during a crisis, help us prepare for it."

Parents and staff members of the NGO also reported as quoted below that trust and pride in the participating children increased when they saw how they participated and were able to positively contribute to their community's disaster preparedness.

"For me, I think I learned what kids can do. Initially, sometimes it felt like kids can't do these things, but, through this programme, especially when they delivered the intervention and people in (the name of the neighbourhood) *praised us and asked us questions, I realised that they can do so much and that made me happy."*

This pride led parents to encourage child participation even in circumstances where it was not common, for example: girls and children from religiously conservative households were not allowed to participate in extra curriculars and generally mingle with other children like they did in this study. Most of all, it seemed like parents thought that their children, regardless of religious restrictions and gender, would benefit from participating in this study.

> *"Especially* (name of a girl participant) *was ready to come with us to a different neighbourhood to teach disaster preparedness. It is surprising to people that a young lady from* (name of the religion) *was keen to participate. And, I know that her family restricted her, but, she discussed this with them and after a few meetings, they agreed."*

"Before, we would only allow boys to participate in extra curriculars like these meetings. But, now both girls and boys are ready to go out boldly. Even the children are confident and tell us that if they participate, they will learn new things and also teach us."

Discussion

This qualitative study reports on the potential impact child participation in DRR activities has on their mental wellbeing and resilience. This study is part of a larger PhD research project where the first author facilitated the co-development and delivery of a DRE intervention with children in the inner-city slums of Chennai, India. Study communities were vulnerable due to prevalence of poverty, high levels of illiteracy among the parents, systemic discrimination and marginalisation as perceived by these communities. The current study attempts to fill a gap in the scientific literature related to child participation in DRR activities (Back et al., 2009; Lopez, Hayden, Cologon, & Hadley, 2012; Pfefferbaum et al., 2018).

The results from this study indicate that child participation is beneficial for both the children as well as their families beyond the expected preparedness outcomes. This study emphasizes that children feel empowered and less anxious about disasters when they participate in DRR activities which is also supported by previous research (Back et al., 2009; Gibbs et al., 2014; Peek, 2008; Pfefferbaum et al., 2018). Children also feel confident in their own risk assessment skills and capacity to prepare for those risks which is also supported in previous research

(Tanner et al., 2009). Furthermore, children become more empathic, and self-aware through their participation (Wong et al., 2010).

Research suggests that child participation usually leads to enhanced resilience (Chu, DePrince, & Weinzierl, 2008; Peek, 2008; Pfefferbaum et al., 2018) and better family preparedness (Amri, Haynes, Bird, & Ronan, 2018; Mudavanhu et al., 2015; Peek, 2008; Ronan et al., 2016). This study asserts the need to continue involving children actively in DRR, to make their voice heard since they understand issues affecting them best (Peek, 2008). Child participation has numerous positive mental wellbeing outcomes such as reduction in overall anxiety, increased confidence, interest in participation in community activities, being assertive, and improved communication skills to name a few.

A strength of this study is that it provides a multi-stakeholder perspective on child participation in a vulnerable community. However, mental health outcomes and resilience could have been a larger focus and included the use of standardised measures. Nevertheless, through this study, we are able to confirm the potentially positive role child engagement plays in children's mental wellbeing and resilience.

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8.3 Implication of Chapter 8 on this PhD

Paper 5 presented in this chapter of the thesis shows that mental health is not just a priority after a disaster, but can be an important element in disaster preparedness. We saw mental health gains in the form of decreased anxiety related to disasters in children. This also reassured the parents and the community members that they could, in future hazard events, focus on evacuation, health and safety, while knowing that their children not only know the plan during such a time, but also are able to cope better than they did last time.

8.4 Summary of Phase 3 of this PhD thesis

Phase 3 of this PhD thesis shows that not only is child participation to co- develop an intervention possible but also, that this intervention is acceptable and feasible for children to deliver the DRE intervention acceptably and that the intervention was also received well (Chapter 7). Furthermore, this intervention, through child participation, had an impact beyond disaster preparedness, it potentially increased a sense of mental wellbeing and resilience in the children.

Chapters 7 and 8 fill some of the gaps in the peer-reviewed literature where children play a vital role in DRR messaging through their active participation in the developing and delivering of a DRE intervention. These chapters add to the growing evidence of the benefits of child participation in important decisions that matter to them, keeping in line with the UNCRC's recommendation. The next chapter (9) will discuss the PhD thesis in its entirety.

Chapter 9: Integrated Discussion and Conclusion

9.1 Introduction

This chapter discusses the findings of this PhD research, their limitations, and their implications. It highlights the contribution this thesis makes to the field of Child-Centred Disaster Risk Reduction (CCDRR). Furthermore, this discussion considers the implications of the main findings. It explores these findings concerning the broader goal of the field, namely to ensure increased child participation in DRR. This chapter also includes a discussion of the strengths and limitations of the current research. Finally, this chapter concludes with a discussion about opportunities and consideration for future research.

9.2 Contributions of this PhD research to DRR research and practice

The overall aim of this research was to co-develop a disaster resilience education intervention with and for children who were affected by the 2015 South Indian floods and the 2016 cyclone Vardah. This research also explored the acceptability and feasibility for developing DRE intervention. A participatory approach guided the entire research process from determining the research questions to designing studies to answer those questions to the implementation of the intervention. Children who participated in this research were vulnerable to hazards not only due to their age, but, also because they lived in inner-city slums of Chennai, India which are frequently neglected communities in DRR research and or practice dialogue. DRR research and or practice dialogue frequently neglects these communities. Thus, we specifically wanted to ensure that the intervention developed during this research remained relevant at the end of this PhD. Since children were co-developers of the intervention, relevant knowledge and skills related to the intervention and its delivery remains with the children as well as with the participating NGO for their continued use.

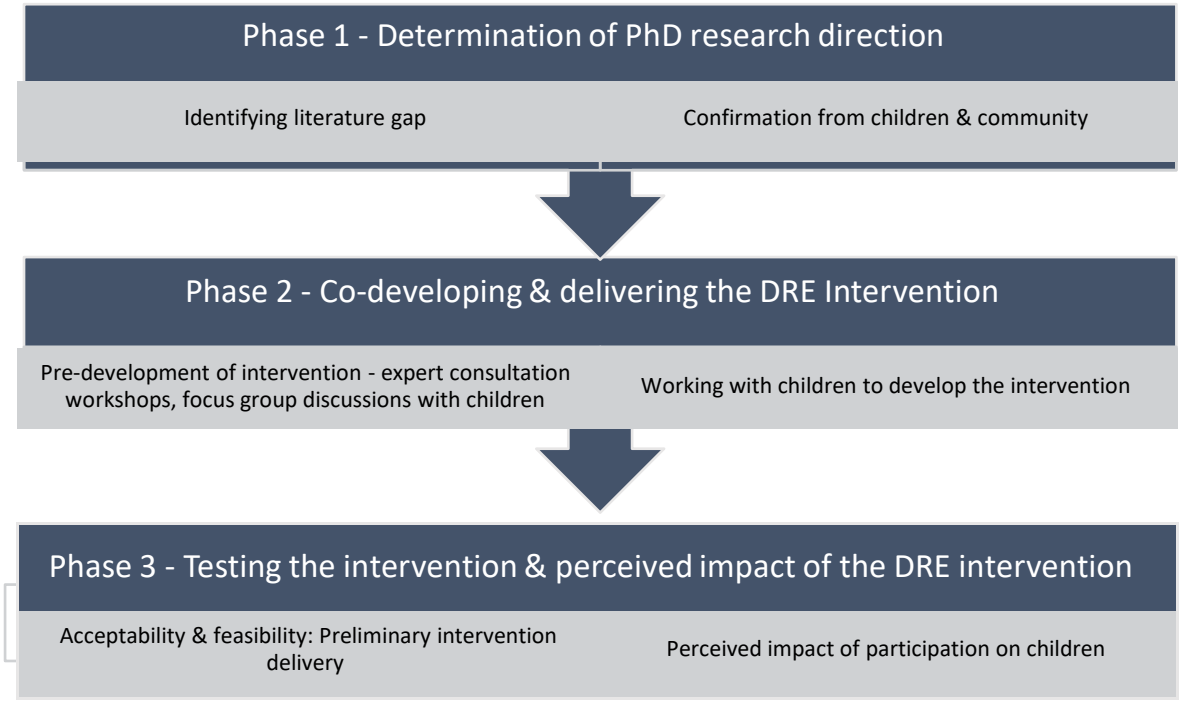
The need for child engagement in Disaster Risk Reduction (DRR) activities (Pfefferbaum et al., 2018) helped develop the aims for this research. Research

encourages child participation in DRR activities; both children and households tend to benefit from children's participation in DRR activities (Amri, Bird, Ronan, Haynes, & Towers, 2017; K. Ronan et al., 2016), yet, it has not translated into action or more in-depth research worldwide or in India (Jörin, Steinberger, Krishnamurthy, & Scolobig, 2018; Krishna, Ronan, & Alisic, 2018). Furthermore, children remain seen as passive recipients of care or support during and in the aftermath of an emergency. At the same time, research suggests that children, when involved in DRR activities, can actively and positively contribute to their, their family's and community's preparedness to hazards (Amri et al., 2017; Amri, Haynes, Bird, & Ronan, 2018; K. Ronan et al., 2016; K. R. Ronan, Alisic, Towers, Johnson, & Johnston, 2015). Thus, this PhD research also aimed to give children a voice in their own DRR journey and provide them with adequate and appropriate support and tools to help themselves, their family, friends and their communities to prepare for hazards without having to wait for 'adult' intervention.

The specific research questions for this PhD research related to children and communities' lived experience during the 2015 South Indian floods, understanding their needs and finally co-developing and delivering a Disaster Resilience Education for, to and by children. We also examined the process of intervention development and delivery, barriers and facilitators for these processes, its acceptability, feasibility, and its perceived impact on children's wellbeing and resilience.

This PhD research was conducted using a multi-phase approach that documented the overall process of deciding the research questions (Phase 1), co- developing the DRE intervention (Phase 2) and exploring the intervention's acceptability and feasibility from a multi-stakeholder perspective and impact of participation on children's mental wellbeing (Phase 3) as illustrated in Figure 9.1.

Figure 9.1: Phases and activities in each phase of this PhD research



The areas affected by the 2015 South India floods in Tamil Nadu, India provided the location for this PhD research. For the first phase of this PhD research, during the process of determining the research direction and eventually specific research questions, data were collected from both urban and rural parts of Tamil Nadu to identify a broader perspective. Once the research questions were determined, research began with communities in the inner-city slums of Chennai, the capital city of Tamil Nadu.

I started my PhD studies in 2016, about a year after the 2015 South Indian floods. As a trained mental health clinician interested in working with vulnerable children and families in low- and middle-income countries, I wanted to choose a research topic that would be applicable and meaningful to my interest group. Since a flood had occurred in the recent past and I knew that many communities, especially those who lived in poverty suffered enormously. I thought working with them to create something impactful would be beneficial for them and reflect a good topic choice for my PhD research. As such, a participatory approach guided my PhD thesis, the children and communities I was to work with, had a significant influence on the direction of the research undertaken through this PhD.

When we did the preliminary research and needs assessment within the communities what became clear during the thesis was that, the community members I spoke to, preferred that the children in the communities learn practical tips to prepare for disasters, to any other mental health related intervention. Although mental health is an important factor in their overall wellbeing and resilience, research suggests that when basic human needs such as food, education, and safe living space are insecure, one does not tend to have the privilege to think about mental health (Patel & Kleinman, 2003). So, it is unsurprising when people in poverty suffer from more mental ill-health and lack of access to good mental health services.

