Examining extreme weather event preparedness, response, and recovery among community health workers in Negros Oriental, Philippines: A qualitative study

by

Bridget Elizabeth Beggs

A thesis

presented to the University of Waterloo

in fulfilment of the

thesis requirement for the degree of

Master of Science

in

Public Health Sciences

Waterloo, Ontario, Canada, 2024

Author's Declaration

This thesis consists of material all of which I authored or co-authored: see Statement of Contributions included in the thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Statement of Contributions

I, Bridget Beggs, authored Chapters 1, 2, and 4 of this thesis under the supervision of Dr. Warren Dodd. These chapters were prepared for this thesis and not for publication. Chapter 3 was prepared as a manuscript with the intent of publication. Co-authors of the manuscript are indicated in Chapter 3, and their contributions to the work are described below.

Chapter 3

I, under the supervision of Dr. Warren Dodd, have been the primary researcher and contributor to the preparation of the manuscript to date, including data collection, analysis, and write-up. Contributions from co-authors have been primarily to the total research efforts as members of the research team.

Dr. Laura Jane Brubacher is a postdoctoral fellow at the University of Waterloo and a member of the research team. Dr. Brubacher provided guidance during data analysis as well as reviewing and revising the manuscript as a thesis committee member.

Monica Bustos was a member of the research team at the University of Waterloo and assisted with project management and data collection in the Philippines.

Dr. Lincoln Lau is the Director of Research at International Care Ministries (ICM), the partner organization for this research. Dr. Lau contributed to reviewing and revising the manuscript as a thesis committee member.

Dr. Jennifer Liu is an Associate Professor at the University of Waterloo. Dr. Liu contributed to reviewing and revising the manuscript as a thesis committee member.

Dr. Warren Dodd is the supervisor of this thesis research and an Associate Professor at the University of Waterloo. Dr. Dodd and Dr. Lau have built a collaborative research partnership between the University of Waterloo and ICM that provided a foundation for this thesis

research. Dr. Dodd provided support throughout all stages of the project, and contributed to designing and conducting the study as well as to reviewing and revising the manuscript.

Abstract

Background: The Philippines remains one of the most vulnerable countries to extreme weather events, which will continue to increase in frequency and severity due to the climate crisis. To urgently address this challenge, community-based strategies have been emphasized as a key component of climate resilient health systems. Community health workers (CHWs) often act as an important resource to deliver health-related support and care in resource-constrained settings and may strengthen community resilience amid disasters. However, there is a need to consider how individual-context and program-specific factors may impact the ability of CHWs to support their communities during extreme weather event preparedness, response, and recovery. This study aimed to explore the experiences of CHWs during extreme weather events to understand how their positionality, existing responsibilities, and perceived capacity shaped their ability to support communities amid extreme weather events.

Methods: This study was conducted in partnership with International Care Ministries (ICM), which is a Philippines-based non-governmental organization. ICM implements the Flourish program, where the organization recruits and trains Community Health Champions (CHCs) who operate as CHWs. We conducted 51 semi-structured interviews with CHWs across four municipalities in Negros Oriental, Philippines, in May-June 2023. Recruitment was facilitated through ICM's pre-existing relationships with CHWs, and data collection and analysis were guided by the disaster risk management framework. All interviews were audio-recorded, transcribed using NVivo software, and thematically analyzed using a hybrid deductive-inductive approach.

Results: Participant narratives indicated that experiences with extreme weather events were shaped by both individual and program specific factors, and that CHWs capacity to provide support within their communities varied at each phase of the disaster. Participants also outlined that their level of preparedness for current extreme weather events was impacted by their experiences with past extreme weather events. Further, although most CHWs highlighted that family members were their priority during extreme weather event response,

some CHWs also exhibited a willingness to support other community members during response activities. Finally, CHWs were recognized as a source of support during extreme weather event recovery activities, despite sharing socioeconomic and demographic characteristics with other community members and experiencing the disaster in a similar way.

Conclusion: Efforts to equip CHWs to support disaster preparedness, response, and recovery need to closely consider both the individual and household-level impacts of extreme weather events that are experienced by CHWs themselves. This study provides insight into how CHWs navigate extreme weather events and underscores the complexities of recognizing CHWs as both health leaders and community members in disaster risk management.

Acknowledgements

The completion of this project would not have been possible without the encouragement and support of many mentors, colleagues, friends, and family members.

First, I am incredibly grateful for the mentorship of my supervisor, Dr. Warren Dodd. It has been a privilege to work with and learn from you. I deeply appreciate your investment in this research and guidance throughout every phase of this project. Thank you for encouraging me to think critically about my work and remain intentional in my approach, and for providing me with the opportunity to travel for field work. Your dedicated and thoughtful approach to mentoring students and connecting with community partners is inspiring.

I am also grateful to my committee members, Dr. Lincoln Lau, Dr. Jennifer Liu, and Dr. Laura Jane Brubacher, for their collaboration and guidance over the course of this project. Lincoln, thank you for your thoughtful feedback and for providing insights on broader considerations within this context. Jennifer, thank you for being such as generous mentor; from my undergraduate thesis to my master's thesis, you have provided invaluable advice and encouragement that has supported my growth as a researcher. LJ, I am so thankful for your mentorship and friendship. From our chaotic trip to Ottawa to our conversations in the hallways, I am deeply grateful for your insights and encouragement towards my research and broader aspirations.

I am thankful to have worked with an incredible organization like International Care Ministries. Thank you to the ICM staff at the Dumaguete City branch, who not only supported this project, but also welcomed us into their space and allowed us to participate in their morning prayers. I am also extremely grateful to my field work team. Monica, thank you for your consistent support during data collection, and for approaching this research with such intention. Your sisterly advice and warm presence provided a lot of comfort during field work, and I am so grateful to have had the opportunity to collaborate with you. Ruth and Alona, thank you for your companionship and sense of humour during our trips. I deeply cherish all of the laughs and the memories we made together.

I am eternally grateful to the 51 CHWs who participated in this study. Thank you for graciously sharing your stories and for welcoming me into your spaces. Your resilience and commitment to your communities is inspiring.

I am also thankful for the financial support I received to engage with this work. Thank you to the Social Sciences and Humanities Research Council for awarding me with a Joseph-Armand Bombardier Canada Graduate Scholarship, and the University of Waterloo for awarding me with a President's Graduate Scholarship, an International Experience Award, and a Global Health Policy and Innovation Research Centre Graduate Research Award.

To my incredible colleagues within the Dodd Lab, thank you for fostering a supportive environment and cultivating a sense of community within the office. I greatly appreciate all of our conversations about global health, research, and future ambitions. Special thanks to Chantelle; from Dumaguete to Ottawa to Toronto to Waterloo, your advice and encouragement always managed to keep me grounded amid moments of doubt.

Thank you to all of the friends who have provided encouragement throughout this journey. To Bailey, I am so grateful for all the memories we have made over the past seven years in Waterloo. Thank you for your unwavering friendship, for all the laughs, and for adopting pets while I was gone so that I always had a furry friend to come back to. To Melanie and Tori, thank you for always cheering me on despite the distance and for the endless supply of inside jokes. To Josh, thank you for being my lab buddy, for keeping me on track, and for your insistence to debate absolutely everything. And to my friends in Vancouver, thank you for allowing me to talk about my work, distracting me from only talking about my work, and for always making time for new adventures.

Finally, I am deeply grateful to my family. To my parents and siblings, I could not have done this without your unconditional love and support. Your confidence in my abilities has always given me strength and motivation when I needed it most. Thank you for pushing me to chase my dreams, supporting me throughout every adventure, and for always being there to welcome me home.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

ASHA	Accredited Social Health Activist
BHW	Barangay Health Worker
CHC	Community Health Champion
CHCC	Community Health Champion Coordinator
CHW	Community Health Worker
DRM	Disaster risk management
DSWD	Department of Social Welfare and Development
FCHV	Female Community Health Volunteer
Health EDRM	Emergency and disaster risk management for health policy framework
ICM	International Care Ministries
LGU	Local government unit
NDCC	National Disaster Coordinating Council
NDRRMC	National Disaster Risk Reduction and Management Council
NGO	Non-governmental organization
SSHRC	Social Sciences and Humanities Research Council
WHO	World Health Organization

Chapter 1: Introduction

1.1 Background

1.1.1 Contextual background

Globally, the frequency and intensity of extreme weather events have increased, while the consequences from these disasters have been exacerbated by climate change (Martin, 2023; Bell et al., 2018; Ebi et al., 2021; Levy & Patz, 2015; McMichael, 2015). With the increasing prevalence of these climate-related disasters, there can be little time between extreme weather events to fully recover, which means the negative impacts of these events continue to compound over time. Extreme weather events, which are periods of unusually severe weather (IPCC, 2023), are responsible for negative physical health outcomes, the destruction of health and other types of infrastructure, damage to livelihoods, and contaminated water sources (Bouwer, 2019; Ebi et al., 2021; Islam et al., 2023; Zou et al., 2023). Additionally, extreme weather events can contribute to increases in long-term mental health challenges, especially in low- and lower middle-income countries where there are fewer resources to cope with these issues (Ebi et al., 2021; Levy & Patz, 2015; Rataj et al., 2016; Sharpe & Davison, 2021). Some of the most prevalent extreme weather events include thunderstorms, tropical storms (e.g., cyclones, hurricanes, and typhoons), floods, drought, and extreme temperatures (Ebi et al., 2021; IPCC, 2023; Radović & Iglesias, 2020).

1.1.2 Extreme weather events in the Philippines

The Philippines is consistently ranked among the most disaster-prone nations in the world (Alcayna et al., 2016; Edwards et al., 2021; IFHV, 2022), and frequently experiences severe earthquakes, volcanic eruptions, and typhoons (Abenir et al., 2022; Robielos et al., 2020; Roteza et al., 2023). Largely due to its location along the Pacific Ring of Fire, the Philippines experiences one of the highest rates of typhoons in the world, with approximately 20 typhoons and five super typhoons each year (UNDRR, 2022). While media sources like websites and radios are frequently used to disseminate warnings for disasters, these channels may not reach the most at-risk populations with adequate information in a timely manner

(Al-Mueed et al., 2021). Though all provinces within the Philippines are at risk of extreme weather events like typhoons, rural areas are disproportionately affected due to underlying vulnerabilities and existing socioeconomic challenges (Cutter et al., 2016; McEntire, 2012; Yonson et al., 2018). Typhoons are also notoriously challenging to predict, which introduces an additional level of complexity to the provision of relief and care within rural and remote communities.

Super Typhoon Odette (internationally known as Rai) swept across the Visayas on December 16, 2021, impacting approximately twelve million people and displacing nearly 3 million individuals (ReliefWeb, 2022a). Just hours before making landfall, Odette intensified from a tropical storm to a super typhoon, and was labelled as a category 5-equivalent super typhoon (Camelo & Mayo, 2021; OCHA, 2022b). Odette was the second strongest typhoon to ever hit the Philippines, and the third strongest storm ever recorded in the northern hemisphere (OCHA, 2022b). While it was the fifteenth typhoon of 2021 in the Philippines, it was classified as the strongest of the year (ReliefWeb, 2022b) and impacted at least eleven of the country's seventeen regions (OCHA, 2023). Thousands of people were injured, and approximately 405 people died as a result of the typhoon (ReliefWeb, 2022a). Odette brought torrential rains, violent winds, storm surges, and landslides to the Visayas and Mindanao regions of the Philippines, and many communities in these regions lost electricity and experienced severe flooding. Odette also occurred during the height of the COVID-19 pandemic, which added an additional layer of complexity to disaster management due to lockdowns and social distancing measures. Burnout from pandemic response impacted both the people affected by Odette as well as the responders, leading to slower response and increased burden on an already strained health system (OCHA, 2022).

1.1.3 Disaster risk management and humanitarian aid

Due to the growing incidence and severity of climate-related disasters on a global scale, disaster risk management strategies have become increasingly prioritized. Though specific strategies have changed throughout history (Rajabi et al., 2022), this concept aims to prevent new disaster risks, reduce existing risks, manage residual risk, reduce losses, and strengthen

resilience (UNDRR, 2024). Prior to the late 1970s, there was a tendency for governments and organizations to rely on 'top-down' and reactive approaches to disaster management, with a specific focus on disaster response efforts (Rajabi et al., 2022; Scolobig et al., 2015). However, during the 1970s and 1980s, countries began to recognize the need to formalize national emergency management systems to address disaster-related risks, and acknowledged the importance of allocating resources towards comprehensive disaster risk management strategies (Rajabi et al., 2022; Scolobig et al., 2015). In 1987, these ideas were further formalized as the United Nations General Assembly named the 1990s as the "International Decade for Natural Disaster Reduction", which aimed to promote internationally coordinated efforts and raise awareness of the importance in reducing natural disaster risks (Housner, 1989; Rajabi et al., 2022). Since then, the advancement of disaster risk management practices has grown, with an increased focus on proactive actions and comprehensive strategies to reduce disaster risks and consequences. These strategies have also aligned closely with previous global calls to action, including the World Health Organization (WHO) operational framework for building climate resilient health systems and the Sendai Framework for Disaster Risk Reduction 2015-2030 (World Health Organization, 2015). While there is no one-size-fits all approach, modern disaster risk management typically comprises of a four-phase framework, which includes mitigation, preparedness, response, and recovery (further elaboration within Chapter 2). Importantly, disasters tend to exist on a continuum, and each phase of the disaster risk management framework may overlap with the next (Coppola, 2015). Indeed, visualizing the framework as a cycle enables actions to be sorted into a time sequence in relation to one another (Alexander, 2018). Since disaster risk management is a broad concept that has been widely explored in the literature, these four phases have been adapted for different disasters and contexts and can be used when understanding and managing disasters at a broad level (i.e., organizing humanitarian aid), or at a localized level (i.e., organizing community-based support).

Often operating at a national or international level, humanitarian aid is highlighted as a valuable approach to deliver aid, especially once a disaster has already occurred. While relief

goods and support may differ based on geographical location, broadly, aid and resources may come from governmental sources, the military, first responder's agencies, UN agencies, non-governmental organizations, and local organizations, among other sources (Besiou & Van Wassenhove, 2020; Cook et al., 2018; Kanteler & Bakouros, 2024; Mohd et al., 2018). Disaster risk management therefore typically relies on collaboration among numerous stakeholders to provide humanitarian aid, particularly in low and lower-middle-income countries where relief efforts may be delayed or limited (Peralta et al., 2023). While efficient coordination among stakeholders facilitates strong disaster risk management, factors such as limited resources, loss of communication abilities, unpredictable humanitarian operations, and challenges associated with infrastructure can hinder effective disaster risk management (Kanteler & Bakouros, 2024; Santiago et al., 2016). Sufficient international and national aid may also depend on corresponding media coverage; when disasters have broad and severe impacts that are reported extensively in media coverage, additional aid may be present (Santiago et al., 2016). For instance, Super Typhoon Yolanda (internationally known as Haiyan), which occurred in 2013 in the Philippines, drew global attention and interest due to its intensity and the extent of damage (Shen et al., 2023). Following Super Typhoon Yolanda, there was a mobilization of foreign aid from both government and private sources (Lum & Margesson, 2014; Santiago et al., 2016; Uichanco, 2022). However, efficient response efforts and distribution of relief goods were initially limited due to a lack of transportation, limited communication systems, a lack of situational clarity from communities, damage to infrastructure, and disrupted government services (Alcayna et al., 2016; Ito et al., 2014; Lum & Margesson, 2014; Peralta et al., 2023). Specifically, delivering food and relief goods to remote locations proved to be an added challenge (Lum & Margesson, 2014; Uichanco, 2022). Thus, while international and national humanitarian organizations provide essential resources amid extreme weather events, it is critical to examine other stakeholders and sources of aid provision in the context of disaster risk management to ensure comprehensive care and support to affected communities.

In the Philippines, the National Disaster Risk Reduction and Management Council (NDRRMC) operates as the highest decision-making body for disaster management, and is comprised of members from different departments, government agencies, local government units (LGUs), civil society organizations, and the private sector. Previously known as the National Disaster Coordinating Council (NDCC), the NDRRMC provides national coordination for disaster risk reduction, management, and resource allocation in the Philippines, and works closely with the Department of Social Welfare and Development (DSWD). In turn, the DSWD provides support to local government units (LGUs), which are political units that each have their own function and responsibilities, and are comprised of provinces, cities, municipalities, and *barangays*[1]. Although the DSWD is not considered a direct first responder, it provides immediate support to LGUs and assists them in coordinating response efforts amid emergencies or disasters. The LGUs then directly manage evacuation centres and act as first responders during emergencies. LGUs across the Philippines have different disaster-related demands and revenue-raising capabilities, but these differences are not considered in the allocation of disaster funds which can lead to an imbalance between local resources and risk exposure (Domingo & Manejar, 2018; Villacin, 2017). Funding for disaster needs is often inadequate, and existing funds are often underutilized, largely due to misidentification of needs and bureaucratic inefficiencies (Domingo & Manejar, 2018; Ravago et al., 2020). Within an LGU, cities and municipalities are led by a mayor, and *barangays* are supported through leadership from a barangay captain. Due to this decentralized system, understanding of risks, corresponding risk behaviours, and priorities may differ across LGUs in the Philippines (Dariagan et al., 2021; Leon, 2021).

1.1.4 Disaster risk management and climate resilient health systems

Though humanitarian aid and assistance from international and national sources is often relied upon following extreme weather events, numerous organizations and actors work to respond to extreme weather events, particularly when these disasters occur in resource-

[1] A *barangay* refers to a small territorial and administrative district forming the most local level of government in the Philippines

constrained and/or remote settings. Indeed, collaborative disaster risk management activities and strategies are critical in building climate resilient health systems Kanteler & Bakouros, 2024; Mosadeghrad et al., 2023; Wei et al., 2022). As outlined by the WHO, "a climate resilient health system is one that is capable to anticipate, respond to, cope with, recover from, and adapt to climate-related shocks and stress, so as to bring sustained improvements in population health, despite an unstable climate" (World Health Organization, 2015, p.8). To build and strengthen climate resilient health systems, there must be an emphasis on community action and engagement, including consideration of how community-based actors contribute within the disaster risk management context (Besiou & Van Wassenhove, 2020; Domingo et al., 2024; Haldane et al., 2021; Lum & Margesson, 2014; Sripad et al., 2021; World Health Organization, 2015).

While disaster risk management has been adapted across different settings, it has been embedded within several approaches and frameworks that have examined facilitators and barriers to effective disaster management. For instance, the WHO operational framework for building climate resilient health systems aims to protect and improve population health in a changing climate through its six building blocks (leadership and governance; health workforce; health information systems; essential medical products and technologies; service delivery; financing) (World Health Organization, 2015). These building blocks can be expanded into ten corresponding components, and act as a starting point to ensure that climate health resilience builds on existing health systems (Mosadeghrad et al., 2023; World Health Organization, 2015). In particular, building block five (service delivery) highlights a need to expand traditional systems of healthcare delivery to enhance climate resilience, which includes the need for disaster risk reduction, and emergency preparedness and management to extreme weather events (World Health Organization, 2015). This building block underscores the importance in empowering communities and strengthening the capacity of health systems to promote preparedness, response, and recovery (World Health Organization, 2015). Following the operational framework, the WHO also developed an emergency and disaster risk management for health policy framework (Health EDRM),

which aligns closely with the concepts of disaster risk management and climate resilient health systems by providing a comprehensive approach that focuses on assessing, communicating and reducing risks across preparedness, response, and recovery to build health system and community resilience (World Health Organization, 2019). Comprised of ten functions, the Health EDRM framework highlights the need to include communities in planning and action and strengthen local health workforce, which includes mobilizing community leaders to build public confidence, disseminate information, and identify people at risk (World Health Organization, 2019). Strengthening the capacity of local health workers and including communities in planning and action can therefore contribute to more resilient climate-health systems (World Health Organization, 2019). In addition, the Sendai Framework for Disaster Risk Reduction 2015-2030 aligns with the WHO frameworks, and outlines four priorities for action to prevent and reduce disaster risks, which include a call to enhance collaboration among community-based and non-governmental organizations to develop pragmatic guidance, contribute to a culture of education and awareness, and advocate for resilient communities (UNDRR, 2015). Though these frameworks underscore the need for community-based engagement to promote strong disaster risk management, there is generally a lack of consideration of the burden and increased responsibilities that this engagement may have among community-based actors, particularly in resource-constrained settings.