9.2.1 Main findings of Phase 1

This Phase of the thesis answers research questions 1 and 2 with the primary aim to determine this PhD's research direction and is made up of Chapters 2, 4 and 5. Two steps were involved – identifying research gap within the literature and consulting the communities who would be involved in the research to identify their needs to ensure that this PhD research would be immediately applicable and useful to the communities involved. This PhD thesis, much like previous research in this field, highlights the need (Pfefferbaum, Pfefferbaum, & Horn, 2018) to involve children in disaster risk reduction activities.

Findings from a systematic review on how children and families living in poverty in low- and middle-income countries in the Asia Pacific region cope with disasters conducted as part of this PhD emphasized the role of socioeconomic, sociocultural factors and indigenous knowledge play in their ability to cope with disasters. We found that the health of family members as well as their financial status, which played a crucial role in their ability to cope with and recover from disasters. The review also found that when discussing coping strategies, most studies focused on strategies related to finances, whilst strategies related to health, notably mental health were lacking. This is understandable, considering finances were a fundamental source of stress for families across studies examined in this review, and families involved in this research demonstrated this stress throughout this PhD research. The review

also highlighted the difficulties members of minority groups, and women had in receiving relief materials. Women and girls are especially vulnerable to exploitation and domestic violence in these situations (Chew & Ramdas, 2005a; Jones-DeWeever, 2007; WHO, 2002). Stigma, shame, corruption, and unfair practices (e.g., discrimination by aid providers) created further barriers.

Another crucial issue this review highlighted was the woeful lack of information on the perspectives of children and youth in a disaster situation. This lack of representation of children is common, and even though, there is growing evidence about the advantages of including children as active participants in disaster risk reduction (Ronan & Johnston, 2005; Ronan et al., 2010; Wachtendorf et al., 2008) response, and recovery dialogue. Further child-centred research focusing on those who live in complex situations like poverty represents a priority. Since we identified that children are a neglected group and even when included, their participation tends to be tokenistic, in the DRR literature, our next step was to plan a research project that involves children actively to ensure we addressed the gap in the literature. The identified gap in the literature, required the communities to confirm the need for the study.

To ensure an independent opinion by the communities, we conducted preliminary studies in those communities using a participatory approach. We conducted interviews with community members to understand their and families' lived-experience during and in the aftermath of the floods. We also interviewed and conducted focus group discussions with staff members from the NGOs to get their perspective since they worked closely within the study communities and many of them even living in the study communities. This qualitative study had two large data components – children's experiences and the research direction according to the adults of the community and community members' experiences and needs during and in the aftermath of the floods. The results from this consultation with the communities confirmed the need for these communities and children to be involved in DRR.

The primary outcomes of this phase reaffirmed issues the literature review had raised about the:

a. Lack of involvement of children and communities, especially those that experience complex vulnerabilities in DRR
b. Impact of factors such as poverty, marginalization, high levels of illiteracy has on families' ability to prepare for, cope with and recover from disasters.
c. Need for children to learn disaster preparedness via their own participation

Parents reported feeling helpless and fearful for the safety of their children, especially for the girls. They found it hard to reassure children and care for them during the floods since they did not know what to do to prepare for a flood. Families did not have food or drinking water stored, which put an immense strain on the families since they were already experiencing poverty. Children were also a source of pride for parents when they saw that the children participated in distributing aid that was coming into the community or they were helping with evacuation efforts. This is another example, which shows how eager children are to engage with and participate in their communities and the potential positive impact they can have through participation.

Child participation was supported by parents too as they identified that if their children knew how to prepare for floods, they might have fared better during this flood and thus had a better chance of recovering from floods. The staff members of NGO, like parents, also identified that working with children in teaching them about disaster preparedness in a way that involves them actively would be a good research direction to pursue. This process finalized the next steps of this PhD research and the rest of the research questions, starting from understanding children's experiences and their thoughts on next steps related to that.

A critical outcome of this phase determined that previous research illustrated global recognition for, involving children in DRR as an important factor in household and community preparedness. Previous research (Bild & Ibrahim, 2013; Carr, 2018; Chan et al., 2020; Gibbs, Ireton, et al., 2018; Krishna, Ronan, et al., 2018; Mitchell et al., 2009; Mudavanhu et al., 2015; Muzenda- Mudavanhu, 2016; Peek, 2008; Pfefferbaum et al., 2018; Ronan et al., 2015; Ronan et al., 2015) has asserted the need for children to be involved in DRR actively for children to be

protected and for added benefits to the community at large. Benefits of involving children in DRR activities go beyond disaster preparedness and recovery. Children who have been involved in DRR have reported increased confidence, willingness to take part in positive activities and increased life skills (Haynes & Tanner, 2015; Mwanga, Jensen, Magnussen, & Aagaard-Hansen, 2008; Nicotera, 2008; Simovska et al., 2012).

Although there has been growing support for the involvement of children in DRR, the involvement is yet to be more active, with participation being less tokenistic and passive. Research suggests that children being passive participants in DRR is not as helpful. Learning theory also supports that 'doing' is the best way for retaining any learning. The participants in this study also wanted their children to learn disaster preparedness, and although they did not really make a distinction between active and passive participation, they focused on practical tips and actions that the children could actually take to prepare for disaster.

9.2.2 Main findings from Phase 2

This phase of research answered research questions 3 and 4. Since our preliminary research determined that involving children was the next step, we went back to our study community to talk to children and understand their experiences and needs. As a first step, after obtaining consent from parents, we conducted focus group discussions with the children to understand their experience during and after the flood. We also asked them what would have made coping and recovery better for them and what they thought they could do to help themselves and their families. Analysing children's focus group discussion data made it clear that children, like their parents, wanted to have more of a voice in DRR activities within their family and communities. Furthermore, children reported that they wanted to 'do more' than waiting for their parents or other adults to help the community. When we explored more about how their involvement would look like and discussed our ideas too, the children were enthusiastic about making their role more active – by participating in the development and delivery of a DRE intervention.

Prior to the intervention development with children began, and throughout the intervention development process, we consulted the literature and experts to ensure the intervention included things that were critical for success. One of the remarkable things during this process was the lack of empirical studies related to DRE interventions; there were only a few studies that tested DRE interventions. Even fewer studies described the DRE intervention or even the process of developing such an intervention. Hardly any studies that detailed children's role in the development of a DRE intervention meant for them, most of the time, they were recipients of those interventions, putting them back into the position of a passive recipient. Thus, this phase not only attempts to fill the gap in the literature by detailing the process of co-developing and delivering the intervention but, it also attempts to put some of the power and ability to prepare for disasters back in the hands of children.

Children have a definite right to participate in decision making about issues that directly affect them, regardless of their race, religion, abilities, location and socio-economic condition. The UN Conventions on the Rights of Children (UNCRC, 1989) protects this right. Previous research has supported child participation in DRR (Acharya, 2009; Amri et al., 2018; Haynes & Tanner, 2015). It has also identified several benefits including increased ability to communicate effectively, improved critical thinking, enhanced decision-making skills, as well as empowering them to become leaders in the future (Amri et al., 2018; Haynes & Tanner, 2015). Children have different needs compared to adults, and many of them go unaddressed if children themselves do not play a role in the development and delivery of DRR messages. Another benefit of child participation is that when children are involved in DRR, the eventual DRR messaging will also be age-appropriate and accessible language, free of jargon and technical aspects that make it challenging to understand. Although there are a few studies that have provided evidence related to child participation in DRR (Ronan et al., 2010), there is still a lack of scientific evidence on how child participation would work in a real-world setting, and how child participation contributes to disaster preparedness for them, their families and their larger communities. This PhD fills some of that literature/ research gap by providing a perspective on the needs and experiences of flood-affected children and communities who were also faced with

multiple complex vulnerabilities, and reporting the process of co-developing and delivering a DRE intervention that was developed over the course of this PhD.

In order to equip children with basic understanding of disasters, our first few meetings were discussing concepts related to disasters – such as risk, vulnerability, causal factors of floods and cyclones (the two hazards that are common to the area) and brainstorming ideas on how one could communicate what was learnt to others. Children's enthusiasm in their participation stood out during the intervention development process. Once the children knew some of the basic concepts, through brainstorming, we discussed the many ways to communicate these concepts to their peers. Deciding what the intervention would look like, its components, its delivery as a team effort were among crucial decisions discussed. Understanding vulnerabilities, assessing household risk, and how parts of the community, create a household preparedness plan were critical components of the DRE intervention, designed for five sessions through active and interactive methods. The methods used in intervention delivery were guided by learning theory and children's report on what they and their peers would find engaging, in addition to relevant literature and experts' views. As identified previously, the literature on children's involvement in DRE interventions is scarce. Description of intervention alone is inadequate (Wells, Williams, Treweek, Coyle, & Taylor, 2012), and needs a detailed description of the development process of the intervention. We have contributed towards bridging this gap by providing a detailed roadmap of the intervention by describing each intervention and its elements including how to deliver each session.

Furthermore, Hoddinott (2015) considered that intervention development process is usually a 'blackbox' of intervention design (Hoddinott, 2015). Qualitative synthesis on the process of intervention development and the elements of the intervention would be useful in ensuring that it can be replicated, assessed and further modified for future use and to minimize 'research waste' (Hoddinott, 2015). Riley and colleagues (2008) argue that lack of reporting on the intervention development process in a standardised manner might be the hurdle that prevents replication, testing and eventually practice and implementation of interventions. Although author's name recognizes the need for reporting the process of intervention development, no uniformly accepted method exists for reporting the

process of intervention development either. Thus, we used GUIDED (Duncan et al., 2020) as a framework to report the intervention development process in the hope that this structured reporting will not only help with the implementation of the intervention in the future, but aid in replication studies, as well as help, modify the intervention as necessary for use in the communities.

9.2.3 Main findings from Phase 3

Phase 3 provided an answer to research question 5 and secondary research question 6. Children in vulnerable communities co-developed the DRE intervention. To explore the acceptability and feasibility of the co-developed DRE intervention, we conducted interviews and focus group discussions with children who co-developed the intervention; children who received the intervention; parents of both sets of children; community member bystanders who observed the sessions being delivered; and the staff members of the collaborating NGO who were present throughout the process intervention development and delivery. Although the DRE intervention has five sessions, the process data in the form of interviews and focus group discussions were conducted after two sessions due to practical and time constraints. The results from the interviews and focus group discussions suggest that children who developed the intervention enjoyed their role. It empowered them to have a ‘say’ in how they, their family and their community prepared for disasters. Meeting their friends, being able to contribute to their, their families and peers’ ability to prepare for disasters contributed to them feeling empowered.

Learning about disasters and ways to prepare for them to create an education programme that they were going to deliver themselves made children proud of their contribution as well as increased their self-confidence. Nearly all the stakeholders, especially the parents reported that safekeeping and packing their most important documents, ensuring all electrical appliances are off, putting away dangerous chemicals or appliances, and packing dry food, and potable water were some of the preparedness activities learned through this DRE intervention. Children who developed the intervention also received a short first aid training along with a first aid kit, and they reported that this was one of the most useful things they learned overall and thought that these skills would come handy all

their lives. The interactive methods used in the development and delivery of the intervention ensured the active engagement of children from both groups. Parents of children who received and developed the intervention reported that it was useful and that they thought children would benefit. The parents whose children participated in the development of the intervention reported that they found that their children were more confident, more open to participating in extracurricular activities compared to before their participation, not too anxious about floods anymore.