1.1.5 Community contributions to climate resilient health systems

Evidently, strong community-based health systems act as a foundation for broader health systems resilience (Haldane et al., 2022; Kruk et al., 2015; Wei et al., 2022; World Health Organization, 2015). Community empowerment and engagement with local organizations may lead to increased capacity building and more resilient health systems, as communities have a unique understanding of the factors that enable them respond to and recover from extreme weather events, as well as an inherent understanding of the risks involved with these events (Lum & Margesson, 2014; Sripad et al., 2021; World Health Organization, 2015). Indeed, dynamic health systems that recognize communities as not simply recipients of care,

but as central actors, contribute to strong climate-resilience (Abunyewah et al., 2020; Kruk et al., 2015). Oftentimes, social norms, social capital, and social networks determine behaviours, with neighbours sometimes acting as first responders amid disasters (Alcayna et al., 2016; Sripad et al., 2021; Uscher-Pines et al., 2013). For instance, following an earthquake in Nepal, community members worked collectively through their social networks to share resources and information, and support each other emotionally (Devkota et al., 2016). Importantly, both informal and formal networks that existed before the earthquake remained active immediately following the earthquake, and these robust local networks facilitated strong community cooperation and solidarity during response and recovery (Devkota et al., 2016). Similarly, trust, communication, and shared experiences among neighbours were highlighted as key factors that strengthened community solidarity and mental health following a typhoon in the Philippines (Jovita et al., 2019). Conversely, researchers in Iran identified a lack of social capital and inadequate community resilience as barriers to managing disasters at the local level (Hosseini et al., 2017). Thus, strong networks and social capital seem to not only impact individual wellbeing, but also facilitate system-wide recovery from a disaster (Guo et al., 2024; Kruk et al., 2015). However, communities cannot operate in isolation. Particularly in resource constrained and remote areas, communities frequently lack the resources, finances, knowledge, and capacity to fully address disaster risk management, which underscores the need for collaboration among multiple actors and coordination at the local level to strengthen community resilience to climate-related disasters (Asweto et al., 2016; Gebremeskel et al., 2021; Hung et al., 2021; Ozano et al., 2018; Sadri et al., 2018; Safapour et al., 2021; Sharma et al., 2018). Though strong social capital has been highlighted as a significant component of community-based disaster experiences (Alcayna et al., 2016; Sripad et al., 2021; Uscher-Pines et al., 2013), current literature lacks a deeper understanding of how the informal and formal networks of community-based health actors may be leveraged to further strengthen community-based disaster risk management. Overall, though foreign aid and governmental assistance is necessary for effective disaster risk management, valuing local knowledge and utilizing community-based strategies for disseminating information and coordinating additional

support may lead to more effective disaster risk management at the local level (Sripad et al., 2021; Rizzoli et al., 2024; World Health Organization, 2015).

As outlined in Goal 13 of the Sustainable Development Goals, there is an urgent need to take action against climate change, which includes rapidly enhancing efforts and initiatives to support climate adaptation and resilience (United Nations, 2015). In alignment with the Sendai Framework and the WHO frameworks, community-based strategies are increasingly relied upon within disaster risk management, with community involvement acknowledged as an important component of disaster governance. One avenue to further support community-based disaster management strategies is the increased expansion of and investment in community health worker programs (Bhutta, 2017; Maher, 2017; Siekmans et al., 2017).

1.1.6 Community health workers

Community health workers (CHWs) are lay members of a community who either volunteer or work within a government health system or through a non-governmental organization (NGO) (Pallas et al., 2013). Though initially introduced in the 1970s, CHW programs have seen a marked increase over the past two decades (Perry et al., 2014). In some cases, CHWs are selected by their own communities, and can either have specific or broad job descriptions (Kok et al., 2017; Pallas et al., 2013). Frequently, CHWs deliver clinical services, make referrals, provide health-related education, collect data for monitoring and evaluation purposes, or provide psychosocial support to their community members (Scott et al., 2018). As CHWs are embedded within communities, they often hold a level of trust with community members and can deliver culturally and contextually appropriate care to multiple households (Kane et al., 2020; Luu et al., 2022). In fact, maintaining the positive relationship between community members and CHWs can lead to more effective program delivery within communities. For example, mothers in South Africa were more likely to reveal their HIV status to CHWs, which enabled CHWs to provide additional support and advice to these community members (Horwood et al., 2017). In India, the presence of a CHW in a community was associated with positive maternal and newborn care practices, such as delivering in a health facility and early initiation of breastfeeding (Smittenaar et al., 2020).

While the CHW model has existed for over 50 years, CHWs are known by different names across different countries and contexts (Oliver et al., 2015; Perry et al., 2014). For instance, CHWs in India are referred to as Accredited Social Health Activists (ASHAs) (Kiran et al., 2021; Mishra, 2014), whereas in Nepal, CHWs are known as Female Community Health Volunteers (FCHVs) (Fredricks et al., 2017). In recent decades, there has been a growth in CHW programs worldwide, with an increasing recognition of their importance in supporting health systems, particularly in low- and lower-middle income countries (Perry et al., 2014). The use of CHWs to facilitate community engagement in health systems has been outlined as a practical strategy to address barriers to health care access and strengthen health systems (Siekmans et al., 2017). Importantly, CHWs often act as a critical resource to deliver health-related support and care in resource-constrained settings during disasters, and may improve community adaptation and resilience amid disasters if provided with appropriate training and adequate resources (Maat et al., 2021; Fredricks et al., 2017; Siekmans et al., 2017). Leveraging the knowledge and trust of CHWs may therefore significantly contribute towards efficient disaster risk management, and strengthen community resilience to climate-related disasters.

Though CHWs are uniquely positioned to address health-related knowledge gaps, deliver care, and reach community members in their homes, they may also face challenges in providing effective care within their communities. In some contexts, the employment of CHWs may be reliant on their political alignment within their community; if the local governmental administration changes, CHWs may be replaced (Dodd et al., 2021; Lewin et al., 2021; Yu et al., 2023). Additionally, adequate financial compensation is a core challenge among many CHW programs, as CHWs are typically offered incentives (either direct and indirect) as compensation for their work, rather than steady wages (Asweto et al., 2016; Colvin et al., 2021; Miller et al., 2018). CHWs may also hold multiple roles within their communities, which can impact their provision of services (Mlotshwa et al., 2015; Rafiq et al., 2019). These overlapping identities may allow CHWs to be seen as both an ‘insider’ and an ‘outsider’ within their communities, which can impact their role and community

perceptions of service delivery (Rafiq et al., 2019). Similarly, as women are often CHWs in low- and lower-middle income countries, many CHWs must navigate gender-based occupational challenges (Parray et al., 2021; Raven et al., 2022; Steege et al., 2018). For instance, CHWs oftentimes hold multiple caregiving roles, both within the household and the broader community (Agarwal et al., 2019; Steege et al., 2018). Many women are mothers and/or care for immediate family members, in addition to their role as a CHW along with other responsibilities or obligations within their community. Balancing these varied roles may therefore limit their capacity and the time they can spend engaging with each responsibility.

In the Philippines, the CHW model of healthcare delivery was adopted in the early 1980s (Mallari et al., 2020). However, due to a decentralized health system, the availability and quality of CHW programs often differs across settings (Baliolaa et al., 2023; Dodd et al., 2021; Mallari et al., 2020; Yu et al., 2023). Operating within their municipalities, or *barangays*, CHWs working with the Department of Health in the Philippines are typically referred to as *barangay* health workers (BHWs). These government-affiliated CHWs serve as a bridge between local health facilities and their communities, and often visit individual households to deliver information or practical services (Mallari et al., 2020; Perez et al., 2020; Schaaf et al., 2020). Though BHWs operate within both urban and rural regions in the Philippines, existing literature typically focuses on their role in rural and remote settings where access to basic health services is often low, where there are often few health professionals (e.g., physicians, nurses), and where households may benefit most from community-based strategies for health care delivery (Mallari et al., 2020; Perry et al., 2014; Wulandari et al., 2021). In addition to the BHW program, NGOs administer or support distinct CHW programs in the Philippines. While operating adjacent to the broader health system, CHWs affiliated with NGO-led CHW programs remain accountable to the specific NGO program. Overall, the governance of CHW programs directly affects the objectives and reach of services, and the ways in which CHWs themselves are incentivized and supported. Despite a potential limit to the scope of their work, previous literature has considered how

these NGO-affiliated CHWs may have more capacity and autonomy to enact social change when compared to government-affiliated CHWs (Dodd et al., 2022; Schaaf et al., 2020). Regardless of whether a CHW program is operated by the government or an NGO, these programs may still face challenges within health systems, including social risk, unstable financing, minimal supervision, and inadequate resources (Dodd et al., 2022; Perry et al., 2014; Schaaf et al., 2020).

1.2 Study context and research objectives

1.2.1 The role of community health workers during disasters

Increased decision-making and involvement at the local level contributes towards more efficient and effective disaster management strategies (Saulnier et al., 2020). Though other actors and organizations are critical in the delivery of aid and support, communities often respond first during disasters when other support systems are delayed (Alcayna et al., 2016; Luu et al., 2022; Sripad et al., 2021; Uscher-Pines et al., 2013). Further, disasters often disproportionately impact resource-constrained communities, who are already at an increased risk of negative health and livelihood impacts due to underlying vulnerabilities and existing socioeconomic challenges. Therefore, with an increasing recognition of the dynamic role that CHWs hold within health systems (Carson et al., 2022; Kane et al., 2020), there may be opportunities to further leverage their efforts when managing the impacts of disasters, thereby strengthening climate-health resilience at the community level (Behera et al., 2020; Domingo et al., 2024; Haldane et al., 2022; Nicholls et al., 2017; Palafox et al., 2021). For instance, CHWs in Madagascar rapidly organized community education meetings on health risks and ensured that clinics continued to run effectively despite disruptions caused by a cyclone (Maat et al., 2021). Due to effective record keeping and in-depth knowledge of their communities, these CHWs maintained a continuity of care throughout the disaster (Maat et al., 2021). Similarly, CHWs in Bangladesh organized temporary clinics and adapted service hours when regular services were disrupted by flooding (Shah et al., 2019). By effectively communicating these new locations to community members, they made treatment and

referral possible amid the flooding emergency (Shah et al., 2019). Further, CHWs in Nepal supported their communities after an earthquake by providing basic first aid, distributing rations, building shelters, and sharing messages of support and reassurance, especially to mothers and children (Fredricks et al., 2017). Following the earthquake, they also continued their routine tasks, which included addressing malnourishment among children in the community (Fredricks et al., 2017). CHWs within Nepal also highlighted the need for relief agencies and government organizations to collaborate with local CHWs to effectively distribute goods to those who were most impacted by disasters (Fredricks et al., 2017). Similarly, when participants of a study in Haiti were asked how to support CHWs during future disasters, there was an emphasis on community health as a priority, along with CHW involvement in identifying challenges and solutions, and increased CHW support during and following disasters (Sripad et al., 2021). Indeed, strengthening the sustainability of community-based health systems to ensure that these systems are still effective even amid disasters is critical in enhancing climate resilient health systems. However, each of the above studies lacks a careful consideration of how CHWs themselves experienced these disasters, and how their experiences impacted their ability to provide support and care within their communities.

With the growing frequency and severity of extreme weather events within the Philippines, it is important to explore how community-based disaster risk management strategies can address complex challenges within rural and remote communities. Previous studies have pointed to the need to strengthen the role of CHWs before and during disasters to extend the reach of health services (Haldane et al., 2022; Mosadeghrad et al., 2023). However, while CHWs are often regarded as health leaders who possess health and education resources within their community, disaster risk management actions and strategies offer unique challenges when CHWs experience the disasters themselves. Though there have been studies that investigate the role that CHWs may be able to play, particularly during response and recovery (Maat et al., 2021; Nicholls et al., 2017; Shah et al., 2019), previous literature has lacked a focus on how the positionality of CHWs influences their responsibilities and

expectations of them as critical health systems actors (Kane et al., 2020; Schaaf et al., 2020). In fact, tensions within health systems have undermined CHWs experiences and performance within community settings (Kane et al., 2016; Kane et al., 2020; Schaaf et al., 2020). Often, CHWs are placed low in the health system hierarchy, and therefore are at risk of being discredited as simply an extra pair of hands (Steege et al., 2018). They also may feel undermined by formal health centres, which can foster feelings of inadequacy and the idea that their legitimacy and credibility as members of the health system are at risk (Sarin et al., 2016; Sarin & Lunsford, 2017). Unclear or increased workloads, often associated with unexpected disasters, can lead to unfair expectations and challenges associated with burnout (Boyce & Katz, 2019; Ndambo et al., 2022; Yella & Dmello, 2022). Task-shifting, whereby specific tasks are shifted to health workers with shorter training periods and fewer qualifications (World Health Organization et al., 2007), can also lead to variable care quality, tension regarding expectations, and challenges associated with workload (Smith et al., 2014). For example, the COVID-19 pandemic impacted availability and efficiency of services on a global scale, and the need for task-shifting was intensified (Das et al., 2023). In Pakistan, COVID-19 surveillance hubs were initiated and CHWs were trained briefly before being sent to communities (Zafar et al., 2022), and in Mexico, CHWs were trained to provide psychological first aid and referrals, which extended the reach of health services in resource-constrained settings (Das et al., 2023; Ortega et al., 2021). However, while community-based actors were seen as an efficient source of support during the growing crisis, the reliance on these actors amid existing shortages not only increased their expanding responsibilities, but also impacted their existing service responsibilities, and sometimes led to feelings of fear, anxiety, and depression (Dodd et al., 2022; Speers et al., 2023). Thus, though community-based actors were an integral part of COVID-19 disaster management, there must be a consideration of how task-shifting impacts their own workload and capacity to provide care amid future disasters. Understanding CHWs experiences in the disaster context is critical in order to outline reasonable expectations of what can and should be within their scope of responsibility (Schaaf et al., 2020). Ultimately, while they are not the only community-based actors operating within the health system, CHWs are an instrumental source of support and

should be properly equipped if they are to play a role in extending the reach of health systems to create and strengthen climate resilience (Domingo et al., 2024; Ebi & Semenza, 2008; Haldane et al., 2021; Haldane et al., 2022).

1.2.2 Partnership

This research is guided by an established collaboration with International Care Ministries (ICM), which is a Philippines-based NGO focused on poverty alleviation. During the COVID-19 pandemic, ICM launched the Flourish program, where the organization recruits and trains Community Health Champions (CHCs) who operate as CHWs. Many of the first CHWs within this program were recruited from another ICM program called Transform, which is a community-based poverty-alleviation program that brings together representatives (often women) from households experiencing extreme poverty to receive health and livelihood education (ICM, 2022b; Lau et al., 2020; Luu et al., 2022).

Once recruited to the program, CHWs are trained and equipped to conduct home visits guided by a mobile application to monitor maternal and child health and screen for health concerns in their community. When a health concern is identified, and based on direction from the mobile application, CHWs can either provide home-based treatment for basic health concerns (i.e., packages of fortified rice for children identified as malnourished, paracetamol for fevers, prenatal vitamins), or refer the individuals to a formal health care facility (e.g., rural health unit) for more complex concerns. If an individual was referred to a health care facility, the CHW would complete a follow-up visit within 48-hours following the referral. CHWs also receive regular support and training from Community Health Champion Coordinators (CHCCs), who directly support these CHWs by leading meetings, delivering health resources, and facilitating CHW training sessions (ICM, 2022b).

ICM operates out of twelve bases located across the Philippines and provided leadership in Super Typhoon Odette recovery and response efforts across resource-limited communities (ICM, 2022a). Recruitment for this study was facilitated through ICM's pre-existing relationships with CHWs in Negros Oriental. It is important to note that while these CHWs

provide maternal and child healthcare within their communities, they do not play a formal role in disaster preparedness, response, and recovery.

1.2.3 Rationale and objectives

This study focused on exploring the experiences of CHWs when preparing for, responding to, and recovering from extreme weather events, recognizing that while they hold a position of leadership within their communities, they share very similar socioeconomic and demographic profiles to their fellow community members and experience extreme weather events in a similar way. Therefore, the objectives of this study were to: 1) Explore how CHWs navigate extreme weather event preparedness, response, and recovery, and gain insight into the role of formal and informal networks amid extreme weather events, and 2) Explore how NGO-led CHWs can be better equipped to support their communities and manage complex challenges that occur during preparedness, response, and recovery to extreme weather events. In exploring opportunities to strengthen climate resilient health systems at the community level, this research makes two important contributions. First, this study offers insights into how CHWs experience extreme weather events, and how these experiences impact their capacity to provide support within their own communities. Second, this study contributes a deeper understanding of individual and program-specific factors involved in preparedness, response, and recovery activities, along with consideration as to how CHWs affiliated with an NGO-led CHW program can be better supported when navigating challenges that arise during disaster risk management. Further, this study contributes to the growing disaster risk management literature by highlighting how CHWs perceive their own capacity to support community-based disaster risk management, which can be used to inform how they can be appropriately incorporated into future strategies.

1.3 Consideration and statement of positionality

My identity, beliefs, and past experiences shaped the ways in which I understood and engaged with this research. Therefore, it is important to acknowledge my positionality in relation to this work.

I entered the MSc program directly after completing my undergraduate degree in Health Studies at the University of Waterloo (BSc, 2022). Prior to starting this thesis, I worked in several interdisciplinary research labs, contributed towards multiple peer-reviewed publications, and had a basic understanding of secondary data analysis and the peer-review process. Together, these experiences offered a unique professional and academic introduction to the research process. However, I had limited background in the field of global health, and no experience collecting or analyzing primary data that I had collected. Therefore, I relied heavily on my mentors and their established partnerships when conducting this work.

My identity played a significant role in the way data were collected and analyzed. I identify as a female, White, Canadian researcher, with no prior experience working in an international context. Prior to this experience, I had limited interviewing and travel experience, and had never worked outside of Canada. Thus, my identity as an obvious foreigner in the Philippines may have impacted the ways in which data were collected, as I had limited knowledge of cultural factors and dynamics within the country. Members of ICM staff, our interpreters, and our research assistant played an instrumental role in helping me understand the customs and dynamics within which we worked. Prior to my trip to the Philippines, I also greatly benefited from conversations with colleagues who had recently returned from field work in the Philippines. Additionally, as I only speak English, I could not comfortably communicate with most of the participants without assistance and translation from our interpreters. Thus, I greatly benefitted from working with two interpreters from Negros Oriental who spoke English, Tagalog, and Bisaya, and our research assistant who spoke both English and Tagalog.

My age also may have influenced the participants' perceptions of me as a researcher, and their levels of comfort during each interview. All the interviewed participants were women between the ages of 18 and 55. Though I was leading this particular study, I was younger than the majority of the participants, which means there may have been conflicting perceptions about my competency or experience as a researcher. Among the participants who were a similar age as I was at the time of interviewing, our experiences and responsibilities

were radically different. For instance, I am not a mother, nor do I have any primary caregiving responsibilities, so there may have been times where I could not relate to or fully understand the experiences that CHWs discussed. Yet, this may have positioned me to understand nuances that may seem obvious to other caregivers. Similarly, I have never experienced an extreme weather event, or had to navigate the challenges associated with evacuating or responding to immediate threats. However, though Super Typhoon Betty fortunately did not land in the Philippines, I was present for these typhoon warnings, and did feel a sense of fear when circumstances and conditions were unknown. While I cannot fully relate to the experiences of CHWs amid extreme weather events, this experience may have provided me with additional understanding and insight into the fears and uncertainty that come with extreme weather event warnings.