The children who received the intervention and their parents who observed the delivery of the intervention reported that they appreciated children delivering the intervention and its interactive methods. However, this was also a barrier since children who delivered the intervention found it hard to engage the recipients actively (children from anther neighbourhood) were quiet or just not engaging the way they hoped. Likewise, children lacked the flexibility to respond to audience questions. More importantly, staff members from the collaborating NGO reported that the intervention was not only useful for these communities, but that they looked forward to using the intervention beyond the time and geographical boundaries of this PhD research. They were also happy that continued use of the intervention did not depend on the researchers being present to deliver the intervention in any way, thus, making the intervention implementation easier for them.

One of the reasons for positive experience in implementing the DRE intervention might have been the fact that it was participatory. It is common that when children are involved in DRE, educators tend to treat them as passive recipients of DRR education. The research identified that a lack of parental and teacher buy-in were identified as common barriers to successful DRR implementation (Amri et al., 2017; Amri et al., 2018). However, by adopting a participatory approach, we ensured to get buy-in from children, parents and NGO staff members. Furthermore, participatory methods ensured the inclusion of the voices of marginalised children.

9.3 Contributions, Strengths, Limitations, and future directions of this PhD research

9.3.1 Strengths of and contributions to the literature by this PhD research

The lack of children's voice in DRR has been widely acknowledged (Amri et al., 2018; Gibbs et al., 2013; Hore et al., 2018; Krishna, Ronan, et al., 2018; Mudavanhu et al., 2015; Muzenda-Mudavanhu, 2016; Pfefferbaum et al., 2018). Authors noted an increase in calls to include children in disaster preparedness activities (Pfefferbaum et al., 2018; UNISDR, 2015). This PhD research brings children's voices, especially those children who face complex vulnerabilities including high levels of poverty, parental illiteracy, perceived marginalisation and discrimination, to the attention of the scientific community. Moreover, this research not only describes the lived experiences of vulnerable children and communities, but it also bridges some of the gap, lack of child representation, in disaster preparedness prevalent in these communities.

This PhD research is unique in the context in which I carried it out. This research gave voice to the seldom heard and severely disadvantaged communities. Research shows how children can lead the development and delivery of a DRE intervention. The intervention primarily consisted of interactive strategies to engage other children and communities in DRR is another factor that makes this PhD research unique. Since children led the intervention development, the intervention was interactive, fun, engaging, didn't have jargon, and was culturally appropriate. Since I knew the language and the culture, I also brought unique cultural knowledge along with skills to engage with children and communities, which facilitated intervention development and delivery. Through this PhD, I hope that we have put some power and decision making back into the hands of children, for them to have a say in their own, their families', and communities' disaster preparedness.

A specific benefit for children leading the development and delivery of the intervention means that this intervention can continue without needing to have the

researcher present during the process. Intervention delivery can happen independently of the researcher, which is not very common in research. Often, an intervention tends to use specialised material or equipment of specific skill and assumes that children lack that 'skill'. However, this PhD research proved otherwise, similar to Gibbs and colleagues' study (2018), we found children engaging, knowledgeable in their own capacities and enthusiastic about helping others. The DRE intervention had a strong basis in theory and previous research and grey literature to ensure that the intervention was evidence-based. More importantly, true to my hope, when I started my PhD, this research was immediately applicable and impactful for the children and communities that were already vulnerable.

9.3.2 Limitations of this PhD research

This PhD research also has many limitations. Due to logistical and practical reasons, we chose to engage with the communities first. We did not engage with children directly until much later. For example: chapter 5 discusses children's experiences through the perspective of their adults, however, understanding and reporting children's lived experiences from their own perspective would have been better and more inclusive aligned to our chosen methodology – the participatory approach.

More time for development and delivery of the intervention, to include an all-hazard approach, could make this PhD research more generalisable. Moreover, this intervention could have included evacuation drills, practiced as part of a session. However, this was not possible due to undertaking the programme, in isolation with children, knowing that each of their houses had different layout, and that this intervention happened in the community. Nevertheless, knowing this skill could be of practical use to the children.

Although we were able to develop the intervention and deliver two sessions, oftentimes, the children didn't feel confident delivering the session and needed the facilitator to help during intervention delivery. However, we couldn't transfer those skills to the staff members of the NGO since they were not present for all the meetings where the intervention was developed. So, the staff members didn't know

specific cues of children struggling or forgetting the intervention. This led to children being anxious about intervention delivery. However, in the two sessions I was present at, while this 'not knowing what to do' posed a challenge, children tended to overcome it with cues from the facilitator or with encouragement from the NGO staff members. Thus, a limitation to truly understanding the acceptability and feasibility of the DRE intervention developed through this PhD is the collection of relevant data after delivering only two of the five planned sessions. I carefully considered the decision to collect data earlier than planned. However, time and practical constraints of a PhD determined the time of data collection. This time constraint can also reflect a barrier to adhering to the ethos of participatory approach. However, we made efforts, as evidenced by reports from all the stakeholder groups to ensure that children's participation was voluntary, and that the children determined and the pace of this intervention development and delivery.

Considering participatory approach provided the basis for this PhD research, it would have been more beneficial if we had included community members and parents in the development and delivery of the intervention. Logistical issues such as scheduling a time when parents and community members could engage was an issue – since they were usually busy and often held more than one job to be able to stay afloat. Furthermore, culturally, 'elders' expect children to listen to them and I was concerned that parents' extensive involvement might undermine children's ideas. However, community members' involvement might have led to a stronger buy-in, which is crucial if this intervention were to be scaled-up and implemented.

9.3.3 Potential future research directions

Future research must consider the intention inclusion of children from the beginning of the study. Furthermore, future research should consider reaching out and including children who are further disadvantaged and left out, such as, children with disabilities, to ensure adults hear their voices, and consequently, the DRE intervention relates to them as well.

Future research to study how to involve more communities in DRR would better support their children in participating in DRR activities. Future research to examine the processes, barriers and facilitators of DRE intervention delivery without the facilitator being present would add further benefit to these communities.

Mental health and wellbeing are crucial aspects, especially in a scenario where a traumatic event, such as a disaster, impacts children and families. Another critical future research direction could include more elements related to mental wellbeing and resilience. Our preliminary exploration about the impact child participation has, on their mental wellbeing shows positive effects. Children in these communities weather more disadvantages than their peers who do not live in poverty or in conditions that these children. Disadvantaged children are exposed to substance abuse (as indicated by HESPER earlier on in this thesis), and domestic violence often. However, they spend less time with their parents and go to understaffed schools which often act as protective factors against mental ill health. Thus, including basic wellbeing strategies in interventions such as the one explored in this PhD thesis is critical. Future research needs to focus on including these basic mental wellbeing skills and provide children with a toolkit to deal with many situations that can be potentially traumatic, including, but, not limited to disasters.

While it was not feasible to include quantitative data regarding the potential effectiveness of the DRE intervention in the current thesis, further data collection would be helpful to understand better the impact of the intervention and to facilitate further implementation and scale-up (and potentially replication elsewhere). Follow-up data collection with both groups of children to explore the extent of intervention retention and understanding the adaptations necessary to make the intervention scalable and adaptable in a different cultural or socioeconomic setting would be a great next step.

9.4. Implications of this PhD Research

From the start, this PhD thesis aimed for real-life applicability. The successful development and delivery of the intervention provides an example of how organisations can involve children in DRR activities to not only empower

them, but also, have their families and communities prepared better for disasters. Furthermore, this thesis also describes an intervention that can be adapted and used in different settings or contexts, especially in contexts where families have multiple vulnerabilities. If other use only parts of the intervention, for example, if the programme developers want to use one of the skits, then, they only need to use that part, as every session, including the various elements, has detailed descriptions for others to follow.

From a research perspective, this PhD thesis provides an example of how children can play the role of co-researchers and take a more active stance in matters that impact them – such as disaster preparedness. It shows the role children, communities and NGOs can play in their own, their families' and community's disaster preparedness. This PhD thesis also provides ideas for collaboration with local NGO partners to involve children and communities. More importantly, this PhD thesis uses innovative methods by involving NGO staff to collect data and this shows how important partnerships are while doing research in settings where access to communities is hard for multiple reasons.

One of the most important contributions and implications of this PhD research is the participation of children in issues that affect them. Children's participation demonstrates one of the key elements in this PhD research, which exemplifies children's roles in research. This thesis focused particularly on DRR messaging concerning children with complex vulnerabilities in inner-city slums of Chennai, India. This research provides an example for advocating for child participation in not just DRR, but, also in other fields and issues that matter to them – climate change, health related topics, and education, among many.

All stakeholders involved in the programme received the DRE intervention well. Through our collaboration with the University of Madras, the Government of Tamil Nadu expressed interest in the intervention, for its potential adaptation for implementation across schools in the state. An implementation workshop was organised with some state officials and schools where the children who developed the intervention were meant to present snippets of their work. However, heavy rains, and with a potential for flooding resulted in the cancellation of this workshop. Despite the

cancellation, the government's interest in the DRE intervention proves the need for such interventions. Furthermore, it also indicates the openness of governments, schools and communities to not only learn DRR, but also be involved and provide a platform for children to empower and equip themselves with DRE. This openness reflects a welcome change to the more common stance of passive children unable to have a 'say' in their disaster preparedness, a matter that is important to them.

9.5 Conclusion

This PhD research focused on bringing children's voices to the forefront in DRR scientific literature, in addition to co-developing and delivering a DRE intervention with, for and by children in the inner-city slums of Chennai, India. Throughout this thesis, the literature and research results acknowledge the lack of children's voices, especially from marginalised children in LMICs. This PhD research shows how children were empowered to participate in their, their families' and communities' disaster preparedness strategies, especially when these communities often felt neglected and ignored regarding these issues. This thesis fills the gap in the peer-reviewed literature and recognizes the importance of children leading and participating in DRR, and its development and delivery methods. It also provides a new template for engaging children actively in the development and delivery of a DRE intervention to their peers and their families. I hope that communities continue to engage their children in DRR activities and that future research focuses on furthering the DRE intervention developed in this research by using an all-hazards approach, including mental wellbeing and resilience as important elements.

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Appendices

1. Search strategy used to find relevant papers: Systematic Review 2.

Search Terms for the present study
1. disaster* or "natural disaster*" or "mass casualty incident*" or hazard* or flood* or fire* or cyclon* or earthquake* or tsunami* or "tidal wave*" or landslide* or drought or typhoon or hurricane or "environmental disaster*"
2. cope* OR copin* OR resilien* OR adapt* OR "Community resilien*"
3. poverty OR impoverished OR unemployed OR "non-employed" OR deprived OR disadvantage* OR disparit* OR underprivilege* OR inequit* OR inequalit* OR needy OR "resource poor"
4. Afghanistan or Australia or Bangladesh or Bhutan or "Brunei Darussalam" or Cambodia or China or "Cook Islands" or Korea or Fiji or India or Indonesia or Iran or Japan or Kiribati or Lao or Malaysia or Maldives or Micronesia or Mongolia or Myanmar or Nauru or Nepal or "New Zealand" or Pakistan or Palau or "Papua New Guinea" or Philippines or Samoa or Singapore or "solomon Islands" or "Sri Lanka" or Thailand or "Timor-Leste" or Tonga or Tuvalu or Vanautu or Veitnam or "Asia Pacific"
5. 1 AND 2 AND 3 AND 4

2. Inclusion and exclusion criteria for papers included in the systematic review

Inclusion Criteria
The study must: 1. report coping strategies employed by children or families in disasters - related to health or psychosocial aspects of children or families. 2. examine coping strategies employed by children and families living in poverty 3. be from the Asia Pacific region (list of countries found: http://www.ohchr.org/EN/Countries/AsiaRegion/Pages/AsiaRegionIndex.aspx) 4. Has to be a peer reviewed empirical article
Exclusion Criteria
Studies that are not: 1. evaluating coping strategies by children and families in disasters 2. evaluating these strategies in people who live in poverty 3. evaluating health or psychosocial factors related coping. For example: if the paper is exclusively discussing agricultural or forestry or coping is primarily about biological factors (plants) or land, then, such studies are to be excluded. 4. in the Asia Pacific region (any country not included in this list is to be excluded: http://www.ohchr.org/EN/Countries/AsiaRegion/Pages/AsiaRegionIndex.aspx) **5.** peer-reviewed empirical literature. E.g. theses, conference papers, editorials and reports.