Furthermore, while interviewing only women for this thesis project was unintentional, it may have added an additional layer of comfort during the interviews themselves. As such, I may have been more comfortable in conversations with the participants for this study when compared to if I had interviewed men. In turn, participants may have felt more comfortable speaking about their experiences with our research team, who all identified as women. Additionally, ICM is a faith-based organization, and many participants detailed their engagement with their own faith during extreme weather event preparedness, response, and recovery activities. As I was raised with a faith background, I may have been better positioned to understand the ways in which participants connected with their faith and how faith strongly influenced personal beliefs and experiences during disaster risk management activities. Working with a faith-based organization, I also may have been better able to understand their values and the ways in which they conduct their organization.

It is also important to acknowledge that while data collection occurred in Negros Oriental, Philippines, data were analyzed and this thesis was written in Waterloo, Ontario, Canada. This study was made possible through my academic privilege and enrollment as a student at the University of Waterloo, which is situated on the traditional territory of the Neutral, Anishinaabeg, and Haudenosaunee peoples. Working in both Negros Oriental and

Waterloo have prompted me to reflect on my identity within both contexts, which has facilitated a broader reflection on colonialism. I recognize my privilege, and commit to ongoing reflection, learning, and action in the field of global health.

Chapter 2: Methods

2.1 Study design

2.1.1 Study location

Travel to Negros Oriental, Philippines, occurred between May 22 and June 16, 2023. As previously mentioned, Super Typhoon Odette's path was directly through both the Visayas (central region of the Philippines) and Mindanao (southern region of the Philippines) regions of the country (ReliefWeb, 2021; ReliefWeb, 2022b). Odette caused severe damage to infrastructure and livelihoods, and impacted nearly 90% of the *barangays* in Negros Oriental (Visayas) (OCHA, 2022a). Specifically, Northern Negros Oriental faced some of the worst impacts of the storm, as Odette passed directly through this area with a tropical cyclone wind signal reaching level four (winds up to 175km/hour) (OCHA, 2022a). Odette made nine landfalls across seven provinces in the Philippines, with its eighth landfall occurring in La Libertad, Negros Oriental (OCHA, 2022b). Negros Oriental also experienced a severe earthquake in 2012, and several local government units have been identified as flood-prone areas (PreventionWeb, 2010; Aurelio et al., 2017). Therefore, while based in Dumaguete (capital city of Negros Oriental), research team members traveled north to four different municipalities within Negros Oriental, which included Guihulngan, La Libertad, Ayungon, and Manjuyod, to conduct semi-structured interviews with CHWs in each municipality. The interviews were conducted in community spaces, primarily churches, within the main city of each location. Participants had their travel costs covered and were provided with an honorarium as a sign of appreciation for their time.

2.1.2 Study sample

This research was anchored by an existing partnership with ICM, and this study was part of a broader evaluation of the Flourish program within Negros Oriental, Philippines. Thus, the population invited to participate in this research was individuals who are associated with ICM programming through involvement with the Flourish program. While the broader

evaluation project was not directly connected to this thesis research, many of the participants who were involved in data collection for the evaluation returned for these interviews. The number and duration of the interviews remained flexible throughout the data collection process and were largely dependent on the weather conditions that impacted the ability of CHWs to travel to the churches for the interviews, and the willingness of the participants to speak about their experiences with such a sensitive topic. Due to the fact that we were interviewing CHWs during the beginning of the rainy season in the Philippines, several participants were unable to travel to the interview locations due to weather conditions, and therefore were unable to partake in this study. All study participants identified as women, and were between the ages of 18-55 years old. Questions were delivered in the participants' language of preference, which was typically either Tagalog or Bisaya. Participants had to be over the age of 18 to participate in the interviews, and all the participants interviewed within this study were living in or near the municipalities of Guihulngan (n=15), La Libertad (n=12), Ayungon (n=11), or Manjuyod (n=13).

2.1.3 Disaster risk management framework

This research is informed by both the Sendai Framework and the WHO operational framework for building climate resilient health systems, and guided by the disaster risk management (DRM) framework. While different models have been proposed for disaster risk management (Scolobig et al., 2015), the DRM framework is traditionally comprised of four main phases of disaster risk management, which include: mitigation, preparedness, response, and recovery (Sawalha, 2020; Kanteler & Bakouros, 2024). Informed by Coppola (2015), the first phase, mitigation, occurs prior to the disaster and involves reducing or eliminating the likelihood or consequence of the disaster, which can include activities such as altering the physical environment by building specific infrastructure (i.e., constructing barriers). Preparedness also typically occurs before the disaster, and involves minimizing losses and increasing chances of survival by equipping people who will be impacted by the disaster (i.e., providing information about what to do before a disaster happens). Response involves reducing or eliminating the impact of disasters that have occurred or are currently occurring

to prevent further loss (i.e., evacuation). Finally, recovery involves returning back to a normal state following a disaster, which can persist for months or even years after the disaster (i.e., rebuilding infrastructure).

Utilizing the DRM framework within qualitative research has become increasingly popular. For instance, in response to the 2015 earthquake in Nepal, Cook et al. utilized the four-phase cycle to better understand the scale of national and international disaster management efforts (Cook et al., 2018). Though focused largely on response efforts to the earthquake, the involvement of community-based NGOs was highlighted as a critical component in reaching disaster-affected communities (Cook et al., 2018). Similarly, in South Africa, Busayo et al. utilized these four phases as an cyclical and 'all-inclusive' approach to flood disaster management, through which localized knowledge and collaborative networks between communities and municipalities facilitated effective flood management (Busayo et al., 2022). Though this framework is widely used in disaster risk management literature, it is important to note that the framework itself is quite broad, and specific applications of the framework and priorities within each of these four phases may shift depending on geographical and socioeconomic contexts. Similarly, adaptations to the four phases of this framework may be used within different settings. For instance, a case study examining flooding in China excluded the mitigation phase entirely, and instead replaced the traditional preparedness, response, and recovery phases of the framework with new headings entitled 'warning', 'emergency relief', and 'rehabilitation' (Guo et al., 2024). Though these headings were adapted, the activities within each phase still aligned with general understandings of preparedness, response, and recovery (Guo et al., 2024). In addition, researchers in Pakistan utilized the four-phase framework when developing their interview guide, but broadened the phases to instead include 'mitigation', 'preparedness', 'relief and rescue' and 'recovery and rehabilitation' (Rana et al., 2021). They also utilized these categories as headings when presenting their results regarding flooding disasters, which provided a clear and comprehensive outline of the barriers and challenges amid flooding disaster management (Rana et al., 2021). Finally, Pratama & Sariffuddin outlined disaster management strategies

carried out by a community when coping with a landslide disaster in Bangladesh, which included three phases: 'readiness', 'response', and 'reconstruction' (Pratama & Sariffuddin, 2018). In their evaluation of each phase, it was evident that the actions and strategies closely aligned with the traditional phases of preparedness, response, and recovery (Pratama & Sariffuddin, 2018).

Though disaster risk management has been broadly utilized within existing literature, there has been some criticism regarding the simplicity of the four-phased framework (Rana et al., 2021). For instance, Bosher et al. argue that presenting this concept as a cycle minimizes the dynamic nature of disasters, and propose that effective disaster risk management should instead lead to the elimination of the disaster altogether, rather than visualizing the disaster itself as part of the cycle (Bosher et al., 2021). Overall, while visualizing the DRM framework as a cycle is beneficial in sorting actions and concepts in relation to one another, this framework also needs to be met with an understanding of the dynamic and contextual nature of disasters.

Evidently, there is a need for collaboration and effective management of multi-disciplinary teams, including organizations at the international, national, and local levels, to build effective and comprehensive disaster risk management strategies. Specifically, community-based disaster risk management must incorporate the involvement of potentially affected communities at the local level (UNDRR, 2024). In particular, local knowledge about resources, facilities, and support systems are critical in effective disaster risk management strategies (Scolobig et al., 2015). The DRM framework was chosen for this study largely based on its overarching use in disaster literature and its association with building stronger climate resilient health systems (Birkmann et al., 2013; Rana et al., 2021; UNDRR, 2024; World Health Organization, 2015). The traditional cyclical nature of the framework also allowed for participants in this study to provide a comprehensive recollection of their experience with extreme weather events (Alexander, 2018).

Although 'mitigation' is the first phase of the DRM framework, it was excluded from the current study (see Figure 1). As previously mentioned, numerous organizations and

stakeholders operate within the disaster risk management space, particularly when the effects of a disaster are widespread. Therefore, as the purpose of this study was to understand experiences of extreme weather events among CHWs in resource-constrained settings, it was important to recognize that disaster mitigation efforts, which often require support from multiple actors and organizations across different sectors, may not necessarily be feasible or prioritized by CHWs in resource-constrained settings. Though mitigation efforts can be defined differently across various settings, broadly, mitigation efforts are typically conceptualized as either structural or nonstructural measures. Structural measures are those that involve some form of engineering or constructing, which makes them generally expensive (Coppola, 2015; Rana et al., 2021). For instance, embankments along rivers in Pakistan were constructure to reduce overall flood exposure, although challenges like lack of regular cleaning and maintenance inhibited their effectiveness (Rana et al., 2021). Conversely, non-structural measures are often used in urban areas. These measures typically include building control or land use and zoning laws, which can lead to problems with compliance and the cost of enforcement (Coppola, 2015; Rana et al., 2021).

Thus, the decision to exclude mitigation from this study was made with consideration of the purpose and scale of this research. This research aimed to explore how CHWs associated with an NGO-led CHW program experienced and navigated extreme weather events in resource-constrained communities and how these experiences may be understood in the context of the DRM framework. However, activities and initiatives associated with mitigation (as conceptualized within the DRM framework) were deemed to be more peripheral to participant's experiences of preparedness, response, and recovery. Further, there was consideration of how CHWs contributions to mitigation activities and initiatives at a community-level may be more limited than their contributions to preparedness, response, and recovery. When considering the applicability of study findings for ICM, it was noted that disaster mitigation activities, particularly with regard to extreme weather events, are not currently mainstreamed in ICM programming. Thus, when assessing opportunities for ICM to support CHWs affiliated with their CHW program amid extreme weather events,

mitigation was deemed to be more outside the sphere of influence of ICM relative to opportunities to support CHWs to enhance community-level preparedness, response, and recovery. Overall, while the three remaining components of the DRM framework guided the design of the interview questions for this study, coding and analysis followed a hybrid deductive-inductive approach to ensure that the themes were comprehensive.

Figure 1. The disaster risk management framework, adapted from Coppola, 2015

2.1.4 Interview guide development

The research questions were designed in alignment with the DRM framework to comprehensively examine the experiences of participants amid preparedness, response, and recovery to extreme weather events. The interview guide itself was structured in three main sections (see Appendix A). After asking about general demographic information (including the participant's age, household size, and education level), the first section aimed to understand a profile of the individual and their community. The second section was specifically guided by the DRM framework and was split into two parts (Part A and B). Part A focused on experiences with Super Typhoon Odette, and Part B inquired about experiences with other extreme weather events or disasters. Finally, the third section of the interview

guide focused on the role of the CHWs amid extreme weather events. Each interview ended with a brief set of follow-up questions from a previous study conducted by University of Waterloo researchers.

In consultation with my supervisor and other research team members, I decided to anchor the interview questions around Odette because we were aware that the typhoon had passed through the Negros Island region and likely had affected most of the participants. Anchoring the interview guide around Odette also allowed us to pinpoint a specific experience for the CHWs to talk about, which enabled them to share personal stories about their preparedness, response, and recovery activities. In doing this, I relied on a phenomenological approach to data collection in order to understand CHWs subjective experiences with extreme weather events (Bevan, 2014; Dodd et al., 2018; Sholokhova et al., 2022). In short, phenomenology aims to explore phenomena from the perspectives of those who have experienced the phenomena (Lapa et al., 2016; Nakagawa, 2017; Neubauer et al., 2019). This approach requires a deep engagement with the data through repeated reading and writing, and is most useful when exploring perceptions of phenomena, and the meaning phenomena have in subjective experiences (Alase, 2017; Lapa et al., 2016; Neubauer et al., 2019). Extreme weather events can be considered as phenomena that occur with little warning and require assistance from numerous stakeholders to address the needs of those affected. Thus, through iterative engagement with the data, this approach was used to explore and understand the experiences of CHWs with extreme weather events, anchored around subjective experiences with Odette. To further broaden the results, CHWs were also asked about other extreme weather events that may have impacted their community. Overall, the structure of the interview guide was designed to encourage the CHWs to talk about any extreme weather event that may have impacted them, but also provided guidance if they were unsure what to discuss.

2.1.5 Language considerations

This study relied on a combination of English, Tagalog, and Bisaya. Communication and coordination between the Waterloo team and ICM staff occurred in English. However, as

English and Tagalog are the two national languages of the Philippines, both were used during field work. Additionally, as data were collected in smaller cities across Negros Oriental where English and Tagalog are not frequently spoken, a local dialect, Bisaya, was used during most of the interviews. Therefore, two interpreters (Ruth and Alona) were present during the data collection process to ensure accurate translation of the questions and responses during each interview (Speers et al., 2023; van Nes et al., 2010). Further, having two interpreters who were both from Negros Oriental facilitated trust and contributed to the creation of a supportive environment (Speers et al., 2023). While Ruth and Alona were from the region, they were not affiliated with ICM. During interviews, they also aimed to maintain a neutral position, which may have facilitated more accurate translation. As English is the only language that I am fluent in, data from the interviews were translated into English, and coding was conducted in English. The research findings are also presented in English.

2.1.6 Research ethics and funding

Research ethics approval was obtained from the University of Waterloo Research Ethics Board (ORE # 43710). Funding for this project was provided by a Joseph-Armand Bombardier Canada Graduate Scholarship (SSHRC), the University of Waterloo President's Graduate Scholarship, the University of Waterloo International Experience Award, and the University of Waterloo Global Health Policy and Innovation (GHPI) Research Centre's Global Health Scholarship.

2.2 Data collection

In total, 51 CHWs were interviewed from the four different locations within Negros Oriental. Travel to each municipality occurred between May 28-June 8, 2023, by public transportation. Coordination for the travel periods was organized by a Filipina Canadian research coordinator (Monica) and Filipina research assistants and interpreters (Ruth and Alona) in collaboration with ICM staff associated with ICM's Dumaguete base.

2.2.1 Prior to the interview process

Before Monica, Ruth, Alona, and I began the first interviews, we met and discussed the research interview guide to ensure the questions could be accurately translated from English to Bisaya for the participants. During this meeting, some of the interview questions were altered to improve clarity, and Ruth and Alona had the opportunity to ask questions regarding the intention of each question. This process ensured that all research team members were aligned with the purpose and goals of this specific study, and that words and concepts spoken in English could be accurately understood when translated into Bisaya (Berman & Tyyskä, 2011; van Nes et al., 2010). Additionally, as we had just received warning about Super Typhoon Betty (internationally known as Mawar) approximately five days prior to this initial meeting, additional questions were added about preparation and response to warnings for this typhoon. While Betty's occurrence did not delay our ability to travel to each municipality, the purpose of adding these questions about Betty was to compare and contrast how preparedness, response, and recovery looked after Odette (which had occurred a year and a half prior). I was interested in understanding if experiences with Super Typhoon Odette would have influenced the ways in which community members prepared for and reacted to news about Super Typhoon Betty. By adding these questions, I also hoped to gain an acute understanding of how people in rural communities felt amid disaster warnings, as Betty had not yet impacted the Philippines but had entered the Philippine Area of Responsibility.

2.2.2 During the interview process

After each day of interviews, Monica and I would meet to discuss what we had learned and where there might be gaps or missing information in participant responses. Throughout the entire interview process, the interview questions were altered slightly to ensure we were gaining a comprehensive understanding of experiences with Odette and other extreme weather events. Acknowledging that the interviews contained sensitive topics and a recollection of negative personal experiences, we also made sure that the participants had the opportunity to lead the conversation to ensure that we did not make them uncomfortable or anxious. Nevertheless, the sensitivity of the topic and the participants' affiliation with ICM

may have introduced response bias during the interviews (Bergen & Labonté, 2020; Dickson-Swift et al., 2009; Silverio et al., 2022). Specifically, social desirability bias may have occurred during data collection, as participants may have presented their perceptions and opinions in a way that was not entirely reflective of their experiences with extreme weather events due to concerns about their connections to ICM operations (Bergen & Labonté, 2020; Scheelbeek et al., 2020). Though it is difficult to completely eliminate opportunities for response bias in interviews, ensuring that participants understood that their identity would remain confidential and that responses would be anonymous may have reduced the incidence of response bias within these interviews.

Before the final two days of interviews in Manjuyod, I conducted a rapid analysis of interviews (n=5) we had finished transcribing to begin exploring key ideas and themes. From this, I found several reoccurring themes, which included the physical impacts of Odette on health and infrastructure, strategies to manage the damage caused by extreme weather events, and multiple stories about the importance of community support and collaboration when responding to Odette. By doing this brief analysis, I was also able to identify areas where I could have asked additional follow up questions in past interviews, which provided insight into where I could probe further to gain more context in our final interviews. Interviewing participants from four municipalities also contributed towards data saturation, as my understanding of CHWs experiences with extreme weather events became stronger and more cohesive and I was able to recognize similarities when comparing and contrasting data (Morse, 2015).

2.2.3 Translation and data storage

Monica and I were each accompanied by either Ruth or Alona during the face-to-face interviews. The questions were delivered in either English or Tagalog, and then translated into Bisaya for the participant. Once responses were translated back to English, we had the opportunity to ask any follow up questions or move to our next question. Informed verbal consent was received prior to each interview, and each interview was audio recorded. Interviews lasted approximately 30 minutes to one hour. Relationships between other

members of the research team and the CHWs were previously established within a different research study with Waterloo researchers, which enabled a level of comfort between the research team and the participants. Once the data were collected via audio-recorders, the interview recordings and transcripts were uploaded to a password protected OneDrive folder. Identifying information (such as names and specific *barangays*) were excluded in the analysis phase to maintain confidentiality.

2.3 Data analysis

2.3.1 Analysis approach

Exploring the experiences of CHWs and the ways in which they can be better supported amid extreme weather events was the primary focus of this study. Following my return to Canada, all interviews were transcribed in English, and reviewed for clarity. Ruth and I collaborated on transcription in the summer (2023), and she was also responsible for transcribing any interviews that were completed entirely in Tagalog to ensure accuracy. Once the data were read thoroughly, the interviews were uploaded to NVivo 14 for coding. Data were thematically analyzed using a hybrid deductive-inductive approach (Fereday & Muir-Cochrane, 2006). As the interview guide generally aligned with the DRM framework, developing an *a priori* coding structure ensured that the objectives of the study were met and that there was consistency between the data collection tools (i.e., interview guide) and data analysis (Fereday & Muir-Cochrane, 2006). While these broad categories (preparedness, response, recovery) were used to deductively outline the analysis, inductive codes were applied following a close reading of the transcript. These inductive codes were developed iteratively, and new subcodes were created as necessary. Members of the research team met to discuss the development of themes, and quotations from the interviews were based on the participant's own words to ensure that the data remained close to the participants' intent and meaning. Maintaining transparency in translation decisions throughout the research process was integral, as the interviews used within the manuscript were translated from Bisaya and Tagalog to English for analysis (Abfalter et al., 2021). Therefore, it is important to note that

quotations used within this study are verbatim according to these translated interviews. The use of verbatim quotations from these translations was done to allow for in-depth analysis of the content among monolingual team members, but also to remain as close to the participants' intended meaning as possible. Though it was difficult to ensure that all ideas and concepts were translated clearly for analysis, collaborating with interpreters who were from Negros Oriental and who had previously worked with the University of Waterloo research team may have facilitated more accurate translation. In addition, meetings with our interpreters prior to data collection may have contributed towards more accurate translation, as Ruth and Alona had the opportunity to clarify the intent and ideas behind each question (Berman & Tyyskä, 2011; van Nes et al., 2010). Further, Ruth collaborated on half of the interviews as an interpreter during data collection, and then translated the other half of interviews prior to analysis, which may have also aided with consistency in translation among all of the interview transcripts.

2.3.2 Thematic analysis

This analysis was broadly guided by Braun and Clarke's six phases of thematic analysis (Braun & Clarke, 2006). Thematic analysis is widely used in qualitative research, and offers a flexible approach that can provide an in-depth account of available data (Braun & Clarke, 2006; Nowell et al., 2017). This approach is useful when summarizing large quantities of data, but is particularly beneficial when exploring different perspectives, highlighting differences and similarities among participants, and generating new insights (Braun & Clarke, 2006; Nowell et al., 2017).