Monash University Human Research Ethics Committee

Approval Certificate

This is to certify that the project below was considered by the Monash University Human Research Ethics Committee. The Committee was satisfied that the proposal meets the requirements of the *National Statement on Ethical Conduct in Human Research* and has granted approval.

Project Number: 0389
Project Title: Disaster, Poverty, and Coping
Chief Investigator: Dr Eva Alisic
Expiry Date: 19/12/2021

Terms of approval - failure to comply with the terms below is in breach of your approval and the *Australian Code for the Responsible Conduct of Research*.

1. The Chief Investigator is responsible for ensuring that permission letters are obtained, if relevant, before any data collection can occur at the specified organisation.
2. Approval is only valid whilst your hold a position at Monash University.
3. It is 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 letterhead and the Monash University complaints clause must include your project number.
6. Amendments to approved projects including changes to personnel must not commence without written approval from MHUREC.
7. Annual Report - continued approval of this project is dependent on the submission of an Annual Report.
8. Final Report - should be provided at the conclusion of the project. MUHREC should be notified if the project is discontinued before the expected completion date.
9. Monitoring - project may be subject to an audit or any other form of monitoring by MUHREC at any time.
10. Retention and storage of data - The Chief Investigator is responsible fo the storage and retention of the original data pertaining to the project for a minimum period of five years.

Thank you for your assistance.

Professor Nip Thomson

Chair, MUHREC

CC: Revathi Nuggehalli Krishna, Prof. Kevin Ronan

MONASH University

Project Number: 2016-0389-1224

EXPLANATORY STATEMENT

Families affected by Chennai Floods, 2015

Project: Exploring the experiences of families and staff of community organisations before, during and after Chennai floods in late 2015.

You are invited to take part in this research. Please read this page before deciding whether or not to participate. If you would like more information about any part of this project, you can contact the researcher:

Mrs. Revathi N. Krishna	**Dr. Eva Alisic**	**Prof. Kevin Ronan**
Monash University Accident Research Centre (MUARC) **Monash University**	Trauma Recovery Lab MUARC Monash University	Foundation Professor in Psychology & Chair in Clinical Psychology, Central Queensland University
Phone: +61 399051255 **Email:** **revathi.nuggehallikrishna@monash.edu**		

What does the research involve?
We are researchers from the Monash University Accident Research Centre and we would like to understand the experiences of families preparing, coping and recovering from floods of December 2015 while living in poverty.

If you agree to participate, you will be invited to speak about your experiences with Mrs. Revathi N. Krishna. She will ask you questions about your experiences before, during and after the floods in Tamil Nadu late 2015. The discussion can range between 45 – 90 minutes, depending on your availability.

Why were you chosen for this research?
We contacted community leaders and community organisations and since you were personally affected by the floods, you were invited to participate. You may have also received the invite because one of your other community members or one of the staff of community organisation who worked in your community suggested we contact you.

Consenting to participate in the project and withdrawing from the research
After you have read this statement, you will be asked whether you agree to participate in a discussion about your experiences during the floods late 2015. If you do not want to participate, you are free to say no. If you want to stop the discussion at any time, or to skip a question, you can. You can also withdraw from the research at any time before the final report is published. If you do not want to participate, this will not have any negative effects for you, your family or for the organization you work for.

Monash University Accident Research Centre (MUARC)
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E: muarc-enquiry@monash.edu
www.monash.edu/muarc
ABN 12 377 614 012

Project Number: 2016-0389-1224

Possible benefits and risks to participants

We do not foresee any physical risks from participating in this study. However, we will be talking about your experiences during the floods late 2015 and some might find talking about such an experience difficult.

There are no financial risks or benefits to participants. For example, participating in this research will not have any effect on any relief material you might be getting. We hope that the research will benefit families and communities like yours in the future, especially children to prepare, cope and recover from disasters like the floods in 2015.

Confidentiality

The researcher will take notes during the discussion. If you agree, she will also audio-record the discussion. No identifying information will be used for writing the report or publications. Only RNK, her supervisors and collaborators will be able to access the data from your discussions.

Storage of data

The notes and recordings will be securely stored at Monash University in Melbourne, Australia. Only the researcher and her colleagues will be able to access them.

Use of data for other purposes

The notes and recordings from your discussion may also be used in future related research. However, your name and any details that could be used to identify you will be deleted from the notes and will not be used any reports or publications produced as part of this research.

Results

An oral presentation will be made to include all participants detailing the results of the project. If the results are published, the links to the paper will also be provided. A one page summary of results from our discussions will be made available via the community organisations if you wish.

Complaints

If you have any concerns or complaints about the conduct of the project, you are welcome to contact the:

Executive Officer, Monash University Human Research Ethics (MUHREC):
Executive Officer
Monash University Human Research Ethics Committee (MUHREC)
Room 111, Chancellery Building E
24 Sports Walk
Research Office
Monash University VIC 3800
Tel: +61 3 9905 2052 Email: muhrec@monash.edu Fax: +61 3 9905 3831

Thank you,
Revathi N. Krishna
PhD Student
Monash University Accident Research Centre,
Monash University, Melbourne, Australia

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www.monash.edu/muarc
ABN 12 377 614 012

Project Number: 2016-0389-1224

List of organisations that offer free mental health services:

1. SCARF: R/7a , North Main Road, Anna Nagar West Extension, Kailash Colony, Sector A, Anna Nagar West Extension, Chennai, Tamil Nadu 600101, India

2. The Banyan: 6th Main Road, Mugappair Eri Scheme,
   Mugappair west, Chennai – 600037
   T: 044 – 26530504, 26530599

Note: The Banyan's rural community mental health project also provides free counselling services in select local council areas (called Panchayats in India).

3. Arunodhaya: 15, Bazaar St, Pudumanaikuppam, Royapuram, Chennai, Tamil Nadu 600013, India
   T: +91 44 4263 2264

4. PHC (relevant PHC closest to the community and based on the preference of the family/ community member): http://nrhmtn.gov.in/huds.html#tpress [List provided]

Note: PHCs provide health services, but, on select days they also provide mental health services.

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MONASH University

Project Number: 2016-0389-1224

EXPLANATORY STATEMENT

Staff of Community Organisations supporting the 2015 flood-affected communities

Project: Exploring the experiences of families and staff of community organisations before, during and after Chennai floods in late 2015.

You are invited to take part in this research. Please read this page before deciding whether or not to participate. If you would like more information about any part of this project, you can contact the researcher:

Mrs. Revathi N. Krishna	**Dr. Eva Alisic**	**Prof. Kevin Ronan**
Monash University Accident Research Centre (MUARC) **Monash University**	Trauma Recovery Lab MUARC Monash University	Foundation Professor in Psychology & Chair in Clinical Psychology, Central Queensland University
Phone: +61 399051255 Email: revathi.nuggehallikrishna@monash.edu		

What does the research involve?
We are researchers from the Monash University Accident Research Centre and we would like to understand the experiences of families preparing, coping and recovering from floods of December 2015 while living in poverty. We are also interested in your perspectives as staff of community organisations who worked in these affected communities throughout the flood cycle.

If you agree to participate, you will be invited to speak about your experiences with Mrs. Revathi N. Krishna. She will ask you questions about your experiences before, during and after the floods in Tamil Nadu late 2015. The discussion can range between 45 – 90 minutes, depending on your availability.

Depending on your availability, some of you might also be invited to participate in a focus group discussion that aims to understand the communities' and research needs within the current scenario. These discussions are not likely to take more than 60 -75 minutes and will happen on the date, time and place that is most convenient to the participants.

Why were you chosen for this research?
We contacted community organisations and since you worked in the affected areas during the floods, you were invited to participate. You may have also received the invite because one of your colleagues suggested we contact you.

Consenting to participate in the project and withdrawing from the research
After you have read this statement, you will be asked whether you agree to participate in a discussion about your experiences during the floods late 2015. If you do not want to participate, you are free to say no. If you want to stop the discussion at any time, or to skip a question, you can. You can also withdraw from the research at any time before the final report is published. If you do not want to participate, this will not have any negative effects for you, your family or for the organization you work for.

Monash University Accident Research Centre (MUARC)
Monash University
Building 70, 21 Alliance Lane
Clayton Campus 3800, Victoria, Australia
T: +61 3 9905 4371
E: muarc-enquiry@monash.edu
www.monash.edu/muarc
ABN 12 377 614 012

MONASH University

Project Number: 2016-0389-1224

Possible benefits and risks to participants

We do not foresee any physical risks from participating in this study. However, we will be talking about your experiences of working in the affected communities during the floods late 2015 and some might find talking about such an experience difficult.

There are no financial risks or benefits to participants. For example, participating in this research will not have any effect on any work related benefits you maybe receiving. We hope that the research will benefit families and communities in the future, especially children to prepare, cope and recover from disasters like the floods in 2015.

Confidentiality

The researcher will take notes during the discussion. If you agree, she will also audio-record the discussion. No identifying information will be used for writing the report or publications. Only RNK, her supervisors and collaborators will be able to access the data from your discussions.

Storage of data

The notes and recordings will be securely stored at Monash University in Melbourne, Australia. Only the researcher and her colleagues will be able to access them.

Use of data for other purposes

The notes and recordings from your discussion may also be used in future related research. However, your name and any details that could be used to identify you will be deleted from the notes and will not be used any reports or publications produced as part of this research.

Results

A one page summary of results will be emailed to the participating organisations at the end of the project. Furthermore, an oral presentation will be made to include all participants detailing the results of the project. If the results are published, the links to the paper will also be provided.

Complaints

If you have any concerns or complaints about the conduct of the project, you are welcome to contact the:

Executive Officer, Monash University Human Research Ethics (MUHREC):
Executive Officer
Monash University Human Research Ethics Committee (MUHREC)
Room 111, Chancellery Building E
24 Sports Walk
Research Office
Monash University VIC 3800

Tel: +61 3 9905 2052 Email: muhrec@monash.edu Fax: +61 3 9905 3831

Thank you,

Revathi N. Krishna
PhD Student
Monash University Accident Research Centre,
Monash University, Melbourne, Australia

Monash University Accident Research Centre (MUARC)
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ABN 12 377 614 012

MONASH University

Project Number: 2016-0389-1224

List of organisations that offer free mental health services:

1. SCARF: R/7a , North Main Road, Anna Nagar West Extension, Kailash Colony, Sector A, Anna Nagar West Extension, Chennai, Tamil Nadu 600101, India

2. The Banyan: 6th Main Road, Mugappair Eri Scheme,
   Mugappair west, Chennai – 600037
   T: 044 – 26530504, 26530599

Note: The Banyan's rural community mental health project also provides free counselling services in select local council areas (called Panchayats in India).