Phase 1: Familiarizing myself with the data

Before beginning the coding process, I comprehensively familiarized myself with the data (Braun & Clarke, 2006; Naeem et al., 2023; Saldaña, 2013). This began in the Philippines as I conducted interviews and discussed findings with Monica after each day of interviews. While I conducted the majority of the interviews in the field, I further familiarized myself with the data through the data cleaning and transcription processes.

Through re-reading the interview transcripts and listening to each recording, I gained a deeper familiarity of the content of each interview (Saldaña, 2013). Brief notes were written during this preliminary review of each transcript, which also aided in familiarizing myself with the data. According to Nowell et al., immersing oneself in the data involves active and repeated reading of the data to search for patterns (Nowell et al., 2017). Therefore, upon a secondary review of the transcripts, memo notes were written directly on the transcripts to begin to identify common sentiments, reflect on my own opinions and thoughts about the interviews, and draw connections between what participants were saying (Birks et al., 2008; Nowell et al., 2017; Saldaña, 2013). These notes also included preliminary ideas for coding, with the intent to return to these ideas during the coding process (Nowell et al., 2017). In addition, I created an Excel sheet to record the demographic information of each participant, along with a brief (~100-150 words) summary of each interview. With a large number of participants, these brief summaries also facilitated more efficient recollection of individual participant responses, and a better understanding of unique experiences. Along with field notes and meeting notes, the use of memoing, supplementary notes, and the Excel sheet all contributed towards strengthening my familiarity with the data prior to coding (Braun & Clarke, 2006; Nowell et al., 2017).

Phase 2: Generating initial codes

After thoroughly familiarizing myself with the entire data set through multiple methods, I generated initial codes by systematically coding each interview in NVivo 14 (Cernasev & Axon, 2023). As the interviews were broadly guided by the DRM framework, these three phases (preparedness, response, recovery) were applied as general, overarching parent codes to strengthen the organization of the coding process. During the initial coding phase, I spoke about the organization of the manuscript with research team members, and we discussed the inclusion of contextual information as a key category within the results, to accompany the phases outlined in the adapted DRM framework. Therefore, coding following a hybrid deductive-inductive process, through which parent codes were guided by these predetermined categories, but child codes were data-driven (Braun & Clarke, 2006; Byrne,

2022). For example, when participants spoke about the different sources (i.e., media, television, phone notifications) used to communicate extreme weather event warnings, a child code entitled 'notifications' was applied to the relevant excerpt and was put under the 'preparation' parent code. While it is important to note that the coded data differed from the themes at this point in the coding process (Byrne, 2022), these broad categories helped to structure the coding process, and the inductive child codes then allowed for additional organization and provided a space for nuanced responses from participants. As outlined by Braun and Clarke, I worked through the entire data set to identify these initial codes, and data excerpts were coded as many times as deemed relevant (Braun & Clarke, 2006; Nowell et al., 2017). Throughout this process when adding a new code, splitting an existing code into multiple codes, or changing the description of a code, I made sure to review how this change affected the coding of all the data (Braun & Clarke, 2006; Byrne, 2022).

Phase 3: Searching for initial themes

Following this initial coding process, I searched for emerging themes in the data. This search was an iterative process as I moved through each interview and involved sorting the initial codes into different themes and subthemes (Elliott, 2018; Saldaña, 2013). During this phase, I focused on the relationships between different codes, and how they may be linked to one another (Braun & Clarke, 2006; Cernasev & Axon, 2023; Nowell et al., 2017). I contemplated the relationships between these emerging themes themselves, and how they may be linked to the broad categories outlined in Phase 2. I used several iterations of a mind-map to better visualize these relationships, and to understand the main themes and subthemes in the data (Byrne, 2022; Saldaña, 2013). It was important at this phase not to abandon any of the codes of data excerpts without further review (Braun & Clarke, 2006).

Phase 4: Reviewing themes

After identifying emerging themes, I reviewed the themes to ensure that I captured all the relevant ideas and opinions shared by the participants. Following Braun and Clarke's recommendation, level one of this phase included reviewing each of the coded data extracts

within each broader theme (Braun & Clarke, 2006; Byrne, 2022). During this step, I found that some themes were able to be condensed further, and some had to be broadened with additional codes (Braun & Clarke, 2006). In addition, I discarded themes from the analysis if they had insufficient data or if the data were too diverse to support the theme (Byrne, 2022). Once the themes were appropriately reworked, level two of this phase included a comprehensive consideration of the entire data set to confirm if the themes reflected the data set as a whole (Braun & Clarke, 2006; Nowell et al., 2017). By the end of this step, I had a strong idea of how the different themes were related to one another, and what story they told about the data (Braun & Clarke, 2006).

Phase 5: Defining and naming themes

After reviewing the themes, I concretely defined and name each theme. At this stage, I refined the themes that are presented in the analysis to both identify the story within each theme, as well as how these different themes contribute to the overarching story presented in the results section of the manuscript (Braun & Clarke, 2006; Nowell et al., 2017; Saldaña, 2013). As mentioned previously, the overarching categories (contextual factors, preparedness, response and recovery) were previously identified, but the subthemes (i.e. 'evacuation and experiences with response', listed under the broad theme 'response and recovery'), were defined at this stage (Braun & Clarke, 2006).

Phase 6: Producing the report

After developing and reviewing these themes, I produced the report in the form of this written thesis. While I developed a preliminary draft of the results by carefully reviewing my NVivo coding schemes and mind-maps, writing this report was an iterative and ongoing process (Braun & Clarke, 2006). Included in this manuscript are codes that represent the story conveyed within and across the data (Braun & Clarke, 2006; Byrne, 2022; Nowell et al., 2017).

2.4 Rigour and reflexivity

Multiple steps were taken to ensure the rigour, reflexivity, and reliability of this study. While in Negros Oriental, I utilized peer debriefing with research team members after interviews to ensure that we were comprehensively capturing participants' experiences (Long & Johnson, 2000; Tobin & Begley, 2004). Additionally, I relied on meetings with multiple members of the University of Waterloo team who worked in the Philippines context to discuss emerging findings (Nowell et al., 2017). I also presented this research at two national conferences, as well as to my committee members during my thesis proposal defense. Engaging with various members of the research team also contributed to my own reflexivity as I continuously reflected on my own positionality, potential biases, and how my experiences impact the way I understand the data (Berger, 2015; Saldaña, 2013; Tobin & Begley, 2004). In addition, I kept a clear audit trail that was comprised of various personal notes and reflections, a summary of each interview, meeting notes, and iterations of the interview guide. The use of a detailed audit trail has contributed to justification of the decisions that have been made at different stages of the research process (Fereday & Muir-Cochrane, 2006; Long & Johnson, 2000). In addition to these notes, I conducted multiple rounds of memoing to ensure that I comprehensively understood the data prior to coding. To further strengthen the rigour of this study, I relied on a hybrid deductive-inductive approach, utilizing Braun and Clarke's six phases of thematic analysis as a guide throughout the analysis process (Braun & Clarke, 2006; Fereday & Muir-Cochrane, 2006). Though I relied on translation, the use of verbatim[2] quotes also strengthens the reliability and rigor of this study (Long & Johnson, 2000).

[2] The interviews used within the manuscript were translated from Bisaya and Tagalog to English for analysis. Therefore, quotations used within this study are verbatim according to the translated interviews.

Chapter 3 – Examining extreme weather event preparedness, response, and recovery among community health workers in Negros Oriental, Philippines: A qualitative study

Bridget Beggs[1], Laura Jane Brubacher[1], Monica Bustos[1], Lincoln Lau[1,2,3], Jennifer Liu[1], Warren Dodd[1]

[1]University of Waterloo, Canada; [2]International Care Ministries, Philippines; [3]University of Toronto, Canada

3.1 Introduction

The frequency and severity of extreme weather events have increased globally, while the consequences from these disasters have been exacerbated by climate change (Bell et al., 2018; Ebi et al., 2021; Levy & Patz, 2015; Martin, 2023; McMichael, 2015). As the prevalence of these disasters is increasing at a rapid rate, there is limited time between extreme weather events for recovery, which means these negative impacts continue to compound over time. The Philippines is consistently ranked among the most disaster-prone countries in the world (Alcayna et al., 2016; Edwards et al., 2021; IFHV, 2022; Rameshshanker et al., 2021), and frequently experiences severe earthquakes, volcanic eruptions, and typhoons (Abenir et al., 2022; Robielos et al., 2020; Roteza et al., 2023). In particular, the Philippines experiences one of the highest rates of typhoons in the world, with approximately 20 typhoons and five super typhoons each year (Roteza et al., 2023; UNDRR, 2022).

Due to the increasing severity of these disasters, the need for robust disaster risk management strategies has intensified (Coppola, 2015; Rajabi et al., 2022; Scolobig et al., 2015). Prior to the 1980s, disaster management largely focused on response activities; however, since then, it has grown to prioritize proactive actions as well, and now typically includes the phases of mitigation, preparedness, response, and recovery (Alexander, 2018; Bosher et al., 2021; Coppola, 2015; Islam et al., 2016; Kanteler & Bakouros, 2024; Sawalha, 2020). Strategies to address disaster risk management during each of these four phases

closely aligns with existing frameworks, such as the WHO operational framework for building climate resilient health systems, and the Sendai Framework for Disaster Risk Reduction (UNDRR, 2015; World Health Organization, 2015). Indeed, strong disaster risk management strategies can create and strengthen climate resilient health systems (Haldane et al., 2021, 2022; Kanteler & Bakouros, 2024; Rameshshanker et al., 2021; Wei et al., 2022). Multiple actors provide support and relief following extreme weather events, which can include a combination of and collaboration among governmental agencies, the military, non-governmental organizations, first responders' agencies, UN agencies, and local organizations, among other sources (Besiou & Van Wassenhove, 2020; Cook et al., 2018; Kanteler & Bakouros, 2024; Mohd et al., 2018). While the value of national and international humanitarian aid cannot be overlooked, there are often physical and logistical challenges that arise when navigating extreme weather event preparation and recovery, particularly in rural and remote locations (Lum & Margesson, 2014; Santiago et al., 2016). Specifically, key challenges associated with inefficient distribution of aid following extreme weather events can include the inaccessibility of many areas due to infrastructure damage, the loss of communication abilities, and the sheer number of people who need assistance (Santiago et al., 2016).

In light of existing limitations and challenges among broader health systems, community-based disaster risk management strategies have been increasingly relied upon to address barriers to effective delivery of support, particularly in remote and resource-constrained settings. Though community-based actors may be able to facilitate a quick and effective response to disasters, tensions have emerged regarding what is within their scope of work (Kane et al., 2016, 2020; Schaaf et al., 2020). Increased workloads or conflicting expectations among community-based actors can lead to variable care quality, feelings of inadequacy, and negative emotions like fear, anxiety, and depression (Boyce & Katz, 2019; Dodd et al., 2022; Ndambo et al., 2022; Sarin et al., 2016; Speers et al., 2023; Yella & Dmello, 2022). Thus, strengthening climate resilient health systems and addressing community-based disaster risk management must be paired with deep consideration of the

roles, responsibilities, and expectations of community-based actors. A key facilitator to building climate resilient health systems, particularly at the local level, is community empowerment and engagement, paired with a deep consideration of the responsibilities held by community-based actors within the disaster risk management context (Haldane et al., 2021, 2022; World Health Organization, 2015). In addition, social connectedness is necessary for communities to withstand and recover from disasters, as neighbors typically rely on each other when external assistance is not yet available (Alcayna et al., 2016; Devkota et al., 2016; Jovita et al., 2019; Sripad et al., 2021; Uscher-Pines et al., 2013). These strong community-based connections can be linked to increased self-sufficiency and resilience when faced with disasters (Alcayna et al., 2016; Jovita et al., 2019; Uscher-Pines et al., 2013). Based on existing literature, an increased investment in community-based supports, particularly in remote locations where recovery efforts are often delayed or inadequately prioritized, can contribute to more efficient disaster risk management (Bhutta, 2017; Maher, 2017; Rizzoli et al., 2024; Siekmans et al., 2017; Sripad et al., 2021; World Health Organization, 2015).

Among the most common approaches to community-based health support is community health worker programs. Community health workers (CHWs) are lay members of a community who either volunteer or work within a government health system or through a non-governmental organization (NGO) (Haldane et al., 2022; Mallari et al., 2020; Pallas et al., 2013). Frequently, CHWs deliver clinical services, make referrals, provide health-related education, and/or provide psychosocial support to their community members (Glenton et al., 2021; Scott et al., 2018). As members of the communities within which they serve, CHWs often hold a level of trust with community members and can deliver culturally and contextually appropriate care (Agarwal et al., 2019; Horwood et al., 2017; Kane et al., 2020; Luu et al., 2022; Malcarney et al., 2017; Mallari et al., 2020; Perez et al., 2020). CHWs also frequently hold multiple roles within their communities, which can impact their provision of services (Kok et al., 2015; Mlotshwa et al., 2015; Rafiq et al., 2019). For instance, as women are often CHWs in low- and lower-middle income countries, many CHWs must navigate

motherhood and gender-based occupational challenges (Parray et al., 2021; Raven et al., 2022). Balancing these multiple responsibilities can also introduce unique challenges and impact priorities, particularly during extreme weather events.

This study focused on examining the experiences of CHWs when preparing for, responding to, and recovering from extreme weather events, recognizing that while they hold a position of leadership within their communities, they have very similar socioeconomic and demographic characteristics and shared experiences with other community members. In doing this, the objectives of the study were to: 1) Explore how CHWs navigate extreme weather event preparedness, response, and recovery, and gain insight into the role of formal and informal networks amid extreme weather events, and 2) Explore how NGO-led CHWs can be better equipped to support their communities and manage complex challenges that occur during preparedness, response, and recovery to extreme weather events. This study aims to offer insights into how CHWs experience extreme weather events, and how these experiences impact their capacity to provide support within their own communities. As well, this study contributes a deeper understanding of individual and program-specific factors involved in preparedness, response, and recovery activities.

3.2 Methods

3.2.1 Study setting and context

Super Typhoon Odette (internationally known as Rai) swept across the Philippines on December 16, 2021, impacting approximately twelve million people and displacing nearly 3 million individuals (ReliefWeb, 2022a). Odette was the second strongest typhoon to ever hit the Philippines, and the third strongest storm ever recorded in the northern hemisphere. While it was the fifteenth typhoon of 2021 in the Philippines, it was classified as the strongest of the year (ReliefWeb, 2022b) and impacted at least eleven of the country's seventeen regions (OCHA, 2023). Thousands of people were injured, and approximately 405 people died as a result of the typhoon (ReliefWeb, 2022a). Odette brought torrential rains, violent winds, storm surges, and landslides to the Visayas and Mindanao regions of the

Philippines, and many communities in these regions lost electricity and experienced severe flooding. Odette specifically impacted the island of Negros, making its eighth landfall in La Libertad (Negros Oriental) (OCHA, 2022b).

With the growing frequency of extreme weather events, particularly within the Philippines, it is necessary to explore how disaster risk management actions and strategies at the community level can be supported to further build and strengthen climate resilient health systems. To do this, research team members were based out of the capital city of Negros Oriental (Dumaguete), and travelled to four municipalities, which included Guihulngan, La Libertad, Ayungon, and Manjuyod, to conduct semi-structured interviews with CHWs in each municipality (see Figure 2). Though we anchored this study around experiences of Odette, approximately five days before we began our interviews, we also received warnings about Super Typhoon Betty (internationally known as Mawar). Thus, we added questions about how participants perceived and responded to these warnings. While Betty's occurrence did not delay our ability to travel to each municipality, the purpose of adding these questions about this typhoon was to compare and contrast how preparedness, response, and recovery looked after Odette (which had occurred a year and a half prior to data collection for this study).

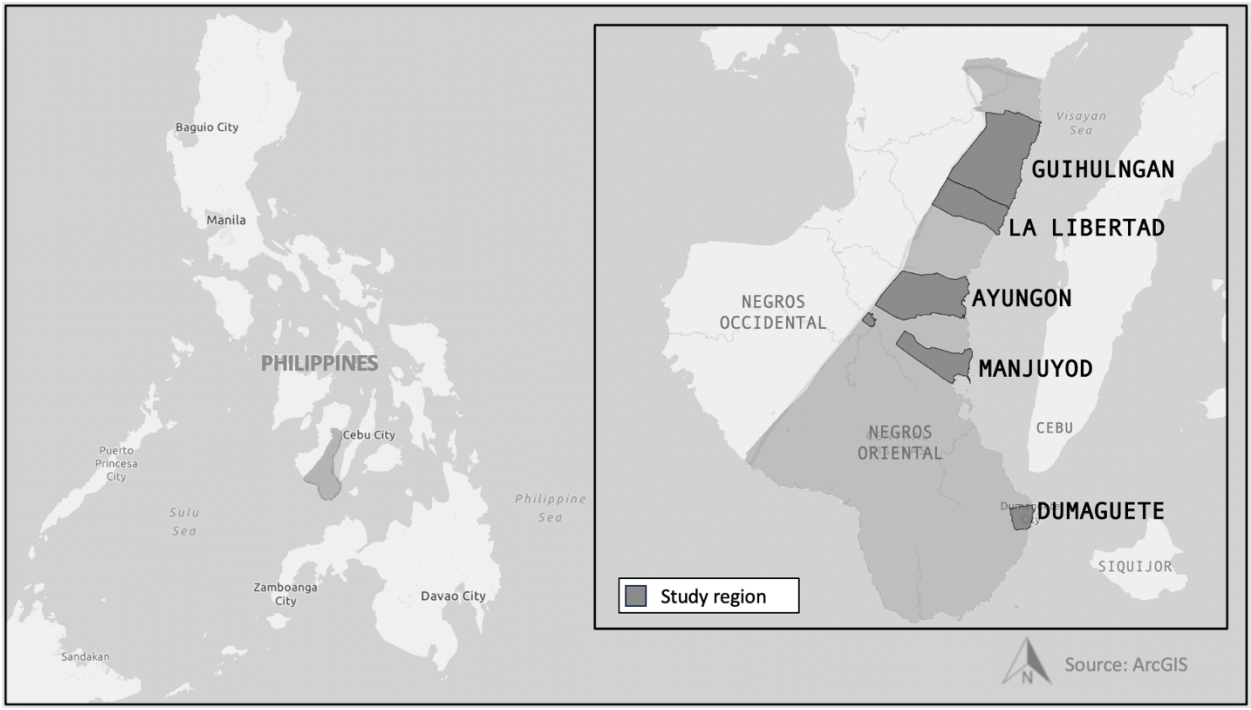

Figure 2. Map of the study region: Negros Oriental (Guihulngan, La Libertad, Ayungon, Manjuyod, Dumaguete), Philippines

This study was conducted in collaboration with International Care Ministries (ICM), which is a Philippines-based NGO focused on addressing poverty and poor health outcomes across resource-constrained communities in the Visayas and Mindanao regions of the Philippines. During the COVID-19 pandemic, ICM launched the Flourish program, where the organization recruits and trains Community Health Champions (CHCs) who operate as CHWs (ICM, 2022b; Lau et al., 2020). Once recruited to the Flourish program, these CHWs are trained and equipped to conduct home visits guided by a mobile application to monitor maternal and child health and screen for health concerns in their community. When a health concern is identified, and based on direction from the mobile application, CHWs can either provide home-based treatment for basic health concerns (i.e., packages of fortified rice for children identified as malnourished, paracetamol for fevers, prenatal vitamins), or refer the

individuals to a formal health care facility (e.g., rural health unit) for more complex concerns. CHWs also receive regular support and training from Community Health Champion Coordinators (CHCCs), who directly support CHWs by leading meetings, delivering health resources, and facilitating training sessions (ICM, 2022b). While ICM provided leadership in Super Typhoon Odette recovery and response efforts across resource-limited communities, the Flourish program does not include any disaster risk management activities (ICM, 2022a). In total, there are approximately 1300 individuals engaged as CHWs through the Flourish program.

3.2.2 Disaster risk management framework

While informed by the WHO operational framework and the Sendai Framework, this research was guided by the disaster risk management framework, which includes four phases: mitigation, preparedness, response, and recovery (Besiou & Van Wassenhove, 2020; Bosher et al., 2021; Busayo et al., 2022; Coppola, 2015; Sawalha, 2020). Informed by Coppola (2015), the mitigation phase occurs prior to the disaster, and involves reducing or eliminating the likelihood or consequence of the disaster. The preparedness phase also occurs prior to the disaster, and involves equipping the people who will be impacted by the disaster to minimize losses and increase chances of survival. Then, the response phase involves reducing or minimizing the impacts of disasters that have either already occurred or are currently occurring to prevent further loss. Finally, the recovery phase can last for months or even years, as individuals and communities return back to a normal state following a disaster. This framework has been broadly utilized and adapted throughout disaster risk management literature (Besiou & Van Wassenhove, 2020; Busayo et al., 2022; Cook et al., 2018; Guo et al., 2024; Pratama & Sariffuddin, 2018; Rana et al., 2021), with the phases overlapping with one another and existing on a continuum (Alexander, 2018; Bosher et al., 2021; Coppola, 2015). However, the ‘mitigation’ phase was excluded from the current study. Though important, mitigation activities and strategies typically include structural measures that may not be feasible or prioritized in remote and resource-constrained settings.

Although it has been critiqued for simplifying the dynamic nature of disasters (Bosher et al., 2021; Rana et al., 2021), the disaster risk management framework was chosen for this study largely based on its overarching use in disaster literature and its association with current strategies aimed at building climate resilient health systems (Birkmann et al., 2013; Rana et al., 2021). Additionally, because the framework is cyclical in nature, actions and strategies could be organized within a time sequence in relation to one another (Alexander, 2018). In utilizing this framing for the interview guide, participants in this study were able to provide comprehensive narratives of their experiences with extreme weather events.

3.2.3 Data collection

Recruitment for this study was facilitated through ICM's pre-existing relationships with CHWs in Negros Oriental. The interview questions were designed in alignment with the disaster risk management framework, and questions were anchored around experiences with Super Typhoon Odette, which allowed participants to share their subjective experiences and personal stories about their preparation, response, and recovery activities (Bevan, 2014; Dodd et al., 2018; Sholokhova et al., 2022). To further broaden the guide, CHWs were also asked about other extreme weather events that may have impacted their community. Questions were delivered in either Tagalog or Bisaya based on the preference of each participant. Informed verbal consent was received prior to each interview, and each interview lasted approximately 30 minutes to one hour. All interviews were audio recorded and transcribed verbatim[3].

3.2.4 Data analysis

Data were analyzed using a hybrid deductive-inductive approach (Fereday & Muir-Cochrane, 2006; Naeem et al., 2023) using NVivo software. Prior to coding, interviews were translated into English and checked closely for accuracy. As the interview guide generally aligned with the disaster risk management framework, developing an *a priori* coding

[3] The interviews used within the manuscript were translated from Bisaya and Tagalog to English for analysis. Therefore, quotations used within this study are verbatim according to the translated interviews.

structure ensured that the objectives of the study were met and that there was consistency between the data collection tools (i.e., interview guide) and data analysis (Gentles et al., 2015; Speers et al., 2023; Wyngaarden et al., 2023). While these broad categories (preparedness, response, recovery) were used to deductively outline the analysis, inductive codes were applied following a close reading of each transcript. These inductive codes were developed iteratively, and new subcodes were created as necessary (Braun & Clarke, 2006). Members of the research team met to discuss the development of themes, and quotations from the interviews were based on the participant's own words to ensure that the data remained close to the participants' intent and meaning (Hill et al., 2022). Identifying information (such as names and specific *barangays*) were excluded to maintain confidentiality (Dougherty, 2021; Kaiser, 2009).

3.3 Results

3.3.1 Individual and program context of community health workers

This study included the experiences and perspectives of 51 CHWs living in Negros Oriental. Many participants lived in remote mountain regions, and all participants lived near the municipalities of either Guihulngan, La Libertad, Ayungon or Majuyod (see Table 1).

Table 1. Age and municipality of residence among study participants (n=51)

	Guihulngan	**La Libertad**	**Ayungon**	**Manjuyod**
Ages 18-29	5	3	1	4
Ages 30-39	7	7	7	2
Ages 40-49	3	2	2	4
Ages 50-55	0	0	1	3
Total	15	12	11	13

While participants were current members of the Flourish program, many also held multiple roles in their households and communities that shaped their perceptions and experiences of extreme weather event preparedness, response, and recovery. Though participants could be considered influential members of their communities through their role as a CHW, they also shared similar socioeconomic and demographic characteristics with fellow community members. Most of the participants spoke about their roles as mothers or primary caregivers within their own households for both immediate and extended family. For example, a 50-year-old participant who lived near Ayungon explained how she cared for her extended family:

> I have two nieces who live with me and both of them have no father, so I treat them as my own children, I provide them with everything like their school fees and other financial needs and also their food.

Through multiple reports mirroring the experiences of this CHW, participants shared how personal financial constraints created challenges for navigating their multiple caregiving roles. Some participants explained that their husbands were working in other cities to make money, which left these participants as the sole caregivers of their own families while also balancing other responsibilities, including their CHW role.

Beyond their responsibilities as mothers and caregivers within their household, many participants spoke about additional roles that they held within their communities. Several participants discussed their experiences in various positions, such as *barangay* health workers (BHWs; government-funded community health worker), as leaders within their church community (such as a *pastora* or youth leader), as *tanods* (safety and security officer within the community), or as savings group members, which further demonstrated a level of leadership within their community. Indeed, several participants noted that their leadership in the community may have influenced the level of trust that other community members had in them as CHWs. For example, one participant who lived near La Libertad stated that due to her past involvement in her community as a *tanod* and volunteer, “It’s not hard for me to

introduce myself as a CHW." Similarly, a 49-year-old participant who lived in a remote mountain region near La Libertad said, "Considering that I've been a BHW for 13 years, so that's why I am known in my community." Thus, holding additional leadership roles and responsibilities within their communities were perceived to be factors that positively impacted their ability to build and strengthen relationships with other community members.

Though opinions varied, most participants also highlighted the positive perceptions that community members held about their CHW role and the gratitude that they received from community members during their regular screening responsibilities. According to the participants, most community members thought favourably of their role as a CHW and trusted them when asking for health support and advice. A participant living near the coast in Ayungon said, "They respect me so much and if talking about health, they asked me instead of talking to the BHWs." Most importantly, due to their connections, credibility, and levels of trust within communities, community members seemed likely to listen to the advice and guidance provided by CHWs. Participants also described the meaning they drew from their CHW role in the community, with many highlighting the joy they felt from their ability to connect with and help others. For instance, a 30-year-old participant living in a remote region near Ayungon stated, "I am happy that aside from giving commodities during screening or going to house visits, I can build relationships with people and my neighbours." A participant living near Guihulngan echoed these sentiments, saying, "It's nice to show love to the people in your community by giving help to them, especially to those who are in need." Specifically, participants acknowledged their gratitude towards being able to pass along knowledge and information that they had learned from their training. A participant living in a mountain region near Ayungon stated, "I am just thankful that I became a CHC because I gained knowledge that I can share to the people in my community." A 26-year-old participant living near Manjuyod further specified, "I am happy that I was able to share my knowledge about health to the families that I've visited." Thus, not only did community members think favourably about these CHWs, but participants also highlighted the personal value they gained from sharing knowledge and building relationships with community members.

The ways in which CHWs operated in their communities influenced how they experienced extreme weather events, their reactions to these events, and their priorities during disasters. For instance, when asked about experiences with disasters and extreme weather events, some of the older participants spoke about their experiences with the Negros earthquake over a decade earlier, while younger participants talked about recent occurrences of flooding and landslides in the region. Although participants primarily reflected on their experiences before, during, and after Super Typhoon Odette in the interviews, some CHWs also reported on their experiences navigating typhoon-related evacuation amid the COVID-19 pandemic. Though participants may hold these positions of leadership and connections within their communities, repeated exposures and past experiences with extreme weather events shaped their opinions and experiences of preparing for, responding to, and recovering from subsequent events.

3.3.2 Preparedness: "you can't just be scared, instead you have to make preparations"

When asked about preparation for extreme weather events, many participants spoke about their experiences immediately before Super Typhoon Odette. Prior to an event like Odette, notifications and warnings about the severity of the storm were sent out to communities via the news (television and radio), social media, or texts from governmental sources. However, participants noted that people living in remote communities may not hear about the warnings in time. This reality was identified by a 34-year-old participant who lived in a remote community near Guihulngan: "We were not prepared because we were informed about the typhoon during the actual day of its arrival…it was too late for us to prepare."

Repeated exposure to and past experiences of extreme weather events also influenced how participants perceived and prepared for incoming extreme weather events. Indeed, many participants outlined how repeated exposure reduced their perception of risk, particularly when extreme weather events became normalized within communities. One CHW living near La Libertad stated, "We have big floods in our river if it's raining hard, because we are in the mountain…it's normal for us to see flooding." Further, many CHWs stated that prior to Odette, they would not prepare for typhoons even if they were warned by governmental

sources, because typhoons were very frequent and typically manageable. Odette appeared to be a unique challenge for many communities, as a 54-year-old participant living near Manjuyod said:

> We were so surprised for that typhoon because we hadn't experienced a strong typhoon before, and we didn't expect that Odette would hit our place. Before, we also heard news about a super typhoon coming named Yolanda [2013], but nothing happened, so we just think the same for Odette.

This CHW further explained that she relied on her relationships with her neighbours prior to Odette, and that the advice they shared with each other was useful in preparing for the typhoon. Her experience illustrates the impact of risk perception on behaviours amid extreme weather events, and the importance of communication and social networks when navigating preparation activities.

Sharing a similar experience, a 33-year-old participant living in the mountains near La Libertad stated, "We heard [about Super Typhoon Odette] over the radio and we saw it in our national news, but we were confident that it wouldn't happen and we chose to relax and ignore it." Even after hearing warnings about Odette, many CHWs did not adequately prepare. One participant living near Guihulngan explained, "The reason why we just don't care about it is because it's happened a lot of times before." Referring to Odette, a 31-year-old participant living in the mountains near La Libertad said, "We heard in the news that there was a strong typhoon [coming] but we just ignored it because we always hear that kind of news." However, when asked about preparation activities in recent years, most participants said that they had learned their lesson after not preparing for Odette, and would now prepare food, documents, clothing, and other necessities during typhoon warnings. Specifically, participant reports of proactive behaviours during Super Typhoon Betty warnings, which occurred during data collection, highlighted the difference in threat perception in contrast to preparation following Odette warnings. In this context, CHWs shared similar experiences and emotions as other community members during extreme weather event warnings. Thus, as trusted members of the community, they may be able to

utilize their leadership and positive relationships to better organize and support disaster preparation activities within their communities.

While CHWs did not hold any formal role in disaster preparation, some participants noted that there may be opportunities to leverage their position within the community to notify community members about extreme weather events and provide guidance on how to adequately prepare. Indeed, some participants mentioned that community members came to them once they heard about Odette and asked for advice. For example, one participant who lived by the coast near Ayungon explained that community members would "ask me if I am going to evacuate and where…I will say yes so that they will evacuate too." Similarly, a CHW living near Manjuyod pre-organized response efforts before the storm, stating, "Before Odette happened, I talked to my neighbours too [and said] that whatever happens, we should go to this specific house for our safety…it's not surrounded with trees and it's also safe from big floods." Though this was not part of her regular CHW responsibilities, this participant exhibited an aptitude to organize and lead community members to protect their wellbeing during Odette. Further several CHWs noted opportunities during the preparedness phase of extreme weather events to provide additional support to communities. For example, a 34-year-old participant living near Ayungon said that though she did not have formal training, she would be able to provide guidance regarding disaster preparation to community members she was interacting with through her CHW role: "If I screen them, I can give advice that they have to prepare if there's a typhoon coming." Similarly, a 25-year-old participant living in a mountain area near Guihulngan stated that her role as a CHW could be leveraged to disseminate warnings, saying, "If I hear some news about any typhoons or that a disaster is coming, I can relay the message to them, because mostly in the mountain area they don't have television." Overall, despite a lack of training in disaster risk management, many CHWs indicated that they had capacity to provide additional support in the form of verbal warnings and advice prior to extreme weather events.

3.3.3 Response and recovery: “we chose to be strong and help each other to survive”

3.3.3.1 Evacuation and experiences with response

Aligned with the sentiments shared surrounding disaster preparation prior to extreme weather events, participants described varying experiences with disaster response and recovery activities. Due to their dedication to their household responsibilities, most participants described their focus on immediate family members during disasters when there was the highest level of acute danger, especially if they were sole caregiver in their households. When referencing her experiences with Super Typhoon Odette, one CHW from the mountain region near Ayungon stated, “I had to think of the safety of my kids because my husband was not with us when the typhoon happened.” The different roles that participants held also influenced their capacity to provide care during and after extreme weather events, with household and familial responsibilities often prioritized over community responsibilities. During Odette specifically, some participants described their decision to evacuate with their families to an evacuation centre, believing that it would be safer than remaining in the oftentimes unstable structure of their own homes. Alternatively, some participants chose to remain at home rather than risk going outside. Typically, participants reported that their decision to remain home was to avoid physical danger and to protect their children, with a 49-year-old CHW living near Manjuyod saying, “We didn't want to evacuate because we believed that it was safer if we just stay inside our houses…considering there might be fallen trees or branches.”

Though experiences varied among participants, some CHWs who chose to remain at home during Odette described the ways in which they opened their own homes to neighbours and chose to welcome additional people into their homes during and immediately following the typhoon. Importantly, community members acknowledged CHWs as people they could rely on during challenging events. For instance, a 50-year-old participant living near Majuyod stated, “The reason why most of my neighbours evacuated in my house was because they already knew me as a person with a good heart, and I was known in my community.” Further, a 34-year-old CHW also living near Manjuyod explained, “And after

Odette…there were actually 13 people in my house for one month." When asked why she chose to welcome so many people in her home despite the challenges she faced during Odette, she replied "Because they lost everything." Similar conversations illustrated that CHWs were motivated to provide care to their communities beyond their regular CHW duties and despite their own obstacles in navigating the aftermath of Odette. Though capacity varied among CHWs, many shared a desire to help their neighbours both during and following the typhoon. A 31-year-old participant living near Guihulngan stated,

> So I helped those people to go to the church as their evacuation area…some of these people went to my house, but I couldn't accommodate [all of them] considering that my house was also partially damaged. So that's why I brought them to the church.

These accounts demonstrate that CHWs were seen as reliable and trustworthy individuals who could provide direction or a safe space for their neighbours. However, due to their lack of training, some CHWs were unable to support others while managing their own circumstances. A 38-year-old participant living in a mountain region near Ayungon confessed that during Odette, "I was blank at that time because everyone was panicked and I couldn't really imagine the best way to save our situation." Though stating that she didn't know how to help during Odette, this CHW went on to say that she hoped to receive training in the future to learn skills that can be applied towards preparedness and response activities, which further demonstrated a willingness to contribute towards disaster risk management strategies.

3.3.3.2 Community support and distribution of relief goods

Many participants described their community's reliance on government support and relief goods following extreme weather events, which were often delayed due to geographical barriers or inefficient processes. The quantity of relief goods also often depended on the disaster itself. For instance, while participants outlined the abundance of support they received after the 2012 Negros earthquake, they reported fewer relief goods in response to Super Typhoon Odette due to the wider geographical reach of the typhoon. Specifically, damage after Odette impacted the transportation of aid and relief goods to remote

communities, with a participant living Manjuyod explaining, “It’s hard because we couldn’t go down [the mountain] to buy food, since we couldn’t pass on the roads as it was very damaged. And also the trucks with the relief goods couldn’t pass.” Another CHW living in a mountain region near Manjuyod agreed, stating that the delivery of relief goods was limited “because [trucks with relief goods] couldn’t pass the river, as it was damaged. Some [community members] also weren’t able to get [relief goods] because there were no more available.” These delays and challenges associated with external aid delivery underscored the need for community-based strategies immediately following extreme weather events.

After Odette, multiple participants reported returning to their regular CHW responsibilities, sometimes within one to two weeks of the typhoon. Though they prioritized their own safety and security during the height of Odette, this quick return to CHW responsibilities indicated a commitment to ensuring a continuity of care within their communities. Further, some participants shared that their affiliation with ICM meant that they were approached with requests for physical aid. For example, one participant living near Manjuyod stated, “After Odette some [people] came in my house and asked me if ICM has a budget or maybe if they can give a little help.” Her experience highlighted the position of influence that CHWs hold within their communities, as neighbours recognized that CHWs may be a conduit of local assistance following disasters. A CHW living in the mountain region near La Libertad explained that these interactions occurred while she was completing her regular screening duties, saying, “When I did house visits, I felt so sorry for [community members] because they asked for help from me but I have nothing to give. They even said that hopefully ICM has something to share too.” Evidently, CHWs’ associations with ICM were noted within their communities, and they were approached as influential community members who may have additional resources. However, with limited physical resources, a CHW living near Ayungon explained that she was able to help her community, but “only by giving advice because we had no budget for financial support and we also had no commodities.” A 35-year-old participant living in a mountain region near Ayungon shared that her position as a CHW had positively impacted her interactions with neighbours: “It

helps [to be a CHC because] I was able to share my knowledge about health to others, especially those having a hard time." A CHW living in the mountains near La Libertad also shared information that she had learned from ICM when the well water was contaminated within her community, saying, "When I did screening, I also informed [community members] that boiling water is very important [to avoid diarrhea]." Similarly, a participant living near Manjuyod described the specific guidance she provided based on her knowledge from ICM, stating, "Since [CHWs] had no commodities yet after Odette, I advised [community members] to use herbal remedies because it was taught to us by ICM before." Indeed, general knowledge from ICM programming appeared to facilitate CHWs' ability to provide support to other community members following Odette. A 38-year-old participant living near Guihulngan stated, "Before I had no idea or knowledge about health, but when I became a CHC and joined the trainings I gained knowledge that I can share to my neighbours if they are sick." As CHWs within this context do not currently have any training in preparedness, response, or recovery actions, these quotations point to the potential for strong community-based support if NGO-led organizations were to offer specific disaster risk management information and training to CHWs.

Furthermore, despite a lack of physical aid, some CHWs reported self-funding relief goods for their neighbours, sharing their own food and water, and offering advice and verbal support following Odette. A participant living near Ayungon shared that she felt a sense of responsibility towards her community following Odette, saying,

> There was a lot [of people] who were having fever so I had to use my money. Because in their mind they believe that I can always provide for them. And I am happy if someone asked for mannapacks[4] from me because I want to see them eating it to avoid malnutrition.

Another participant living in a mountain region near Ayungon also recalled her sense of responsibility during that time by saying that after Odette "Even though I was sick, I did my best to recover so that I could help [community members] to recover too." Following Odette,

[4] Mannapacks are fortified food aid packages specifically for malnourished children.

a CHW living near La Libertad highlighted the challenges that CHWs were also facing at the time, stating that "I wanted to give [community members] food and money, but the problem is we were facing the same problem." Similarly, another CHW living in a mountain region near La Libertad explained "I really want to help but I have nothing to give because we have the same situations." These experiences further highlight that community-based actors in this context continue to feel motivated to support and care for fellow community members following extreme weather events, despite their own financial challenges.

3.3.4 Future training and support

Participants frequently stated that they would be interested in receiving disaster training, including training on preparation activities, first aid to help community members during and after disasters, and how to provide emotional counselling following disaster events. Participants further highlighted different categories of training that they would hope to receive, with a CHW from Ayungon stating she wanted to receive more tactical training like "first aid or how to save someone who is drowning when there's flooding", while a CHW from Guihulngan reported that she hoped for "training on how to have proper preparations when there's a typhoon coming so that I can also share it to my neighbours." One CHW from Manjuyod also stated that she wanted first aid training, but defined first aid as knowing "the right dosage of medicine to give to people." While many CHWs said that they hoped for additional knowledge and training to share with community members, some participants also wanted to know how to provide emotional support and counsel their neighbours following disasters, with a CHW from Guihulngan saying that she hoped for training on "counselling for after calamities, where usually there's trauma." Alongside training, participants also pointed to physical resources, such as medication and food aid, that they believed would be beneficial to support their communities following disasters.