3. Arunodhaya: 15, Bazaar St, Pudumanaikuppam, Royapuram, Chennai, Tamil Nadu 600013, India
   T: +91 44 4263 2264

4. PHC (relevant PHC closest to the community and based on the preference of the family/ community member): http://nrhmtn.gov.in/huds.html#tpress [List provided]

Note: PHCs provide health services, but, on select days they also provide mental health services.

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ABN 12 377 614 012

"Namaste, my name is Revathi. I am a PhD student at Monash University, Australia. I am interested in studying how families living in difficult situations cope with disasters (like the floods that happened in Dec last year). I am also interested in your children's experiences during this time. For this discussion, I will talk to you and ask you questions about your and your families' experience during the floods. This discussion should not take more than an hour and half. Everything we discuss today will be kept confidential, unless you report any intentions of hurting yourself or others. All the information I collect from you today will be kept in a secure location at my university, Monash University. Only my supervisors, collaborators and I will have access to this information. When we eventually write a report or a publication, it will not contain your name or any identification leading to you. However, we might use some of the things we discuss today as quotes – again without your names attached to them.

We do not foresee any physical and minimal emotional risk (if any) from participating in this project, however, you might be recalling some of your experiences you had during the floods and that might be distressing. If you find discussing these topics stressful, please let me know and we can stop the discussion. I will also provide you with contact details of an NGO close to you who provides free counselling services should you need it. You will not receive any monetary benefits for participating in this study. However, we hope that this discussion will be useful in helping families like yours, especially children, prepare for, cope with and recover from disasters better in the future.

Again, this is an absolutely voluntary participation, it is not compulsory for you to participate. You can stop the discussion whenever you want or also ask me not to include your information in my study later. Your participation or denial to participate will not affect you (at work or in the community) in any way. It is completely your decision to participate. In order to ensure accurate information retention, we would like to audio record this discussion.

If you have any concerns or complaints about participation in this discussion or me, please feel free to contact: Executive Officer, Monash University Human Research Ethics (MUHREC) at Monash University. The contact details are provided in the explanatory statement.

Do you have any questions before we continue?

Do you consent to participate in this discussion to talk about your experiences during the floods last year? Do you consent to audio record this discussion?"

After consent has been obtained:

"Thank you for agreeing to talk to me about your and your families' experience during the floods late last year. There is no correct or wrong answer, please feel free to tell me whatever comes to your mind and elaborate as much as you think is necessary.

I will begin with asking you some questions about your experiences when you realized that water was going to come into your community and street and your home."

1. When did you realize that water might come into your house and that you might not be able to stay at your home till the water recedes?
   Probes: What do you remember from that time?
2. What did you do when you found out that you can't stay in your house?
   Probes: Where did you go?

How did your family members feel about moving then?
If they have children: What did you tell your children?
How else did you prepare them?
How did the children react?

3. Is there something else you want to tell me about your experiences before the floods really hit your community/ road/ house?

"Next, I am going to ask you a few questions about your experiences during the floods."

1. Where were you and your family during the flood?
2. What are your memories of the flood?
3. What did you think would happen to you and your family then?
4. Tell me a bit about you and your family members being able to work during the floods?
   Probes: What made it difficult to work?
   What kinds of things facilitated being able to go to work?
5. What services (through NGOs, or the government) were you able to avail during the floods?
6. Is there something else you want to tell me about your experiences during the floods?

"Now, let us talk about your experiences after the floods – this can be a time that you were sure that the rains had stopped and the cleaning started and can include experiences till recently or even those times that are affecting you currently too."

1. When did you return your house?
   Probes: What steps did you have to take in order to return to your house?
2. What kinds of difficulties did children have returning to school (e.g. not wanting to leave you to get to school, or not wanting to go by themselves, etc.)?
3. What kinds of difficulties did the children have (if any) at home after the floods (*give examples only if they cannot answer this question* - for example – maybe with playing with friends by themselves, or going out by themselves or wetting the bed, or any other health related problems like frequent stomach aches, difficulty falling asleep or nightmares, etc.)?
4. Tell me about the help did you receive after the floods? [It maybe related to child care, cleaning the house or other things like food, water, etc.]
5. How did your neighbours/ community help you?
6. How did you help you neighbours/ community?
7. What were the biggest challenges for you after the floods?
8. Tell me about some of things you or your children are proud of from that time.
9. Is there something else you want to tell me about your experiences after the floods?

"Lastly, think about your whole experience (before, during and after) the floods while you answer this question."

1. Thinking back to that time, what is the single biggest memory you have of the event and its effects on (1) you, (2) your family, and (3) your community?
2. If floods like this were to happen again, what kinds of things would you do differently?
   Probe: what instructions would you be giving/ things would you like to tell your children?

"Thank you for your time. For this final part, I will ask you a few questions. I am going to ask you about the serious problems that you may currently be experiencing. I am interested in finding out what you think – a serious problem is a problem that you consider serious. There are no right or wrong answers. I am going to ask you about your own serious problems first."

Name of participant:	ID:	Date:	Level of Education (illiterate (1), primary (2), secondary (3), intermediate (4), University (5)):	Severity of flood (1 mild – 5 severe):
Age:	Gender:	No. of children (age & gender):	Usual employment:	Employed (Y/N):
Housing status (makeshift (1), concrete (2)):	Family Annual Income:	Number of days displaced (approximately):	Marital Status (single (1), married (2), divorced/ separated (3), widowed (4)):	Permission to contact again (Y/N):
Address and Phone number:				

Rating: 0= no serious problem; 1= serious problem; 9= does not know/ not applicable/ declines to answer	Ratings
1. Drinking water Do you have a serious problem because you do not have enough water that is safe for drinking or cooking?	
2. Food Do you have a serious problem with food? For example, because you do not have enough food, or because you are not able to cook food.	
3. Place to live in Do you have a serious problem because you do not have a suitable place to live in?	
4. Toilets Do you have a serious problem because you do not have easy and safe access to a clean toilet?	
5. Keeping clean *For men*: Do you have a serious problem because in your situation it is difficult to keep clean? For example: because you do not have enough soap, water or a suitable place to wash. *For women*: Do you have a serious problem because in your situation it is difficult to keep clean? For example: because you do not have enough soap, sanitary materials, water or a suitable place to wash.	
6. Clothes, shoes, bedding or blankets Do you have a serious problem because you do not have enough, or good enough, clothes, shoes, bedding or blankets?	
7. Income or livelihood Do you have a serious problem because you do not have enough income, money or resources to live?	

8. Physical Health Do you have a serious problem with your physical health? For example, because you have physical illness, injury or disability.	
9. Health care *For men*: Do you have a serious problem because you are not able to get adequate health care for yourself? For example: treatment or medicines. *For women*: Do you have a serious problem because you are not able to get adequate health care for yourself? For example, treatment or medicines, or health care during pregnancy or childbirth.	
10. Distress Do you have a serious problem because you feel very distressed? For example, very upset, sad, worried, scared or angry.	
11. Safety Do you have a serious problem because you or your family are not safe or protected where you live now? For example, because of conflict, violence or crime in your community, city or village.	
12. Education for your children Do you have a serious problem because your children are not in school, or are not getting a good enough education?	
13. Care for family members Do you have a serious problem because in your situation it is difficult to care for family members who live with you? For example, young children in your family, or family members who are elderly, physically or mentally ill, or disabled.	
14. Support from others Do you have a serious problem support from people in your community? For example, emotional support or practical help.	
15. Separation from family members Do you have a serious problem because you are separated from family members?	
16. Being displaced from home Do you have a serious problem because you have been displaced from your home country, city or village?	
17. Information *For displaced people*: Do you have a serious problem because you do not have enough information? For example, because you do not have enough information about the aid that is available; or because you do not have enough information about what is happening in your home country or home town. *For non-displaced people*: Do you have a serious problem because you do not have enough information? For example, because you do not have enough information about the aid that is available.	
18. The way aid is provided Do you have a serious problem because of inadequate aid? For example, because you do not have fair access to the aid that is available, or because aid agencies are working on their own involvement from people in your community?	
19. Respect	

Do you have a serious problem because you do not feel respected or you feel humiliated? For example, because of the situation you are living in, or because of the way people treat you.	
20. Moving between places Do you have a serious problem because you are not able to move between places? For example, going to another village or town.	
21. Too much free time Do you have a serious problem because you have too much free time in a day?	

The last few questions refer to people in your community, so please think about members of your community when answering these questions.

22. Law and justice in your community Is there a serious problem in your community because of an inadequate system for law and justice, or because people do not know enough about their legal rights?	
23. Safety or protection from violence for women in your community Is there a serious problem for women in your community because of physical or sexual violence towards them, either in the community or in their homes?	
24. Alcohol or drug use in your community Is there a serious problem in your community because people drink a lot of alcohol, or use harmful drugs?	
25. Mental illness in your community Is there a serious problem in your community because people have a mental illness?	
26. Care for people in your community who are on their own Is there a serious problem in your community because there is not enough care for people who are on their own? For example, care for unaccompanied children, widows or elderly people, or unaccompanied people who have a physical or mental illness, or disability.	

Other serious problems:

Do you have any other serious problems that I have not asked you about? *(Write down the person's answers)* 27.
28.
29.

Priority ratings for serious problems:

Read out the titles of all questions you have rated as '1', as well as any other serious problems listed above. Write down the person's answers *(write down the number and title of the questions).* 1. Out of all these problems, which one is the most serious problem?
2. Which one is the second most serious problem?
3. Which one is the third most serious problem?

Name:	ID:	Age:	Gender:
Flood Severity [1- mild – 5 - severe]:	Role in the organisation:	Previous experience of such events:	Organisation:

"Let us begin with talking about your experiences when you realized that water was going to come into the community you were working in."

Note: Ask for specific examples and elaboration (as necessary), especially when talking about their observation of the community/ community action.

1. What are your memories from the floods when you realized water was going to enter into the communities you lived or were working in?
2. What did the families do when they had to leave their home because of the water?
3. What strengths did you notice in the community during that time?
4. What challenges did you notice for the community during that time?
5. What else do you think was important at that time?

"Next, I am going to ask you a few questions about your experiences during the floods."

1. How did you (personally) help the communities you worked in during the floods?
2. How did families help each other during the floods?
3. What kinds of programs were created for the children in the community (during and after the floods)?
4. What kinds of help did your organisation offer the affected communities?
5. What kinds of help did the communities or families avail from you?
6. What else do you find important?
7. (If the staff's community/ house was flooded too) How did you manage your own situation while you were helping other communities?

"Now, let us talk about your experiences after the floods – this can be a time that you were sure that the rains had stopped and the cleaning started and can include experiences till recently or even those times that are affecting you currently too."

1. What do you think was the difference between those communities that recovered well versus those communities that didn't recover as well as others?
2. What kinds of programs related to the floods are currently running?
   Probe: What are your thoughts on current programs (since it's been about a year since the floods) helping flood affected families?
3. How else could other agencies (govt – eg. Panchayat, NGOs, school, etc.) help children and families prepare better for disasters?
4. What services you think need to be offered for these flood affected families, especially for children in these families?

"Lastly, think about your whole experience (before, during and after) the floods while you answer this question."

1. Thinking back to that time, what is the single biggest memory you have of the event and its effects on (1) you, and (2) the community you worked with?
2. If floods like this were to happen again, what kinds of things would you advice your organisation do differently?
3. If floods like this were to happen again, what kinds of things would you advice the community do differently?
   Probe: What specific steps should the community take to ensure the safety and wellbeing of the children in the community?