Capacity to provide additional support may also vary at different stages of disaster risk management. Based on previous experiences with disaster events, CHWs prioritized their own households during the response phase but demonstrated a capacity to provide additional support to their communities during the preparedness and recovery phases. For instance,

CHWs could act as a conduit for disseminating information during their regular interactions with community members, which could help to better prepare community members during extreme weather event warnings and avoid health risks. Indeed, due to shared beliefs and experiences, community members may take warnings more seriously if these messages were originating from trusted fellow community members in comparison to news sources or government notifications. During the recovery phase after the immediate threat has passed, there may also be opportunities for CHWs to be involved in the organization and distribution of relief goods, alongside offering advice and guidance to neighbours. CHWs could also play a role in advocating for their communities and organizing community needs following a disaster when governmental support is delayed, which could be further supported by access to physical resources such as medical support and food aid.

3.4 Discussion

This study investigated the experiences of CHWs in navigating extreme weather event preparedness, response, and recovery in remote communities in the Philippines. Though they shared similar demographic and socioeconomic characteristics with other community members, findings from this study indicate that the positionality and responsibilities that CHWs held within their communities impacted both how they were perceived by community members, as well as their own perceived capacity to provide support during extreme weather events.

Key frameworks, including both the Sendai Framework and the WHO operational framework, have outlined the importance of including communities within disaster risk management strategies to build climate resilient health systems (Haldane et al., 2021, 2022; Mosadeghrad et al., 2023; Rameshshanker et al., 2021; UNDRR, 2015; Wei et al., 2022; World Health Organization, 2015, 2019). Specifically, CHWs hold a unique position within communities as both community members themselves, as well as health leaders who often hold significant levels of responsibility and trust through their affiliation with either the public health system or established NGOs (Kok, Broerse, et al., 2017; Kok, Ormel, et al., 2017). This positionality offers unique benefits and challenges when contextualized within

community-based disaster risk management. Indeed, strong communication, trust, and social networks are frequently highlighted as important components when navigating the challenges that arise during disasters (Alcayna et al., 2016; Luu et al., 2022; Sripad et al., 2021; Uscher-Pines et al., 2013). In this study, CHWs highlighted how their position within their community impacted the ways that other community members perceived them. As CHWs typically held additional roles within their communities besides their CHW responsibilities, people who become CHWs may inherently have strong leadership qualities and existing connections, and therefore may inspire more confidence and trust in providing direction and support during extreme weather events.

In alignment with previous research (Fredricks et al., 2017; Maat et al., 2021; Shah et al., 2019; Sripad et al., 2021), CHWs in this study were an influential and valuable source of support amid extreme weather events, and multiple CHWs outlined the position of influence that they held within their communities before, during, and after Super Typhoon Odette. Though other actors and organizations are critical in providing support during extreme weather events, in general, the capacity of CHWs to provide support to communities in this study varied greatly during each phase of the disaster risk management framework. For instance, during the preparedness phase, multiple participants outlined issues associated with typhoon warnings in rural communities. While some CHWs did not receive Odette warnings in time to adequately prepare, many participants outlined their choice to ignore these warnings due to the frequency of typhoons in these regions. Indeed, during Odette warnings, there seemed to be a general consensus among community members that there was no need to prepare. However, their negative experiences with Odette led participants to then prepare resources and materials for Super Typhoon Betty, signifying that their threat perception for Betty was significantly higher due to their past experiences (Poletti et al., 2012). Previous studies have also found that perception of risk can be influenced by others with shared interests and values (Heinkel et al., 2022; Paton et al., 2013). CHWs hold a level of credibility within communities through their position, but they also share similar socioeconomic and demographic characteristics, and typically maintain positive relationships

with other community members. Therefore, CHW participation in disaster preparedness activities, including the dissemination of warnings, may positively influence disaster risk perceptions and beliefs, along with subsequent preparation activities. Though acknowledging challenges with their own capacity during extreme weather events, participants identified future strategies to provide additional support during preparation, such as utilizing their regular screening duties as a time to also pass along health information and warnings about incoming extreme weather events. Given their unique positionality, these community-based actors may be able to encourage other community members to adhere to disaster risk management advice and recommendations more closely, thereby limiting the challenges that are associated with lack of knowledge and preparation (Abunyewah et al., 2020; Heinkel et al., 2022; Paton et al., 2013).

While there may be opportunities to leverage the CHW role during preparation for extreme weather events, participants outlined that their existing responsibilities, particularly within their own household, impacted their capacity to provide support during disaster response when there was the highest threat to physical safety. However, multiple participants also described how they opened their homes to other community members and helped others evacuate safely. Following extreme weather events, formalized support in the form of food and other relief goods is frequently delayed (Besiou & Van Wassenhove, 2020; Coppola, 2015; Peralta et al., 2023; Rizzoli et al., 2024; World Health Organization, 2015). Therefore, community members often act as the first responders to extreme weather events and other disasters, especially in rural and remote settings (Alcayna et al., 2016; Luu et al., 2022; Sripad et al., 2021; Uscher-Pines et al., 2013). Despite having no formal training in disaster risk management activities or strategies, community members in this study appeared to rely on CHWs for physical, emotional, and spiritual support following extreme weather events (Alcayna et al., 2016; Luu et al., 2022; Uscher-Pines et al., 2013). Further, due to their affiliation with ICM, community members associated CHWs with the provision of relief goods, which was evidenced by their frequent inquiry about physical resources and materials following Odette. Though they too lacked relief goods and physical resources, many CHWs

highlighted that they felt confident in their ability to provide advice and emotional support to community members following Odette. In addition to the delay in relief good delivery, participants also described how the retrieval of relief goods was inefficient due to geographical barriers, damage to infrastructure, and inequitable distribution of aid. Thus, it may be valuable to further explore the ways in which CHWs could contribute to more effective recovery efforts by advocating for and organizing available relief goods to ensure that community members receive equitable support quickly following extreme weather events. Overall, findings highlight that despite navigating their own challenges amid extreme weather events, CHWs were still able to provide informal support to community members. However, this support varied greatly between each phase of the extreme weather event itself. Thus, allocating training and resources towards equipping CHWs to provide additional support during the preparedness and recovery phases may strengthen health systems, whereas focusing attention on the provision of formalized support during the response phase of disasters may lead to unfair and unethical expectations of CHWs (Boyce & Katz, 2019; Ndambo et al., 2022; Yella & Dmello, 2022).

Although they may be an effective source of local assistance, acknowledging the capacity for CHWs to provide additional support during disaster risk management must be met with a critical consideration of their scope of responsibility, and corresponding tensions within the health system (Ajisegiri et al., 2023; Schaaf et al., 2020; Schneider et al., 2016; Smith et al., 2014; World Health Organization et al., 2007). These tensions have been explored across different disasters and settings, but were particularly evident during the COVID-19 pandemic, where CHWs provided additional support beyond their regular capacity (Das et al., 2023; Ortega et al., 2021; Zafar et al., 2022). Critically, while CHWs do not play a formal role in disaster risk management, they often hold significant networks and social capital while operating on the ‘front line’ of health systems (Kok, Broerse, et al., 2017; Kok, Ormel, et al., 2017; Perry et al., 2021). In this study, participants were frequently affiliated with their CHW role amid Super Typhoon Odette, and described their regret at being unable to provide physical resources due to the reality that they were facing the same situation. Though the

value of community-based actors has been underscored in previous literature (Alcayna et al., 2016; Devkota et al., 2016; Haldane et al., 2022; Rameshshanker et al., 2021), it is necessary to place these experiences within the greater context of extreme weather events, understanding that there is a balance between what CHWs can accomplish as leaders within the community while also recognizing that they too require humanitarian aid and support following extreme weather events. Indeed, future research should consider the contextual factors that impact CHWs experiences when developing community-based disaster risk management strategies to prevent overburdening CHWs amid extreme weather events.

In alignment with previous research (Mallari et al., 2020; Ndambo et al., 2022; Olaniran et al., 2022), CHWs in this study demonstrated a desire to provide support to other community members, and drew meaning from their position in their community. This was evidenced not only during their structured CHW duties, but also during the recovery phase from Odette. Following Odette, many participants stated that though they wished they had physical resources to give to their community members, they still could provide advice and verbal encouragement to community members. Further, though acknowledging challenges with their own capacity during extreme weather events, many CHWs outlined their desire to provide more formalized support to community members following future extreme weather events, and often pointed to the need for additional training and resources. Based on these findings, CHWs may be well positioned to address challenges associated with extreme weather events and provide contextually appropriate care that accounts for community-specific needs.

Ultimately, building climate-resilient health systems requires a foundation of strong community-based health systems (Haldane et al., 2022; World Health Organization, 2015). While community-based actors are not a replacement for broader systems level support during extreme weather events, leveraging their positionality within communities may lead to more effective disaster risk management strategies. However, although participants of this study outlined their desire for additional training to support communities, it would be an oversimplification to assume that additional training alone would solve these complex

challenges. In addition, capacity and required resources for CHWs to provide additional support during extreme weather events may change based on the setting and context of the CHW program itself. Thus, any opportunity to scale up CHW programs to formally incorporate disaster risk management strategies into their responsibilities, needs to be met with appropriate guidance, support, resources, and compensation to match the increased expectations.

3.4.1 Limitations

This study has several limitations. First, while the scope of the research may have contributed richness to the interviews, findings may lack applicability within other disaster contexts. In addition, all participants in this study were women, shared similar demographic characteristics, and were recruited according to their involvement with ICM programming in Negros Oriental. Thus, participant experiences may not be reflective of community-based health actors with different socio-demographic characteristics or located elsewhere in the Philippines. Second, the sensitive nature of this study may have impacted data collection, as participants were asked about their experiences during a traumatic event. In addition, due to their affiliation with ICM, response bias may have been introduced within the study as participants may not have felt completely comfortable discussing issues pertaining to ICM operations. To mitigate this challenge, we introduced our topic before the interview, encouraged participants to only share what they felt comfortable with, and allowed participants to lead the discussion. Finally, language barriers may have impacted the results of the study. To address this challenge, we relied on local interpreters during each interview, and held team meetings to ensure that the research questions could be translated without a loss of meaning.

3.5 Conclusion

This study examined CHWs experiences navigating preparedness, response, and recovery amid extreme weather events in the Philippines. Through exploring experiences with Super Typhoon Odette in particular, this research highlights CHWs as critical actors in providing

health support and knowledge dissemination, particularly in rural settings where formal support may be delayed or limited. Notably, this study provided insight into CHWs as both community members and health leaders, and how their positionality within communities impacts their ability to navigate challenges associated with disaster risk management. Future research could build upon this work by outlining practical strategies, including specific and contextually appropriate training and resources, that could facilitate effective community-based health support during extreme weather events and other disasters. Overall, this research highlights the potential contributions of CHWs in facilitating and building climate resilient health systems at the community level.

Chapter 4: Conclusion

4.1 Summary of findings

The findings from this study were presented as a single co-authored manuscript (see Statement of Contributions for co-authorship information). The manuscript, presented in Chapter 3, outlines the experiences of 51 community health workers (CHWs) amid extreme weather event preparedness, response, and recovery in the Philippines. Conversations with the CHW participants revealed that experiences with extreme weather events were shaped by both individual-context and program-specific factors. While many participants stated that they prioritized their role as a CHW, some CHWs also held multiple roles that influenced their capacity and ability to dedicate time to each responsibility. In alignment with previous research (Parray et al., 2021; Raven et al., 2022; Steege et al., 2018), caregiving was highlighted as a key component of participant responsibilities, with some participants not only caring for their own children, but also extending this care to additional family members, including parents, in-laws, nieces, and nephews. Furthermore, CHWs often held other occupational responsibilities within their communities, which facilitated positive recognition among other community members. As credible figures within their communities, often due to these multiple roles, CHWs maintained strong social networks, with some participants stating that community members would rely on them over other community-based actors. While some perceptions differed, most participant narratives also highlighted the positive perceptions that other community members held towards their role. Aligning with previous research (Mallari et al., 2020; Ndambo et al., 2022; Olaniran et al., 2022), CHWs highlighted the personal value that they drew from their position, and stated that they felt motivated to provide physical and verbal assistance to further support community members.

Participant narratives also outlined their varying experiences and levels of capacity during each phase of the adapted disaster risk management framework (preparedness, response, and recovery). For instance, participants described how their levels of preparedness was impacted by perceptions of disaster risk (Heinkel et al., 2022; Paton et al., 2013). During

the preparedness phase, most CHWs said that they did not prepare for Super Typhoon Odette, despite receiving warnings about the incoming typhoon, due to the frequency of typhoon warnings in the Philippines. However, when hearing Super Typhoon Betty warnings a year and a half later, CHWs highlighted their motivation to avoid the negative impacts that they experienced due to under-preparation for Odette. The preparedness phase was also outlined as one through which CHWs felt they could provide additional support by passing along information about incoming disasters during their regular screening duties. Furthermore, most CHWs acknowledged that they prioritized their family members during the response phase of the framework. However, despite a lack of formal training or resources, CHWs exhibited a strong willingness to also support other community members during disaster response and recovery activities. For instance, during Odette specifically, participants outlined the ways in which they assisted in evacuation efforts, offered their homes to families without shelter, shared their own limited resources, and provided information and verbal support. Due to their reputation as leaders within their communities, it appeared that community members felt safe and comfortable turning to CHWs during Odette response and recovery activities. This was further illustrated in the aftermath of Odette during the distribution of relief goods, when participants shared that they were approached with requests for food and other relief goods. Most of the participants lived in remote areas in the mountains, which greatly impacted their ability to receive adequate support from governmental sources and may have influenced community members' decision to turn to community-based support. Indeed, CHWs and their connections to the health system through ICM were seen as a valuable source of post-disaster aid when communities lacked sufficient resources.

Insights from this study illustrate the complexity in developing effective strategies that consider CHWs as both health leaders and also community members. Participant narratives underscored CHWs' desire to provide additional support, particularly during the preparedness and response phases, despite a recognition that they were experiencing the same challenges as other community members. Numerous CHWs also stated that they would

be interested in disaster training to know how to adequately prepare for incoming disasters, how to provide physical assistance during and after disasters, and how to provide additional emotional support following these events. Participant narratives in this context provided insight into community-based support amid extreme weather events, and contributes a deeper understanding about both the challenging landscape of community-based disaster risk management as well as community contributions to strengthen climate-resilient health systems.

4.2 Study strengths and limitations

Several aspects of this study provided strengths and limitations to this thesis research. A key strength of this research is that it builds on a history of collaboration between the University of Waterloo and International Care Ministries (ICM) (e.g., Bustos et al., 2023; Dodd et al., 2023; Lau, Dodd, et al., 2020; Lau et al., 2022). This established relationship provided the foundation for this study and influenced my field work experience in the Philippines (Luu et al., 2022; Olivier et al., 2016; Speers et al., 2023). For instance, formal agreements and pre-existing trust between the two partners meant that I was able to focus my attention on data collection rather than prioritizing the initiation of an organizational relationship with ICM. In addition, this study was part of a broader evaluation of a current program within ICM, called the Flourish program. Thus, most of the participants involved in this study were also involved in previous interviews with University of Waterloo researchers, which took place approximately a month before these interviews. This prior experience with data collection and exposure to researchers from the University of Waterloo established a level of comfort and may have increased participants' willingness to participate in this study as well as their openness during interviews.

In addition, there were both strengths and limitations associated with the methods of this research. First, we were able to conduct in-person interviews with participants, rather than rely on online forms of communication. Conversing with participants face-to-face allowed us to build rapport and establish a level of comfort with participants before the interviews, observe body language and non-verbal cues during the interviews, and provided a deeper

understanding of contextual factors that may have influenced participants' experiences (Brayda & Boyce, 2014; de Villiers et al., 2021; Irvine et al., 2013; Johnson et al., 2021). For instance, since data were collected in the Philippines at the same time as Super Typhoon Betty warnings, we were likely able to probe deeper into these experiences and collect richer data when compared to if we had conducted the interviews in an online format (Johnson et al., 2021). However, language barriers represented a challenge that impacted data collection for this study. While English is a national language within the Philippines, many of the participants for this study live in rural areas within Negros Oriental, where English was not commonly spoken. Even though some of the participants understood basic English, most did not feel comfortable communicating in English, and spoke in Tagalog or Bisaya when answering interview questions. Therefore, we had to rely heavily on translation during data collection. While the assistance of talented interpreters through every stage of the interview process mitigated many potential challenges, relying on translation entirely will inherently be a research limitation (Abfalter et al., 2021; Al-Amer et al., 2015; Berman & Tyyskä, 2011; van Nes et al., 2010). As nearly all my communication was done through translation, it was difficult to ensure that the meaning of my questions was clearly translated into Bisaya, and the responses were clearly articulated back to English. To mitigate this challenge, our research team met prior to the start of data collection to ensure that all the interview questions could be accurately translated into Bisaya without a loss of meaning. Additionally, all the interviews that were conducted entirely in Tagalog (approximately a quarter of the interviews) were transcribed by one of our interpreters to further prevent a loss of intent of meaning. Finally, transparency in translation decisions was maintained throughout this work (Abfalter et al., 2021; Al-Amer et al., 2015).

The sensitivity of the topics explored through this study also necessitated consideration, particularly during data collection (Dickson-Swift et al., 2009; Silverio et al., 2022). For instance, it was important to maintain a delicate balance between asking in-depth questions and knowing when to stop probing to avoid discomfort and/or unnecessary stress. In addition, as this research is connected to ICM operations and focused primarily on negative

experiences of Odette and other extreme weather events, response bias may have been introduced when participants talked about their behaviours and perceptions of disaster risk management within their communities (Bergen & Labonté, 2020; Scheelbeek et al., 2020). While it was difficult to ascertain that response bias was not present during this study, several steps were taken to ensure that it was minimized. To facilitate this approach, we introduced our topic at the beginning of the interview, and encouraged participants to only share what they felt comfortable with. Further, we assured participants that their identity would remain anonymous, and anything they shared during the interview would remain confidential (Birks et al., 2007; Mirza et al., 2023; Speers et al., 2023). I also structured the interview guide to begin with a few general questions before discussing any experiences with extreme weather events. In doing this, I aimed to build rapport between myself and the participant and provide a comfortable space for them to share their experiences. Even though we were guided by an outlined script of questions, we also allowed the participants to lead the discussion. Though operating through translation, we also closely monitored the body language of the participants; if they demonstrated any signs of distress during the interview, we moved on from a particular question (Brayda & Boyce, 2014; Silverio et al., 2022).

Finally, this study offers a unique lens due to its scope. Conducting this study through a specific NGO in the Philippines and focusing on Odette as a case study enabled a deep exploration of CHWs experiences within this context. However, this focused approach may mean that findings are not reflective of or applicable towards other countries and contexts. For instance, as all CHWs in the four study regions were women, there was not an opportunity to compare and contrast experiences between women and men with disaster preparedness, response, and recovery. Further, this study lacked narratives from community members and other community leaders, which may have provided additional context regarding how other community roles intersect with community-based disaster risk management. Interviewing these individuals may have provided a more comprehensive understanding of the facilitators and barriers to community-based disaster risk management in the settings where data collection occurred. In addition, further exploring how the presence

of multiple community-based leadership roles among the participants impacted their experiences during extreme weather events may have provided additional contextual information. To broaden the results of this study, the disaster risk management framework was utilized to inform data collection and analysis, as it has been previously applied in various contexts (Busayo et al., 2022; Cook et al., 2018; Coppola, 2015; Guo et al., 2024; Pratama & Sariffuddin, 2018; Rana et al., 2021). Findings from this study also provide contributions towards a collective understanding of task-shifting and community responsibility amid disasters (Das et al., 2023; Dodd, Brubacher, et al., 2022; Ortega et al., 2021; Speers et al., 2023; Zafar et al., 2022). Ultimately, though this research may lack some applicability towards other contexts, narrowing the scope of this study allowed me to delve deeper into the interviews and gain a more comprehensive understanding of the experiences of CHWs affiliated with an NGO-led CHW program.

4.3 Research contributions

This study contributes to the growing body of disaster risk management literature by highlighting the importance of considering both individual-context and program-specific factors in understanding CHWs experiences amid extreme weather events. While existing literature has explored the actions of CHWs following extreme weather events (Fredricks et al., 2017; Maat et al., 2021; Shah et al., 2019; Sripad et al., 2021), there is a limited research focused on how CHWs themselves experience extreme weather events. As CHWs are affiliated with the health system and also hold these shared experiences with other community members, they may be able to deliver more contextually specific support, particularly during the preparation and response phases to extreme weather events. However, as community members, CHWs also share challenges associated with inefficient preparation and distribution of relief goods following extreme weather events. Indeed, this study contributes to current conversations regarding accountability and responsibility amid disasters, particularly in resource-constrained settings (Das et al., 2020; Dodd, Brubacher, et al., 2022; Speers et al., 2023). Similarly, while social networks and trusting relationships between neighbours has been highlighted as a facilitator of support during disasters (Alcayna

et al., 2016; Devkota et al., 2016; Jovita et al., 2019; Luu et al., 2022; Sripad et al., 2021; Uscher-Pines et al., 2013), this research contributes a unique understanding of the role of social capital, established networks, and community leadership in relation to the CHW role following extreme weather events.

In addition, the adaptation of the disaster risk management framework and its implications for guiding data analysis provide further contributions. While disaster risk management literature typically follows four main phases (mitigation, preparedness, response, recovery), this study focused exclusively on preparedness, response, and recovery, recognizing that mitigation efforts may not be feasible in the study context (Alexander, 2018; Coppola, 2015; Rana et al., 2021). While the disaster risk management framework is broadly referenced within existing literature (Alexander, 2018; Besiou & Van Wassenhove, 2020; Busayo et al., 2022; Cook et al., 2018; Coppola, 2015; Guo et al., 2024; Kanteler & Bakouros, 2024), the application of these three phases towards extreme weather events in the Philippines offers additional insight into the adaptability and applicability of this framework for specific contexts. Indeed, the use of this adapted framework may contribute towards broader conversations regarding the use of mitigation as a core component within the framework, and the application of each phase of the framework within different settings (e.g., high-income vs. low-income; urban vs. rural). Despite the omission of the mitigation phase, use of the disaster risk management framework in this study corroborates other research (Pratama & Sariffuddin, 2018; Rana et al., 2021) by comprehensively outlining participant experiences before, during, and after disasters. Thus, the practical application and adaptation of the disaster risk management framework during data analysis provides a starting point for future studies in disaster risk management research, particularly those exploring experiences in resource-constrained community-based settings.

This study also has practical implications for CHW training and support in disaster risk management. As previously mentioned, numerous actors and organizations play a role when a disaster occurs, with support originating from international, national, and local levels. At the local level within the Philippines, BHWs are affiliated with the government and may

work in close collaboration with the *barangay* captain to provide support amid disasters. Though important, there are instances this support can be susceptible to inequitable distribution based on political affiliations and priorities. With many interconnected components and actors playing a role in the provision of support following a disaster, community-based systems are likely to experience inequitable distribution, particularly in remote and resource-constrained areas. Though BHWs are a valuable source of support within communities during disasters, CHWs affiliated with an NGO-led CHW program are more accountable to specific NGOs rather than the government, and thus may be positioned to address potential inequities in the provision of support before and after extreme weather events. Though they should not replace existing structures and communication channels, CHWs affiliated with NGO-led CHW programs may be able to utilize their connections and position within their communities to disseminate warnings and provide information to community members before an extreme weather event to ensure that communities properly prepare for incoming disasters. Building the strength and capacity of NGO-led CHW programs may therefore lead to stronger preparedness, response, and recovery amid disasters in a way that reflects the political, social, and environmental needs and realities of specific communities (LeBan et al., 2021; Perry et al., 2021). Following an extreme weather event and due to their networks with other community members, these CHWs may also be able to provide immediate physical assistance to their communities if provided with first aid training. The provision of immediate assistance within communities could be further facilitated by providing CHWs with additional physical resources to distribute during emergencies, such as medications. In addition, CHWs affiliated with NGO-led CHW programs may be able to leverage their networks with other community leaders to advocate for their community members and contribute towards more equitable distribution of relief goods. Further, these CHWs may be able to leverage their NGO affiliation to advocate for community members to various levels of government in a manner that ensures equitable distribution and support following disasters. Thus, there is an opportunity for NGOs that offer CHW programs to work collaboratively with these CHWs to incorporate disaster risk management training and strategies into existing programming to address the increasing

challenges associated with extreme weather events, particularly in resource-constrained communities. Providing additional training and support to CHWs would not be a complete overhaul of existing CHW services, but rather an opportunity to leverage the CHWs position within their communities, as well as existing NGO operations, to offer additional assistance to community members.

Results from this study can be shared with ICM to provide insight into CHW experiences, and potentially inform future strategies that could further equip CHWs to provide support to their communities amid extreme weather events (see Table 2). Therefore, though CHWs affiliated with ICM's Flourish program are not currently equipped to support disaster risk management strategies, this study may be useful for ICM and other NGO-led CHW programs when considering the broader role of CHWs within disaster risk management and the level of responsibility that CHWs should be accountable for within their own communities. While acknowledging their own struggles in navigating challenges and barriers amid extreme weather events, CHWs in this study demonstrated a clear desire to provide additional support to their communities. Through these findings, ICM can more intimately understand the perceived capacity of CHWs when navigating disaster risk management. Due to the increasing frequency and severity of extreme weather events in the Philippines, acknowledging CHWs experiences and perceived capacity to provide additional support may strengthen climate-resilient health systems through the expansion and/or development of future CHW programs. Further, these findings are applicable towards other settings, and may offer insights into resources and training for other NGO-led CHW programs to formally contribute towards building climate resilient health systems that address broader climate-related disasters. Developing programs that recognize the complexity of the CHW role during disasters would be particularly beneficial in resource-constrained and remote settings, where national and international humanitarian aid may be delayed or limited (Bhutta, 2017; Maher, 2017; Peralta et al., 2023; Rizzoli et al., 2024; Siekmans et al., 2017; Sripad et al., 2021; World Health Organization, 2015).

Table 2. Recommendations for incorporating disaster risk management strategies into International Care Ministries (ICM)

	Recommendation	Description	Intended outcome
1	First aid training	Incorporate first aid training into existing monthly Flourish meetings.	CHWs can offer immediate physical assistance and first aid to community members both within their immediate vicinity as well as upon a return to standard tasks following an extreme weather event.
2	Preparation and evacuation information for CHWs to disseminate during standard tasks	Inform households about extreme weather event warnings, especially in communities further from municipalities who are unable to receive governmental warnings. Alongside disseminating warnings, providing information and guidance about how and what to prepare for an incoming extreme weather event.	CHWs who screen families living far from municipalities will be able to provide warnings in advance of a disaster, which will allow for additional time for these families to properly prepare. Community members may better adhere to the advice and recommendations provided by trusted community members like CHWs. Community members will be better equipped with knowledge on what to do and the choices they have when an extreme weather event occurs.
3	Additional medications and resources	Provide CHWs with additional medications to disseminate during emergencies.	CHWs can provide faster distribution of essential medication and more immediate assistance when broader support is delayed.
4	Community advocacy	CHWs to work closely with NGOs to advocate for community needs amid extreme weather events.	CHWs hold existing networks with other community leaders, and may be able to support more equitable distribution of relief goods among community members.

4.4 Implications, future research, and concluding thoughts

This research produced several important implications. First, ICM could use the findings of this study to consider pathways for expanding and further supporting CHWs affiliated with the Flourish program amid extreme weather events. As CHWs demonstrated an interest in providing additional support, ICM could consider reviewing additional means of equipping CHWs to support community-based preparation and recovery from extreme weather events, including strategies to disseminate effective warnings, additional information to pass along to community members at each stage of an extreme weather event, increased resources to cope with losses, and supplementary training.

Second, this research has implications for NGOs more broadly, who may use these learnings as a foundation when considering the development of new programs or the expansion of existing programs and health supports to build climate resilient health systems. Finally, disaster researchers could consider the methods used in this study to further examine the intersections between community responsibilities and disaster risk management. Indeed, future research should continue to explore the complex issues of accountability and task-shifting to further understand how communities manage each phase of a disaster. Specifically, the use of the disaster risk management framework to guide data collection and analysis highlighted the need to consider contextual factors when evaluating the capacity of community-based actors.

Future research regarding the experiences of CHWs during extreme weather events should aim to further the foundation of work presented in this study. Notably, future research should continue exploring and highlighting the complex nature of CHWs experiences and responsibilities during extreme weather events. Due to their existing role within communities, CHWs may be a valuable source of support to combat the challenges associated with inefficient disaster risk management, and contribute towards climate resilient health systems. As CHWs often hold previous responsibilities in their communities, future research must also consider their multi-dimensional positionality when exploring their levels of capacity. In addition, future research may benefit from incorporating diverse perspectives

within this body of work. For instance, future studies could incorporate narratives from community members and other community leaders to understand their perceptions of community-based disaster risk management and explore who they rely on during extreme weather events, which may add more nuance to current findings. Further, future research that explores community contributions to climate resilient health systems may benefit from examining how factors regarding context and setting in other resource-constrained areas impact the capacity of community-based actors. An exploration of CHWs experiences with other disasters, broadly including infectious disease outbreak, internal and external conflicts, and/or other natural disasters, may elucidate a more comprehensive understanding of individual-context and program-specific factors that impact the capacity for CHW involvement in disaster risk management.

In conclusion, this thesis research explored the experiences of CHWs before, during, and after extreme weather events in rural communities in the Philippines. This study was guided by three key phases within the disaster risk management framework to understand how CHWs navigated complex challenges associated with Super Typhoon Odette. Through participant narratives, it was apparent that capacity to support communities varied during each phase of the extreme weather event itself. In addition, positionality and other responsibilities within the community impacted both the reputation of CHWs within their community, as well as their capacity to effectively respond to immediate danger during an extreme weather event. These findings provide insights for NGO-led CHW programs in navigating tensions regarding CHW expectations, responsibilities, and burnout amid disasters. In addition, the focus on CHWs presented in this thesis research offer contributions to the broader field of community-based disaster risk management research. Overall, with careful consideration of their responsibilities and shared experiences with extreme weather events, CHWs may be a valuable source of community-based support to strengthen climate resilient health systems.

References

Abenir, M. A. D., Manzanero, L. I. O., & Bollettino, V. (2022). Community-based leadership in disaster resilience: The case of small island community in Hagonoy, Bulacan, Philippines. *International Journal of Disaster Risk Reduction*, *71*, 102797. https://doi.org/10.1016/j.ijdrr.2022.102797

Abfalter, D., Mueller-Seeger, J., & Raich, M. (2021). Translation decisions in qualitative research: A systematic framework. *International Journal of Social Research Methodology*, *24*(4), 469–486. https://doi.org/10.1080/13645579.2020.1805549

Abunyewah, M., Gajendran, T., Maund, K., & Okyere, S. A. (2020). Strengthening the information deficit model for disaster preparedness: Mediating and moderating effects of community participation. *International Journal of Disaster Risk Reduction*, *46*, 101492. https://doi.org/10.1016/j.ijdrr.2020.101492

Agarwal, S., Curtis, S., Angeles, G., Speizer, I., Singh, K., & Thomas, J. (2019). Are community health workers effective in retaining women in the maternity care continuum? Evidence from India. *BMJ Global Health*, *4*(4), e001557. https://doi.org/10.1136/bmjgh-2019-001557

Ajisegiri, W. S., Abimbola, S., Tesema, A. G., Odusanya, O. O., Peiris, D., & Joshi, R. (2023). "We just have to help": Community health workers' informal task-shifting and task-sharing practices for hypertension and diabetes care in Nigeria. *Frontiers in Public Health*, *11*. https://doi.org/10.3389/fpubh.2023.1038062

Al-Amer, R., Ramjan, L., Glew, P., Darwish, M., & Salamonson, Y. (2015). Translation of interviews from a source language to a target language: Examining issues in cross-cultural health care research. *Journal of Clinical Nursing*, *24*(9–10), 1151–1162. https://doi.org/10.1111/jocn.12681

Alase, A. (2017). The Interpretative Phenomenological Analysis (IPA): A guide to a good qualitative research approach. *International Journal of Education and Literacy Studies*, *5*(2), 9. https://doi.org/10.7575/aiac.ijels.v.5n.2p.9

Alcayna, T., Bollettino, V., Dy, P., & Vinck, P. (2016). Resilience and disaster trends in the Philippines: Opportunities for national and local capacity building. *PLoS Currents*, *8*, https://doi.org/10.1371/currents.dis.4a0bc960866e53bd6357ac135d740846

Alexander, D. E. (2018). L'Aquila, central Italy, and the "disaster cycle", 2009-2017. *Disaster Prevention and Management: An International Journal*, *28*(4), 419–433. https://doi.org/10.1108/DPM-01-2018-0022

Al-Mueed, M., Chawdhery, M. R. A., Harera, E., Alhazmi, R. A., Mobrad, A. M., Althunayyan, S. M., & Al-Wathinani, A. M. (2021). Potential of community volunteers in flood early warning dissemination: A case study of Bangladesh. *International Journal of Environmental Research and Public Health*, *18*(24), Article 24. https://doi.org/10.3390/ijerph182413010

Asweto, C. O., Alzain, M. A., Andrea, S., Alexander, R., & Wang, W. (2016). Integration of community health workers into health systems in developing countries: Opportunities and challenges. *Family Medicine and Community Health*, *4*(1), 37–45. https://doi.org/10.15212/FMCH.2016.0102

Aurelio, M. A., Dianala, J. D. B., Taguibao, K. J. L., Pastoriza, L. R., Reyes, K., Sarande, R., & Lucero, A. (2017). Seismotectonics of the 6 February 2012Mw 6.7 Negros Earthquake, central Philippines. *Journal of Asian Earth Sciences*, *142*, 93–108. https://doi.org/10.1016/j.jseaes.2016.12.018

Baliolaa, M. Y. T., Golpe, M. R., & Advincula-Lopez, L. V. (2023). Gains and challenges of the Barangay Health Worker (BHW) program during COVID-19 in selected cities in the Philippines. *Journal of Health Research*, *38*(1). https://doi.org/10.56808/2586-940X.1060

Behera, M. R., Behera, D., & Satpathy, S. K. (2020). Planetary health and the role of community health workers. *Journal of Family Medicine and Primary Care*, *9*(7), 3183–3188. https://doi.org/10.4103/jfmpc.jfmpc_328_20

Bell, J. E., Brown, C. L., Conlon, K., Herring, S., Kunkel, K. E., Lawrimore, J., Luber, G., Schreck, C., Smith, A., & Uejio, C. (2018). Changes in extreme events and the potential impacts on human health. *Journal of the Air & Waste Management Association*, *68*(4), 265–287. https://doi.org/10.1080/10962247.2017.1401017

Bergen, N., & Labonté, R. (2020). "Everything is perfect, and we have no problems": Detecting and limiting social desirability bias in qualitative research. *Qualitative Health Research*, *30*(5), 783–792. https://doi.org/10.1177/1049732319889354

Berger, R. (2015). Now I see it, now I don't: Researcher's position and reflexivity in qualitative research. *Qualitative Research*, *15*(2), 219–234. https://doi.org/10.1177/1468794112468475

Berman, R. C., & Tyyskä, V. (2011). A critical reflection on the use of translators/interpreters in a qualitative cross-language research project. *International Journal of Qualitative Methods*, *10*(2), 178–190. https://doi.org/10.1177/160940691101000206

Besiou, M., & Van Wassenhove, L. N. (2020). Humanitarian operations: A world of opportunity for relevant and impactful research. *Manufacturing & Service Operations Management*, *22*(1), 135–145. https://doi.org/10.1287/msom.2019.0799

Bevan, M. T. (2014). A method of phenomenological interviewing. *Qualitative Health Research*, *24*(1), 136–144. https://doi.org/10.1177/1049732313519710

Bhutta, Z. A. (2017). Community–based primary health care: A core strategy for achieving sustainable development goals for health. *Journal of Global Health*, *7*(1), 010101. https://doi.org/10.7189/jogh.07.010101

Birkmann, J., Cardona, O. D., Carreño, M. L., Barbat, A. H., Pelling, M., Schneiderbauer, S., Kienberger, S., Keiler, M., Alexander, D., Zeil, P., & Welle, T. (2013). Framing vulnerability, risk and societal responses: The MOVE framework. *Natural Hazards*, *67*(2), 193–211. https://doi.org/10.1007/s11069-013-0558-5

Birks, M., Chapman, Y., & Francis, K. (2008). Memoing in qualitative research: Probing data and processes. *Journal of Research in Nursing*, *13*(1), 68–75. https://doi.org/10.1177/1744987107081254

Birks, M. J., Chapman, Y., & Francis, K. (2007). Breaching the wall: Interviewing people from other cultures. *Journal of Transcultural Nursing*, *18*(2), 150–156. https://doi.org/10.1177/1043659606298617

Bosher, L., Chmutina, K., & van Niekerk, D. (2021). Stop going around in circles: Towards a reconceptualisation of disaster risk management phases. *Disaster Prevention and Management: An International Journal*, *30*(4/5), 525–537. https://doi.org/10.1108/DPM-03-2021-0071

Bouwer, L. M. (2019). Observed and projected impacts from extreme weather events: Implications for loss and damage. In R. Mechler, L. M. Bouwer, T. Schinko, S. Surminski, & J. Linnerooth-Bayer (Eds.), *Loss and Damage from Climate Change: Concepts, Methods and Policy Options* (pp. 63–82). Springer International Publishing. https://doi.org/10.1007/978-3-319-72026-5_3

Boyce, M. R., & Katz, R. (2019). Community health workers and pandemic preparedness: Current and prospective roles. *Frontiers in Public Health*, *7*. https://doi.org/10.3389/fpubh.2019.00062

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2021). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology*, *18*(3), 328–352. https://doi.org/10.1080/14780887.2020.1769238

Brayda, W. C., & Boyce, T. D. (2014). So you really want to interview me?: Navigating "sensitive" qualitative research interviewing. *International Journal of Qualitative Methods*, *13*(1), 318–334. https://doi.org/10.1177/160940691401300115

Busayo, E. T., Kalumba, A. M., Afuye, G. A., Olusola, A. O., Ololade, O. O., & Orimoloye, I. R. (2022). Rediscovering South Africa: Flood disaster risk management through ecosystem-based adaptation. *Environmental and Sustainability Indicators*, *14*, 100175. https://doi.org/10.1016/j.indic.2022.100175

Bustos, M., Lau, L. L., Kirkpatrick, S. I., Dubin, J. A., Manguerra, H., & Dodd, W. (2023). Examining the association between household enrollment in the Pantawid Pamilyang Pilipino Program (4Ps) and wasting and stunting status among children experiencing poverty in the Philippines: A cross-sectional study. *Asia Pacific Journal of Public Health*, *35*(6–7), 420–428. https://doi.org/10.1177/10105395231189570

Byrne, D. (2022). A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Quality & Quantity*, *56*(3), 1391–1412. https://doi.org/10.1007/s11135-021-01182-y

Camelo, J., & Mayo, T. (2021). The lasting impacts of the Saffir-Simpson Hurricane Wind Scale on storm surge risk communication: The need for multidisciplinary research in addressing a multidisciplinary challenge. *Weather and Climate Extremes*, *33*, 100335. https://doi.org/10.1016/j.wace.2021.100335

Cernasev, A., & Axon, D. R. (2023). Research and scholarly methods: Thematic analysis. *JACCP: Journal of the American College of Clinical Pharmacy, 6*(7), 751–755. https://doi.org/10.1002/jac5.1817

Colvin, C. J., Hodgins, S., & Perry, H. B. (2021). Community health workers at the dawn of a new era: 8. Incentives and remuneration. *Health Research Policy and Systems*, *19*(3), 106. https://doi.org/10.1186/s12961-021-00750-w

Cook, A. D. B., Shrestha, M., & Zin Bo Htet. (2018). An assessment of international emergency disaster response to the 2015 Nepal earthquakes. *International Journal of Disaster Risk Reduction*, *31*, 535–547. https://doi.org/10.1016/j.ijdrr.2018.05.014

Coppola, D. P. (2015). *Introduction to international disaster management* (Third edition). Elsevier/Butterworth-Hein.