Group ID:	No. of participants:	Gender (M): (F):	Organisation:	Flood Severity [1- mild – 5 - severe]:

1. What kinds of interactions did you observe/ notice families were having with their children about the flood or coping from the flood?
2. What do you think were the three most important needs of the communities you were working with?
3. What do you think were the three most important needs of the children in the communities you were working with?
4. If floods like this were to happen again, what kinds of things would you think is needed to be done differently in order for children & families in poverty to be prepared better?
5. What the three most difficulties or challenges children face in this community (beyond the financial constraints) in order to be healthy and well?
   Probe: give some specific examples
6. Resilience is defined as "the process of adapting well in the face of adversity, trauma, tragedy, threats or significant sources of stress". It's also called as "bouncing back from stress". Do you think we should work towards developing resilience in children? What do you think we need to do in order to build resilience in children – whether it is to face day-to-day life challenges, or family issues or related to disaster events like the floods?

"Next, I will read out and give you an example of the kinds of experiences I have been hearing lately. This is not any one person's experience, I have made this story up using some of the experiences I heard."

A case example: "Nalini is an 8 year old girl living with her parents, her older sister (15) and a younger brother (2 yrs). Both her parents work. On the day that water rose to a level where the water came into their house, her parents were out at work. Schools were closed and consequently, she and her siblings were home. Nalini was really worried about keeping her dolls and her school books safe, while her sister was more worried about the house computer, and her dresses amongst other things. Both children weren't sure what in the kitchen needed to be done because, the gas cylinder is too heavy and the stove is already on a height and can't get it any higher because of the length of the pipe. Most of all, they had been instructed to not touch the gas stove and the cylinder by their parents. Finally, when the water comes into the house, the siblings though were initially scared, jumped in the water – and started to play, swim, etc. Their neighbours noticed that the house had taken in water and that the kids were playing in the water. They came and asked the kids to go with them. Nalini and her brother left with the neighbours despite their protest and her sister stayed behind so that she could inform their parents and evacuate with them. Due to the urgency of the situation, Nalini and her brother did not have any clothes or essentials packed and had to leave in the clothes they were wearing. Nalini was very scared till she saw her parents and her younger brother was quite scared too and was crying. Her parents instructed her and her younger brother to continue staying with the neighbour's family. The neighbours noticed that Nalini became quiet, but, otherwise kept asking about her older sister and her parents. Nalini wasn't able to sleep well because she was scared and she found it hard to wash herself or use toilets due to lack of privacy and the relatively long distance she had to travel for them. Nalini also wouldn't let her younger brother out of sight and got nervous if he was not around for even a short period of time. The

neighbours struggled with entertaining Nalini – they were also worried water spreading into the house they were currently in. Furthermore, they were worried about their house in Nalini's neighbourhood and the condition they would find that in. They weren't sure what they would need to do in order to make it fit to live in again. Nalini's parents also had similar problems and were struggling to get information about their daughter and vice versa. The neighbours didn't know how to help Nalini or her brother calm down.

"Keeping this story in mind lets discuss somethings that might be useful to do to prepare for an event like this in the future."

1. Before starting with specific questions, what are you initial thoughts here?
2. In this situation, what are the most important things for Nalini? Her parents? Her siblings? Her community?
3. In this situation, what do you think could have helped Nalini? Her parents? her siblings? her neighbours?
4. What kinds of things would have helped Nalini and her siblings learn about floods to keep them safe?
5. How could we help Nalini clam down when she felt scared?
6. What kinds of things could Nalini's parents or school or community centre (anganwadi) do to help Nalini prepare for such events in the future?

Debriefing Form for Individual Interview

	ID:	Date:	Level of Education (illiterate (1), primary (2), secondary (3), intermediate (4), University (5)):	Severity of flood (1 mild – 5 severe):
Age:	Gender:	No. of children (age & gender):	Usual employment:	Employed (Y/N):
Housing status (makeshift (1), concrete (2)):	Family Annual Income:	Number of days displaced (approximately):	Marital Status (single (1), married (2), divorced/ separated (3), widowed (4)):	Permission to contact again (Y/N):
Address and Phone number:				

1. Overview: [OVERALL COMMENTS, CONCERNS, BARRIERS]
   Note general comments or barriers or challenges faced during the IDI *[e.g.,: the questions didn't elicit responses, the flow of the questions, etc.]*

2. Main themes, important observations: [CONCEPTUAL ISSUES]
   Note common themes that emerged in the IDI *[eg. We didn't expect the floods to be that severe, we didn't know what to tell the children when they kept asking when we could go back home, etc.]*

3. Issues for follow up in future interviews:
   Note ideas for future IDIs *[e.g., suggestions on the topic guide based on the experience of doing this round of the IDI, own observation, etc.]*

Appendix 1 - Humanitarian Emergency Settings Perceived Needs Scale (HESPER)

Date:	Interviewer name:	Participant number:
Location (name of city, village or camp):	Gender:	Age:

Rating: 0 = no serious problem 1 = serious problem 9 = does not know / not applicable / declines to answer	Ratings

I am going to ask you about the **serious problems** that you may **currently** be experiencing. We are interested in finding out what you think – a serious problem is a problem that **you** consider serious. There are no right or wrong answers. I am going to ask you about your own serious problems first.

1. Drinking water Do you have a serious problem because you do not have enough water that is safe for drinking or cooking?	
2. Food Do you have a serious problem with food? For example, because you do not have enough food, or good enough food, or because you are not able to cook food.	
3. Place to live in Do you have a serious problem because you do not have a suitable place to live in?	
4. Toilets Do you have a serious problem because you do not have easy and safe access to a clean toilet?	
5. Keeping clean *For men:* Do you have a serious problem because in your situation it is difficult to keep clean? For example, because you do not have enough soap, water or a suitable place to wash. *For women:* Do you have a serious problem because in your situation it is difficult to keep clean? For example, because you do not have enough soap, sanitary materials, water or a suitable place to wash.	
6. Clothes, shoes, bedding or blankets Do you have a serious problem because you do not have enough, or good enough, clothes, shoes, bedding or blankets?	
7. Income or livelihood Do you have a serious problem because you do not have enough income, money or resources to live?	
8. Physical health Do you have a serious problem with your physical health? For example, because you have a physical illness, injury or disability.	
9. Health care *For men:* Do you have a serious problem because you are not able to get adequate health care for yourself? For example, treatment or medicines. *For women:* Do you have a serious problem because you are not able to get adequate health care for yourself? For example, treatment or medicines, or health care during pregnancy or childbirth.	
10. Distress Do you have a serious problem because you feel very distressed? For example, very upset, sad, worried, scared, or angry.	
11. Safety Do you have a serious problem because you or your family are not safe or protected where you live now? For example, because of conflict, violence or crime in your community, city or village.	
12. Education for your children Do you have a serious problem because your children are not in school, or are not getting a good enough education?	
13. Care for family members Do you have a serious problem because in your situation it is difficult to care for family members who live with you? For example, young children in your family, or family members who are elderly, physically or mentally ill, or disabled.	
14. Support from others Do you have a serious problem because you are not getting enough support from people in your community? For example, emotional support or practical help.	
15. Separation from family members Do you have a serious problem because you are separated from family members?	
16. Being displaced from home Do you have a serious problem because you have been displaced from your home country, city or village?	

Interviewers should be trained in the HESPER before use (see Appendix 2 of the HESPER manual).

17. Information *For displaced people:* Do you have a serious problem because you do not have enough information? For example, because you do not have enough information about the aid that is available; or because you do not have enough information about what is happening in your home country or home town. *For non-displaced people:* Do you have a serious problem because you do not have enough information? For example, because you do not have enough information about the aid that is available.	
18. The way aid is provided Do you have a serious problem because of inadequate aid? For example, because you do not have fair access to the aid that is available, or because aid agencies are working on their own without involvement from people in your community.	
19. Respect Do you have a serious problem because you do not feel respected or you feel humiliated? For example, because of the situation you are living in, or because of the way people treat you.	
20. Moving between places Do you have a serious problem because you are not able to move between places? For example, going to another village or town.	
21. Too much free time Do you have a serious problem because you have too much free time in the day?	

The last few questions refer to people in your community*, so please think about members of your community when answering these questions.

22. Law and justice in your community Is there a serious problem in your community because of an inadequate system for law and justice, or because people do not know enough about their legal rights?	
23. Safety or protection from violence for women in your community Is there a serious problem for women in your community because of physical or sexual violence towards them, either in the community or in their homes?	
24. Alcohol or drug use in your community Is there a serious problem in your community because people drink a lot of alcohol, or use harmful drugs?	
25. Mental illness in your community Is there a serious problem in your community because people have a mental illness?	
26. Care for people in your community who are on their own Is there a serious problem in your community because there is not enough care for people who are on their own? For example, care for unaccompanied children, widows or elderly people, or unaccompanied people who have a physical or mental illness, or disability.	

Other serious problems:

Do you have any other serious problems that I have not yet asked you about? Write down the person's answers. 27.
28.
29.

Priority ratings for serious problems:

Read out the titles of all questions you have rated as '1', as well as any other serious problems listed above. Write down the person's answers (write down the number and title of the questions).
1. Out of these problems, which one is the most serious problem?
2. Which one is the second most serious problem?
3. Which one is the third most serious problem?

* Throughout the HESPER form, the term 'community' should be replaced with the term that is most suitable to the local geographical area (for example village, town, neighbourhood, camp and so on).

Monash University Human Research Ethics Committee

Approval Certificate

This is to certify that the project below was considered by the Monash University Human Research Ethics Committee. The Committee was satisfied that the proposal meets the requirements of the *National Statement on Ethical Conduct in Human Research* and has granted approval.

Project Number: 8979
Project Title: Child co-developed DRE programme in India
Chief Investigator: Dr Eva Alisic
Expiry Date: 03/11/2022

Terms of approval - failure to comply with the terms below is in breach of your approval and the *Australian Code for the Responsible Conduct of Research*.

1. The Chief Investigator is responsible for ensuring that permission letters are obtained, if relevant, before any data collection can occur at the specified organisation.
2. Approval is only valid whilst you hold a position at Monash University.
3. It is 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 letterhead and the Monash University complaints clause must include your project number.
6. Amendments to approved projects including changes to personnel must not commence without written approval from MHUREC.
7. Annual Report - continued approval of this project is dependent on the submission of an Annual Report.
8. Final Report - should be provided at the conclusion of the project. MUHREC should be notified if the project is discontinued before the expected completion date.
9. Monitoring - project may be subject to an audit or any other form of monitoring by MUHREC at any time.
10. Retention and storage of data - The Chief Investigator is responsible for the storage and retention of the original data pertaining to the project for a minimum period of five years.

Thank you for your assistance.

Professor Nip Thomson

Chair, MUHREC

CC: Mrs Revathi Nuggehalli Krishna, Prof. Kevin Ronan

List of approved documents:

Document Type	File Name	Date	Version
Questionnaires / Surveys	CCDRR and Household Resilience Toolkit Crocetti Draft 4	02/10/2017	4
Explanatory Statement	Explanatory Statement_Young people's participation_v1 18.10.2017	18/10/2017	1
Explanatory Statement	Explanatory Statement_Staff_v1 18.10.2017	18/10/2017	1
Explanatory Statement	Explanatory Statement_Community members_v1 18.10.2017	18/10/2017	1
Explanatory Statement	Explanatory Statement_Experts_v1 18.10.2017	18/10/2017	1

MONASH University

Project Number: 8979

EXPLANATORY STATEMENT

Children affected by Chennai Floods, 2015

Project: Child co-developed DRE programme in Chennai, India

Your children are invited to take part in this research. Please read this page before deciding whether or not to consent to your child(ren)'s participation in this project. If you would like more information about any part of this project, you can contact the researchers:

Mrs. Revathi N. Krishna	Dr. Eva Alisic	Prof. Kevin Ronan
Monash University Accident Research Centre (MUARC) **Monash University**	Trauma Recovery Lab MUARC Monash University	Foundation Professor in Psychology & Chair in Clinical Psychology, Central Queensland University
Phone: +61 399051255; Email: revathi.nuggehallikrishna@monash.edu		

What does the research involve?
We would like to involve children in developing and testing a disaster risk education (DRE) programme to prepare children and families better for future floods or cyclones. Thus, we would like to understand the experiences of children in preparing, coping and recovering from the floods of December 2015 while living in difficult situations.

If you agree for your child/children to participate, they will be invited to speak about their experiences and be asked their views on what would have helped them prepare better for the floods with Mrs. Revathi N. Krishna. She will ask questions about their experiences before, during and after the floods in Tamil Nadu late 2015, focusing on what helped them cope with floods and what could have helped them prepare better for the floods, including what they think are important things to remember and do if there is another flood in the future and what is essential in a good Disaster Risk Education programme. Furthermore, if you agree, the children will be invited to contribute to the design of the programme and they will have a say in how, where, when and who should deliver this programme. They might also be invited to be recipients of the DRE programme. Much of this process will happen via discussions over a few months. The first discussion can range between 60 – 90 minutes, but, the later discussions will be aimed to be done within 60 minutes.

Why were you chosen for this research?
We spoke to you and/ or other members of your community last year to understand the adults' perspectives and needs in disaster situations. You and/or your community members showed interest in being further involved in this study and also invited Mrs. Krishna to talk with children in the community, and identified school holidays in December to be a good time to engage with your children in order to develop the DRE programme that would help children and community prepare better for disasters. Based on this interest, we would like to invite you and others in your community to help children and your community at large prepare for future floods or cyclones.

Consenting to participate in the project and withdrawing from the research
After you have read this statement, you will be asked whether you agree for your child to participate in a discussion about their experiences during the floods late 2015. If you do not want them to participate, you are free to say no. They will be given opportunities to stop the discussion at any time, or to skip a question. They can also withdraw from the research study at any time before the final report is

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published. If you do not want your child/ children to participate, this will not have any negative effects for you, your family or in the community.

Possible benefits and risks to participants

We hope that the research will benefit families and communities like yours in the future, especially children to prepare, cope and recover from disasters like the floods in 2015. We do not foresee any physical, risks from participating in this study. We will be talking about their experiences during the floods late 2015 and their thoughts on how to prepare for such events in the future. While our experience is that most children appreciate this, some might find this difficult. I have over five years' experience in working with children and families in various scenarios and settings and if I see any signs distress on the part of the child, I will offer to stop the activity and inform you accordingly. Finally, there are no financial risks or benefits to you or your children.

Confidentiality

The researcher will take notes during the discussion. If children agree, she will also audio-record the discussions. No identifying information will be used for writing the report or publications. Only Revathi, her supervisors and collaborators will be able to access the data from your discussions.

Storage of data

The notes and recordings will be securely stored at Monash University in Melbourne, Australia. Only Revathi and her colleagues will be able to access them.

Use of data for other purposes

The notes and recordings from your discussion may also be used in future related research. However, your name and any details that could be used to identify you will be deleted from the notes and will not be used any reports or publications produced as part of this research.

Results

An oral presentation will be made to include all parents and children participating in the study, detailing the results of the project. If the results are published, the links to the paper will also be provided if you wish through the community organisation that works with your community.

Complaints

If you have any concerns or complaints about the conduct of the project, you are welcome to contact the:

Executive Officer, Monash University Human Research Ethics (MUHREC):
Executive Officer
Monash University Human Research Ethics Committee (MUHREC)
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Thank you,
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Project Number: 8979

EXPLANATORY STATEMENT

Staff of community organisations working in the 2015 flood affected areas

Project: Child co-developed DRE programme in Chennai, India

You are invited to take part in this research. Please read this page before deciding whether or not to participate. If you would like more information about any part of this project, you can contact the researcher:

Mrs. Revathi N. Krishna	Dr. Eva Alisic	Prof. Kevin Ronan
Monash University Accident Research Centre (MUARC) **Monash University**	Trauma Recovery Lab MUARC Monash University	Foundation Professor in Psychology & Chair in Clinical Psychology, Central Queensland University
Phone: +61 399051255 **Email: revathi.nuggehallikrishna@monash.edu**		

What does the research involve?
We aim to co-develop and test a Disaster Risk Education programme with children in the communities that your organisation works in to help them be better prepared for future hazards like floods or cyclones.

If you agree to participate, you will be invited to speak about your thoughts on the DRE programme that the children have co-developed with Mrs. Revathi N. Krishna. She will ask you questions about your thoughts about the structure of the programme, facilitators and barriers to the programme, especially focusing on how to ensure the continuity of this programme and what your thoughts are on the role your organisation could potentially play in it. You will also have an opportunity to suggest modifications to the programme. The discussion can range between 45 – 90 minutes, depending on your availability.

Why were you chosen for this research?
We spoke to you and/ or other staff of your organisation last year to understand your perspectives on how the community coped with the 2015 floods and what, in your opinion, were the needs of the communities. You and/or your colleagues showed interest in being further involved in this study and also invited Mrs. Krishna to talk with children in the communities you work in, and identified school holidays in December to be a good time to visit. Based on this interest, we would like to invite you and other staff in your organisation to help children and community at large prepare for future floods or cyclones.

Consenting to participate in the project and withdrawing from the research
After you or Revathi have read this statement out aloud to you, you will be asked whether you agree to participate in a discussion about your thoughts on the DRE programme. If you do not want to participate, you are free to say no. If you want to stop the discussion at any time, or to skip a question, you can. You can also withdraw from the research at any time before the final report is published. If you do not want to participate, this will not have any negative effects for you, your family or for the organization you work for.

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Possible benefits and risks to participants

We do not foresee any physical, emotional or financial risks from participating in this study. We hope that the research will benefit families and communities you work with, especially children to prepare, cope and recover from disasters like the floods in 2015. Moreover, this study will showcase the involvement of children you work with in co-designing and testing of the DRE programme and so we hope that this will be beneficial to everyone involved.

Confidentiality

The researcher will take notes during the discussion. If you agree, she will also audio-record the discussion. No identifying information will be used for writing the report or publications. Only Revathi, her supervisors and collaborators will be able to access the data from your discussions.

Storage of data

The notes and recordings will be securely stored at Monash University in Melbourne, Australia. Only the Revathi and her colleagues will be able to access them.

Use of data for other purposes

The notes and recordings from your discussion may also be used in future related research. However, your name and any details that could be used to identify you will be deleted from the notes and will not be used any reports or publications produced as part of this research.

Results

A one page summary of results will be emailed to your organisation at the end of the project. Furthermore, an oral presentation will be made to include all participants detailing the results of the project. If the results are published, the links to the paper will also be provided.

Complaints

If you have any concerns or complaints about the conduct of the project, you are welcome to contact the:

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MONASH University

Project Number: 8979

EXPLANATORY STATEMENT

Child Centered-Disaster Risk Reduction (CC-DRR) experts

Project: Child co-developed DRE programme in Chennai, India

You are invited to take part in this research. Please read this page before deciding whether or not to participate. If you would like more information about any part of this project, you can contact the researcher:

Mrs. Revathi N. Krishna	Dr. Eva Alisic	Prof. Kevin Ronan
Monash University Accident Research Centre (MUARC) **Monash University**	Trauma Recovery Lab MUARC Monash University	Foundation Professor in Psychology & Chair in Clinical Psychology, Central Queensland University
Phone: +61 399051255 **Email: revathi.nuggehallikrishna@monash.edu**		

What does the research involve?
We aim to co-develop and test a Disaster Risk Education (DRE) programme with children in the flood affected communities of Chennai, India to help them be better prepared for future hazards like floods or cyclones.

If you agree to participate, you will be invited to participate in consultations with Revathi N. Krishna to provide your expertise on developing an effective DRE programme. She will ask you questions about your thoughts about the structure of the programme, its core elements and potential ways to deliver it. Furthermore, you might be invited to comment on the draft of the programme. The discussion can range between 45 – 120 minutes, depending on your availability and mode of consultation (e.g. in group vs. individual; face-to-face vs. skype or phone).

Why were you chosen for this research?
You are the experts in the field of CC-DRR. You are either involved in CC-DRR research or practice on the field or both.

Consenting to participate in the project and withdrawing from the research
After you have read this statement, you will be asked whether you agree to participate in discussions related to development and refinement the DRE programme. If you do not want to participate, you are free to say no. If you want to stop the discussion at any time, or to skip a question, you can. You can also withdraw from the research at any time before the final report is published. If you do not want to participate, this will not have any negative effects for you, your family or for the organization you work for.

Possible benefits and risks to participants
We do not foresee any physical, emotional or financial risks from participating in this study. We hope that the research will benefit families and communities who are live in at-risk-to-hazards neighbourhoods, especially children to prepare, cope and recover from disasters like the floods in

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2015. Moreover, this study will showcase the involvement of children in co-designing and testing of the DRE programme and so we hope that this will be beneficial to everyone involved.

Confidentiality

The researcher will take notes during the discussion. If you agree, she will also audio-record the discussion. No identifying information will be used for writing the report or publications. Only Revathi, her supervisors and collaborators will be able to access the data from your discussions.

Storage of data

The notes and recordings will be securely stored at Monash University in Melbourne, Australia. Only the Revathi and her colleagues will be able to access them.

Use of data for other purposes

The notes and recordings from your discussion may also be used in future related research. However, your name and any details that could be used to identify you will be deleted from the notes and will not be used any reports or publications produced as part of this research.

Results

Results from the discussion and triangulation of data from the literature, discussion with you (the experts) and discussions with children will be made available to you in the form of a draft DRE programme without any identifying information on the participants. If you are involved in the next round of discussions as well, a final draft of the DRE programme will also be made available to you. If the results are published, the links to the paper will also be provided.

Complaints

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"Vannakam, my name is Revathi. I am a PhD student at Monash University, Australia. I am interested in studying how children and families cope with disasters (like the floods that happened in Dec 2015). For this discussion, I will talk to you and ask you questions about your experience during the floods. This discussion should take about an hour. We have already asked permission from your parents and they have agreed to let you participate if you'd like to. Everything we discuss today will be kept confidential, unless you report any intentions of hurting yourself or others. Everything we discuss here will be kept in a secure location at my university, Monash University. Only my supervisors, collaborators and I will have access to this information. When we eventually write a report or a publication, it will not contain your name or any identification leading to you. However, we might use some of the things we discuss today as quotes – again without your names attached to them.

We do not foresee any physical and minimal emotional risk (if any) from participating in this project, however, you might be recalling some of your experiences you had during the floods and that might be distressing. If you find discussing these topics stressful, please let me know and we can stop the discussion. I will also provide you with contact details of a counsellor who can provide free counselling services should you need it. You will not receive any monetary benefits for participating in this study. However, we hope that this discussion will be useful in helping children like yourselves, especially children, prepare for, cope with and recover from disasters better in the future.

Again, this is an absolutely voluntary participation, it is not compulsory for you to participate. You can stop the discussion whenever you want or also ask me not to include your information in my study later. Your participation or denial to participate will not affect you (at school or at home or in the community) in any way. It is completely your decision to participate. In order to ensure accurate information retention, we would like to audio record this discussion.

If you have any concerns or complaints about participation in this discussion or me, please feel free to contact: Executive Officer, Monash University Human Research Ethics (MUHREC) at Monash University. The contact details are provided in the explanatory statement.

Do you have any questions before we continue?

Do you consent to participate in this discussion to talk about your experiences during the 2015 floods? Do you consent to audio record this discussion?"

After consent has been obtained:

"Thank you for agreeing to talk to me about your experience during the 2015 floods. There is no correct or wrong answer, please feel free to tell me whatever comes to your mind and elaborate as much as you think is necessary.

I will begin with asking you some questions about your experiences when you realized that water was going to come into your community and street and your home."

1. What is the first thing that comes to your mind when you think of the floods in Dec 2015?
2. When you found out that water might enter your house, what did you do?
3. How did your parents help you prepare for the floods? [give examples if necessary: e.g. helped them pack their books, toys and clothes; talking about floods and preparing children mentally, etc.]

"Next, I am going to ask you a few questions about your experiences during the floods."

1. Where were you and your family staying during the flood?
2. What did you think would happen to you or your siblings, friends and family during that time?
3. Who helped you during the floods? How?
4. What would have been more helpful for you during the floods that you wished you got?
5. What made the floods difficult for you?
6. Tell me about school during the floods. Were you able to go to school, was it open?

"Now, let us talk about your experiences after the floods – this can be a time that you were sure that the rains had stopped and the cleaning started and can include experiences till recently or even those times that are affecting you currently too."

1. When did you return your house? How long did it take to come back?
2. Were you able to return to school right after you returned home?
3. What made it difficult to get back to school?
4. What made it easy to get back to school?
5. What difficulties did you have in school?
6. What difficulties did you notice your friends were going through?
7. Many children and adults too tend to have nightmares, general fear of floods happening again, sleeping difficulties or headache, stomach ache, etc. Did any of experience anything like that? Describe what happened and what did you do after that? How long did this last? Is it still happening? When was the last time it happened?
8. What were some of the most difficult things for you during that time?
9. What could have made it easier for you during that time?

"Lastly, let's talk about your whole flood experience."

1. Thinking back to that time, what is the single biggest memory you have of the event and its effects on (1) you, (2) your family and friends, and (3) your school?
2. If floods like this were to happen again, how would you prepare yourself better? What kinds of things would you do? Where will you go? What kinds of things might you keep with you?
3. How could (1) parents and (2) teachers help you prepare for floods and even during and after the floods?
4. What kinds of things do you think needs to happen in the community in order to make sure every child in the community knows what floods are, how to prepare for them and what they should do during the floods?

We have co-developed a Disaster Risk Education (DRE) intervention through active participation of children aged 9 yrs – 17yrs. The intervention has been developed by triangulating information from three sources: the literature, experts (such as yourselves & from India) and children who live in flood affected areas of Chennai, India. By the time this intervention was ready to be delivered, the group (research team, experts as well as children) decided on who, where and how it should be delivered along with to whom this intervention should be delivered (children or dyads – child & parent or a group of children).

Sticking to our pre-set protocol, we have collected baseline information using surveys and focus group discussions with participants of the study (two groups – those who will co-develop the intervention as well as those who will receive the intervention) about their knowledge, attitude, household preparedness to hazards. We have also explored their expectations from this programme/ intervention.

Then the intervention was delivered according to the results of the discussion (who, where, when, how, and to whom).

Outcome measures were administered at three time points [baseline 1 (right before the intervention was developed), baseline 2(right before receiving the intervention) and outcome 1 (post intervention)]. Measures include assessment of knowledge of relevant hazards, safety behaviours, plan, etc.; attitude towards preparedness and household preparedness (action/ behaviour based) to hazards.

The results show that the intervention is neither acceptable, nor feasible. The intervention did not meet the participants' expectations. It wasn't effective in preparing the children and families for hazards, or ensuring child participation or even measuring the right outcomes.

So, despite our best attempt, the children co-developed Disaster Risk Education Intervention has failed miserably. Our task today is to dig our heels to find what might have caused this catastrophic failure and find ways to mitigate and save this intervention. [think of intervention content, intervention delivery, child engagement, community engagement, implementation and outcome measures]

Steps:

1. Provide the project summary and the worksheet.
2. Ask for potential problems. 10 mins independently
3. Get everyone to list the problems (one that hasn't been mentioned yet, until all the problems are covered).
4. Get everyone to discuss the priority of each of the problems highlighted. Put it down on a whiteboard and choose the top 5 problems.
5. Write the top 5 problems down on the board.
6. Now get potential solutions for each of those 5 problems (reasons of failure) – provide sticky note – one idea per note. 10 mins independently.
7. Pile each of the solution under each problem.
8. Then, read/ familiarize the group with all the solutions (for a problem – so one problem at a time).
9. Then, this needs discussion to find the best possible solution – using the DA approach for this:
    a. Split into two groups: one presents solutions to a problem while the other critiques it.

b. We continue this till both groups arrive at a consensus.
c. Repeat this process for each problem.

Reasons for Failure "What could have caused this?"	Level of Concern 1 = lowest 5 = Highest	Action steps to prevent failure "What can be done differently?"
Intervention Content		
Intervention Delivery		

Reasons for Failure "What could have caused this?"	Level of Concern 1 = lowest 5 = Highest	Action steps to prevent failure "What can be done differently?"
Outcome measures		
Outcome assessment process		

Reasons for Failure "What could have caused this?"	Level of Concern 1 = lowest 5 = Highest	Action steps to prevent failure "What can be done differently?"
Child(ren) engagement		
Community engagement		

Reasons for Failure "What could have caused this?"	Level of Concern 1 = lowest 5 = Highest	Action steps to prevent failure "What can be done differently?"
Others		

GUIDED[1] – a guideline for reporting for intervention development studies.

Item description	Explanation	Page in manuscript where item is located	Other*
1. Report the context for which the intervention was developed.	Understanding the context in which an intervention was developed informs readers about the suitability and transferability of the intervention to the context in which they are considering evaluating, adapting or using the intervention. Context here can include place, organisational and wider socio-political factors that may influence the development and/or delivery of the intervention (15).	3-4	
2. Report the purpose of the intervention development process.	Clearly describing the purpose of the intervention specifies what it sets out to achieve. The purpose may be informed by research priorities, for example those identified in systematic reviews, evidence gaps set out in practice guidance such as The National Institute for Health and Care Excellence or specific prioritisation exercises such as those undertaken with patients and practitioners through the James Lind Alliance.	3-4	
3. Report the target population for the intervention development process.	The target population is the population that will potentially benefit from the intervention – this may include patients, clinicians, and/or members of the public. If the target population is clearly described then readers will be able to understand the relevance of the intervention to their own research or practice. Health inequalities, gender and ethnicity are features of the target population that may be relevant to intervention development processes.	6-7	
4. Report how any published intervention development approach contributed to the development process	Many formal intervention development approaches exist and are used to guide the intervention development process (e.g. 6Squid (16) or The Person Based Approach to Intervention Development (17)). Where a formal intervention development approach is used, it is helpful to describe the process that was followed, including any deviations. More general approaches to intervention development also exist and have been categorised as follows (3):- Target Population-centred intervention development; evidence and theory-based intervention development; partnership intervention development; implementation-based intervention development; efficacy-based intervention development; step or phased-based intervention development; and intervention-specific intervention development (3). These approaches do not always have specific guidance that describe their use. Nevertheless, it is helpful to give a rich description of how any published approach was operationalised	6, 13-14	
5. Report how evidence from different sources informed the intervention development process.	Intervention development is often based on published evidence and/or primary data that has been collected to inform the intervention development process. It is useful to describe and reference all forms of evidence and data that have informed the development of the intervention because evidence bases can change rapidly, and to explain the manner in which the evidence and/or data was used. Understanding what evidence was and was not available at the time of intervention development can help readers to assess transferability to their current situation.	5-7, 14-15	
6. Report how/if published theory informed the intervention development process.	Reporting whether and how theory informed the intervention development **process aids the reader's understanding of the theoretical rationale that** underpins the intervention. Though not mentioned in the e-Delphi or consensus meeting, it became increasingly apparent through the development of our guidance that this theory item could relate to either existing published theory or programme theory	4-5	
7. Report any use of components from an existing intervention in the current intervention development process.	Some interventions are developed with components that have been adopted from existing interventions. Clearly identifying components that have been adopted or adapted and acknowledging their original source helps the reader to understand and distinguish between the novel and adopted components of the new intervention.	13-14	
8. Report any guiding principles, people or factors that were prioritised when making decisions during the intervention development process.	Reporting any guiding principles that governed the development of the **application helps the reader to understand the authors'** reasoning behind the decisions that were made. These could include the examples of particular populations who views are being considered when designing the intervention, the modality that is viewed as being most appropriate, design features considered important for the target population, or the potential for the intervention to be scaled up.	8	

[1]Duncan E, *et al. BMJ Open* 2020; 10:e033516. doi: 10.1136/bmjopen-2019-033516

Item description	Explanation	Page in manuscript where item is located	Other*
9. Report how stakeholders contributed to the intervention development process.	Potential stakeholders can include patient and community representatives, local and national policy makers, health care providers and those paying for or commissioning health care. Each of these groups may influence the intervention development process in different ways. Specifying how differing groups of stakeholders contributed to the intervention development process helps the reader to understand how stakeholders were involved and the degree of influence they had on the overall process. Further detail on how to integrate stakeholder contributions within intervention reporting are available (19).	8-15	
10. Report how the intervention changed in content and format from the start of the intervention development process.	Intervention development is frequently an iterative process. The conclusion of the initial phase of intervention development does not necessarily mean that all uncertainties have been addressed. It is helpful to list remaining uncertainties such as the intervention intensity, mode of delivery, materials, procedures, or type of location that the intervention is most suitable for. This can guide other researchers to potential future areas of research and practitioners about uncertainties relevant to their healthcare context.	8-13	
11. Report any changes to interventions required or likely to be required for subgroups.	Specifying any changes that the intervention development team perceive are required for the intervention to be delivered or tailored to specific sub groups enables readers to understand the applicability of the intervention to their target population or context. These changes could include changes to personnel delivering the intervention, to the content of the intervention, or to the mode of delivery of the intervention.	19-20	
12. Report important uncertainties at the end of the intervention development process.	Intervention development is frequently an iterative process. The conclusion of the initial phase of intervention development does not necessarily mean that all uncertainties have been addressed. It is helpful to list remaining uncertainties such as the intervention intensity, mode of delivery, materials, procedures, or type of location that the intervention is most suitable for. This can guide other researchers to potential future areas of research and practitioners about uncertainties relevant to their healthcare context.	18-20	
13. Follow TIDieR guidance when describing the developed intervention.	Interventions have been poorly reported for a number of years. In response to this, internationally recognized guidance has been published to support the high quality reporting of health care? interventions[5]and public health interventions[14]. This guidance should therefore be followed when describing a developed intervention.	15-18	
14. Report the intervention development process in an open access format.	Unless reports of intervention development are available people considering using an intervention cannot understand the process that was undertaken and make a judgement about its appropriateness to their context. It also limits cumulative learning about intervention development methodology and observed consequences at later evaluation, translation and implementation stages. Reporting intervention development in an open access (Gold or Green) publishing format increases the accessibility and visibility of intervention development research and makes it more likely to be read and used. Potential platforms for open access publication of intervention development include open access journal publications, freely accessible funder reports or a study web-page that details the intervention development process.	N/A	

*e.g. if item is reported elsewhere, then the location of this information can be stated here.

[1]Duncan E, *et al. BMJ Open* 2020; 10:e033516. doi: 10.1136/bmjopen-2019-033516