Cutter, S. L., Ash, K. D., & Emrich, C. T. (2016). Urban–rural differences in disaster resilience. *Annals of the American Association of Geographers*, *106*(6), 1236–1252. https://doi.org/10.1080/24694452.2016.1194740

Dariagan, J. D., Atando, R. B., & Asis, J. L. B. (2021). Disaster preparedness of local governments in Panay Island, Philippines. *Natural Hazards*, *105*(2), 1923–1944. https://doi.org/10.1007/s11069-020-04383-0

Das, J. K., Salam, R. A., Saeed, M., Kazmi, F. A., & Bhutta, Z. A. (2020). Effectiveness of interventions for managing acute malnutrition in children under five years of age in low-income and middle-income countries: A systematic review and meta-analysis. *Nutrients*, *12*(1), Article 1. https://doi.org/10.3390/nu12010116

Das, S., Grant, L., & Fernandes, G. (2023). Task shifting healthcare services in the post-COVID world: A scoping review. *PLOS Global Public Health*, *3*(12), e0001712. https://doi.org/10.1371/journal.pgph.0001712

de Villiers, C., Farooq, M. B., & Molinari, M. (2021). Qualitative research interviews using online video technology – challenges and opportunities. *Meditari Accountancy Research*, *30*(6), 1764–1782. https://doi.org/10.1108/MEDAR-03-2021-1252

Demuth, J. L., Morss, R. E., Lazo, J. K., & Trumbo, C. (2016). The effects of past hurricane experiences on evacuation intentions through risk perception and efficacy beliefs: A mediation analysis. *American Meteorological Society, 8*, 327-344. https://doi.org/10.1175/WCAS-D-15-0074.1

Deng, Y., Wang, M., & Yousefpour, R. (2017). How do people's perceptions and climatic disaster experiences influence their daily behaviors regarding adaptation to climate change? — A case study among young generations. *Science of The Total Environment*, *581–582*, 840–847. https://doi.org/10.1016/j.scitotenv.2017.01.022

Devkota, B. P., Doberstein, B., & Nepal, S. K. (2016). Social capital and natural disaster: Local responses to 2015 earthquake in Kathmandu. *International Journal of Mass Emergencies & Disasters*, *34*(3), 439–466. https://doi.org/10.1177/028072701603400305

Dickson-Swift, V., James, E. L., Kippen, S., & Liamputtong, P. (2009). Researching sensitive topics: qualitative research as emotion work. *Qualitative Research*, *9*(1), 61–79. https://doi.org/10.1177/1468794108098031

Dodd, W., Brubacher, L. J., Kipp, A., Wyngaarden, S., Haldane, V., Ferrolino, H., Wilson, K., Servano, D., Lau, L. L., & Wei, X. (2022). Navigating fear and care: The lived experiences of community-based health actors in the Philippines during the COVID-19 pandemic. *Social Science & Medicine (1982)*, *308*, 115222. https://doi.org/10.1016/j.socscimed.2022.115222

Dodd, W., Brubacher, L. J., Speers, S., Servano, D., Go, D. J., & Lau, L. L. (2023). The contributions of religious leaders in addressing food insecurity during the COVID-19 pandemic in the Philippines: A realist evaluation of the Rapid Emergencies and Disasters Intervention (REDI). *International Journal of Disaster Risk Reduction*, *86*, 103545. https://doi.org/10.1016/j.ijdrr.2023.103545

Dodd, W., Kipp, A., Nicholson, B., Lau, L. L., Little, M., Walley, J., & Wei, X. (2021). Governance of community health worker programs in a decentralized health system: A qualitative study in the Philippines. *BMC Health Services Research*, *21*(1), 451. https://doi.org/10.1186/s12913-021-06452-x

Dodd, W., Scott, P., Howard, C., Scott, C., Rose, C., Cunsolo, A., & Orbinski, J. (2018). Lived experience of a record wildfire season in the Northwest Territories, Canada. *Canadian Journal of Public Health*, *109*(3), 327–337. https://doi.org/10.17269/s41997-018-0070-5

Domingo, A., Little, M., Beggs, B., Brubacher, L. J., Lau, L., & Dodd, W. (2024). Examining the role of community health workers amid extreme weather events in low- and middle-income countries: A scoping review. *Public Health*. Accepted manuscript.

Domingo, S. N., & Manejar, A. J. A. (2018). *Disaster preparedness and local governance in the Philippines*. https://www.econstor.eu/bitstream/10419/211072/1/1663429758.pdf

Dougherty, M. V. (2021). The use of confidentiality and anonymity protections as a cover for fraudulent fieldwork data. *Research Ethics*, *17*(4), 480–500. https://doi.org/10.1177/17470161211018257

Ebi, K. L., & Semenza, J. C. (2008). Community-based adaptation to the health impacts of climate change. *American Journal of Preventive Medicine*, *35*(5), 501–507. https://doi.org/10.1016/j.amepre.2008.08.018

Ebi, K. L., Vanos, J., Baldwin, J. W., Bell, J. E., Hondula, D. M., Errett, N. A., Hayes, K., Reid, C. E., Saha, S., Spector, J., & Berry, P. (2021). Extreme weather and climate change: Population health and health system implications. *Annual Review of Public Health*, *42*(1), 293–315. https://doi.org/10.1146/annurev-publhealth-012420-105026

Edwards, B., Gray, M., & Borja, J. (2021). The influence of natural disasters on violence, mental health, food insecurity, and stunting in the Philippines: Findings from a nationally representative cohort. *SSM - Population Health*, *15*, 100825. https://doi.org/10.1016/j.ssmph.2021.100825

Elliott, V. (2018). Thinking about the coding process in qualitative data analysis. *The Qualitative Report*. https://doi.org/10.46743/2160-3715/2018.3560

Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, *5*(1), 80–92. https://doi.org/10.1177/160940690600500107

Fredricks, K., Dinh, H., Kusi, M., Yogal, C., Karmacharya, B. M., Burke, T. F., & Nelson, B. D. (2017). Community health workers and disasters: Lessons learned from the 2015 earthquake in Nepal. *Prehospital and Disaster Medicine*, *32*(6), 604–609. https://doi.org/10.1017/S1049023X1700680X

Gebremeskel, A. T., Otu, A., Abimbola, S., & Yaya, S. (2021). Building resilient health systems in Africa beyond the COVID-19 pandemic response. *BMJ Global Health*, *6*(6), e006108. https://doi.org/10.1136/bmjgh-2021-006108

Gentles, S., Charles, C., Ploeg, J., & McKibbon, K. A. (2015). Sampling in qualitative research: insights from an overview of the methods literature. *The Qualitative Report*. https://doi.org/10.46743/2160-3715/2015.2373

Glenton, C., Javadi, D., & Perry, H. B. (2021). Community health workers at the dawn of a new era: 5. Roles and tasks. *Health Research Policy and Systems*, *19*(3), 128. https://doi.org/10.1186/s12961-021-00748-4

Guo, J., Bian, Y., Li, M., & Du, J. (2024). Assessing resilience through social networks: A case study of flood disaster management in China. *International Journal of Disaster Risk Reduction*, *108*, 104583. https://doi.org/10.1016/j.ijdrr.2024.104583

Haldane, V., De Foo, C., Abdalla, S. M., Jung, A.-S., Tan, M., Wu, S., Chua, A., Verma, M., Shrestha, P., Singh, S., Perez, T., Tan, S. M., Bartos, M., Mabuchi, S., Bonk, M., McNab, C., Werner, G. K., Panjabi, R., Nordström, A., & Legido-Quigley, H. (2021). Health systems resilience in managing the COVID-19 pandemic: Lessons from 28 countries. *Nature Medicine*, *27*(6), 964–980. https://doi.org/10.1038/s41591-021-01381-y

Haldane, V., Dodd, W., Kipp, A., Ferrolino, H., Wilson, K., Servano, D., Lau, L. L., & Wei, X. (2022). Extending health systems resilience into communities: A qualitative study with community-based actors providing health services during the COVID-19 pandemic in the Philippines. *BMC Health Services Research*, *22*(1), 1385. https://doi.org/10.1186/s12913-022-08734-4

Heinkel, S. B., Thiebes, B., Than, Z. M., Aung, T., Kyi, T. T., Mar, W. L., Oo, S. S., Miller, C., Willkomm, M., Maung, W., Myint, Z. N., Soe, K. K., Spohner, R., & Kraas, F. (2022). Disaster preparedness and resilience at household level in Yangon, Myanmar. *Natural Hazards*, *112*(2), 1273–1294. https://doi.org/10.1007/s11069-022-05226-w

Hill, Z., Tawiah-Agyemang, C., Kirkwood, B., & Kendall, C. (2022). Are verbatim transcripts necessary in applied qualitative research: Experiences from two community-based intervention trials in Ghana. *Emerging Themes in Epidemiology*, *19*(1), 5. https://doi.org/10.1186/s12982-022-00115-w

Horwood, C., Butler, L., Barker, P., Phakathi, S., Haskins, L., Grant, M., Mntambo, N., & Rollins, N. (2017). A continuous quality improvement intervention to improve the effectiveness of community health workers providing care to mothers and children: A cluster randomised

controlled trial in South Africa. *Human Resources for Health*, *15*(1), 39. https://doi.org/10.1186/s12960-017-0210-7

Hosseini, S. H., Amanat, N., Ghanbari, V., Nakhaee, M., Abbasabadi, M., Najafi, M., Khankeh, H. R., & Pashaei Sabet, F. (2017). Community-based management challenges in disaster risk reduction: A content analysis in Iran. *Health in Emergencies and Disasters Quarterly*, *2*(2), 63–70. https://doi.org/10.18869/nrip.hdq.2.2.63

Housner, G. W. (1989). An international decade of natural disaster reduction: 1990–2000. *Natural Hazards*, *2*(1), 45–75. https://doi.org/10.1007/BF00124757

Hung, K. K. C., Mashino, S., Chan, E. Y. Y., MacDermot, M. K., Balsari, S., Ciottone, G. R., Della Corte, F., Dell'Aringa, M. F., Egawa, S., Evio, B. D., Hart, A., Hu, H., Ishii, T., Ragazzoni, L., Sasaki, H., Walline, J. H., Wong, C. S., Bhattarai, H. K., Dalal, S., … Graham, C. A. (2021). Health workforce development in health emergency and disaster risk management: The need for evidence-based recommendations. *International Journal of Environmental Research and Public Health*, *18*(7). https://doi.org/10.3390/ijerph18073382

ICM. (2022a, February 8). Beyond relief: ICM launches recovery program for Typhoon Odette survivors. *International Care Ministries*. https://www.caremin.com/2022/02/beyond-relief-icm-launches-recovery-program-for-typhoon-odette-survivors

ICM. (2022b, August 29). Community Health Champions are our new heroes of the new normal. *International Care Ministries*. https://www.caremin.com/2022/08/community-health-champions-are-our-new-heroes-of-the-new-normal

IPCC. (2023). *Climate Change 2021 – The Physical Science Basis: Working Group I Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* (1st ed.). Cambridge University Press. https://doi.org/10.1017/9781009157896

Irvine, A., Drew, P., & Sainsbury, R. (2013). 'Am I not answering your questions properly?' Clarification, adequacy and responsiveness in semi-structured telephone and face-to-face interviews. *Qualitative Research*, *13*(1), 87–106. https://doi.org/10.1177/1468794112439086

Islam, D. M., Haque, M. A., Rahman, M. F., Roberts, E., Hasemann, A., & Roddick, S. (2023). *Local Perspective on Loss and Damage in the Context of Extreme Events*. https://assets.publishing.service.gov.uk/media/57a08a4740f0b652dd000656/bangladesh-cyclones.pdf

Islam, R., Kamaruddin, R., Ahmad, S. A., Jan, S. J., & Anuar, A. R. (2016). *A Review on Mechanism of Flood Disaster Management in Asia*, *6*(1), 29-52.

Ito, H., Wisetjindawat, W., & Yokomatsu, M. (2014). Improving the operational efficiency of humanitarian logistics in the aftermath of a large-scale disaster. *IDRiM Journal*, *4*(2), 142–155. https://doi.org/10.5595/idrim.2014.0091

Johnson, D. R., Scheitle, C. P., & Ecklund, E. H. (2021). Beyond the in-person interview? How interview quality varies across in-person, telephone, and skype interviews. *Social Science Computer Review*, *39*(6), 1142–1158. https://doi.org/10.1177/0894439319893612

Jovita, H. D., Nashir, H., Mutiarin, D., Moner, Y., & Nurmandi, A. (2019). Social capital and disasters: How does social capital shape post-disaster conditions in the Philippines? *Journal of Human Behavior in the Social Environment*, *29*(4), 519–534. https://doi.org/10.1080/10911359.2018.1556143

Kaiser, K. (2009). Protecting respondent confidentiality in qualitative research. *Qualitative Health Research*, *19*(11), 1632–1641. https://doi.org/10.1177/1049732309350879

Kane, S., Kok, M., Ormel, H., Otiso, L., Sidat, M., Namakhoma, I., Nasir, S., Gemechu, D., Rashid, S., Taegtmeyer, M., Theobald, S., & de Koning, K. (2016). Limits and opportunities to

community health worker empowerment: A multi-country comparative study. *Social Science & Medicine*, *164*, 27–34. https://doi.org/10.1016/j.socscimed.2016.07.019

Kane, S., Radkar, A., Gadgil, M., & McPake, B. (2020). Community health workers as influential health system actors and not "just another pair of hands." *International Journal of Health Policy and Management*, *10*(8), 465–474. https://doi.org/10.34172/ijhpm.2020.58

Kanteler, D., & Bakouros, I. (2024). A collaborative framework for cross-border disaster management in the Balkans. *International Journal of Disaster Risk Reduction*, *108*, 104506. https://doi.org/10.1016/j.ijdrr.2024.104506

Kiran, P. S., Mohan, B., Abhijith, V., Abraham, A., Anoop, G., Dinesh, R. S., Krishnan, H., Mahadevan, K., Peethambaran, M., Kunheen, M., Sidharthan, M., Prathibha, S., Sukesh, G., Thomas, K. P., Jayaprakashan, K. P., & Jaisoorya, T. S. (2021). Framework for strengthening primary health care and community networks to mitigate the long-term psychosocial impact of floods in Kerala. *International Journal of Disaster Risk Reduction*, *52*, 101947. https://doi.org/10.1016/j.ijdrr.2020.101947

Kok, M. C., Broerse, J. E. W., Theobald, S., Ormel, H., Dieleman, M., & Taegtmeyer, M. (2017). Performance of community health workers: Situating their intermediary position within complex adaptive health systems. *Human Resources for Health*, *15*(1), 59. https://doi.org/10.1186/s12960-017-0234-z

Kok, M. C., Kea, A. Z., Datiko, D. G., Broerse, J. E. W., Dieleman, M., Taegtmeyer, M., & Tulloch, O. (2015). A qualitative assessment of health extension workers' relationships with the community and health sector in Ethiopia: Opportunities for enhancing maternal health performance. *Human Resources for Health*, *13*(1), 80. https://doi.org/10.1186/s12960-015-0077-4

Kok, M. C., Ormel, H., Broerse, J. E. W., Kane, S., Namakhoma, I., Otiso, L., Sidat, M., Kea, A. Z., Taegtmeyer, M., Theobald, S., & Dieleman, M. (2017). Optimising the benefits of community health workers' unique position between communities and the health sector: A comparative analysis of factors shaping relationships in four countries. *Global Public Health*, *12*(11), 1404–1432. https://doi.org/10.1080/17441692.2016.1174722

Kruk, M. E., Myers, M., Varpilah, S. T., & Dahn, B. T. (2015). What is a resilient health system? Lessons from Ebola. *The Lancet*, *385*(9980), 1910–1912. https://doi.org/10.1016/S0140-6736(15)60755-3

Lapa, Ma. M. I. M., Palompon, D. R., & Garcia, L. L. (2016). Experiences with Typhoon Yolanda: The voices of young survivors revealed. *Journal of Nursing Education and Practice*, *6*(12), p136. https://doi.org/10.5430/jnep.v6n12p136

Lau, L. L., Dodd, W., Qu, H. L., & Cole, D. C. (2020). Exploring trust in religious leaders and institutions as a mechanism for improving retention in child malnutrition interventions in the Philippines: A retrospective cohort study. *BMJ Open*, *10*(9), e036091. https://doi.org/10.1136/bmjopen-2019-036091

Lau, L. L., Hung, N., Go, D. J., Choi, M., Dodd, W., & Wei, X. (2022). Dramatic increases in knowledge, attitudes and practices of COVID-19 observed among low-income households in the Philippines: A repeated cross-sectional study in 2020. *Journal of Global Health*, *12*, 05015. https://doi.org/10.7189/jogh.12.05015

Lau, L. L., Hung, N., Go, D. J., Ferma, J., Choi, M., Dodd, W., & Wei, X. (2020). Knowledge, attitudes and practices of COVID-19 among income-poor households in the Philippines: A cross-sectional study. *Journal of Global Health*, *10*(1), 011007. https://doi.org/10.7189/jogh.10.011007

LeBan, K., Kok, M., & Perry, H. B. (2021). Community health workers at the dawn of a new era: 9. CHWs' relationships with the health system and communities. *Health Research Policy and Systems*, *19*(3), 116. https://doi.org/10.1186/s12961-021-00756-4

Leon, I. Z. P. de. (2021). *A Portrait of Contrasts in Disaster Risk Response: A Post-Haiyan Study of Coron, Philippines*. https://doi.org/10.1175/WCAS-D-20-0093.1

Levy, B. S., & Patz, J. A. (2015). Climate change, human rights, and social justice. *Annals of Global Health*, *81*(3), 310–322. https://doi.org/10.1016/j.aogh.2015.08.008

Lewin, S., Lehmann, U., & Perry, H. B. (2021). Community health workers at the dawn of a new era: 3. Programme governance. *Health Research Policy and Systems*, *19*(3), 129. https://doi.org/10.1186/s12961-021-00749-3

Long, T., & Johnson, M. (2000). Rigour, reliability and validity in qualitative research. *Clinical Effectiveness in Nursing*, *4*(1), 30–37. https://doi.org/10.1054/cein.2000.0106

Lum, T., & Margesson, R. (2014). Typhoon Haiyan (Yolanda): U.S. and international response to Philippines disaster. *Current Politics and Economics of South, Southeastern, and Central Asia*, *23*(2), 209–246.

Luu, K., Brubacher, L. J., Lau, L. L., Liu, J. A., & Dodd, W. (2022). Exploring the role of social networks in facilitating health service access among low-income women in the Philippines: A qualitative study. *Health Services Insights*, *15*, 11786329211068916. https://doi.org/10.1177/11786329211068916

Maat, H., Balabanova, D., Mokuwa, E., Richards, P., Mohan, V., Ssengooba, F., Twinomuhangi, R., Woldie, M., & Mayhew, S. (2021). Towards sustainable community-based systems for infectious disease and disaster response; Lessons from local initiatives in four African countries. *Sustainability*, *13*(18), Article 18. https://doi.org/10.3390/su131810083

Maher, D. (2017). 'Leaving no-one behind': How community health workers can contribute to achieving the Sustainable Development Goals. *Public Health Action*, *7*(1), 5. https://doi.org/10.5588/pha.17.0022

Malcarney, M.-B., Pittman, P., Quigley, L., Horton, K., & Seiler, N. (2017). The changing roles of community health workers. *Health Services Research*, *52*(S1), 360–382. https://doi.org/10.1111/1475-6773.12657

Mallari, E., Lasco, G., Sayman, D. J., Amit, A. M. L., Balabanova, D., McKee, M., Mendoza, J., Palileo-Villanueva, L., Renedo, A., Seguin, M., & Palafox, B. (2020). Connecting communities to primary care: A qualitative study on the roles, motivations and lived experiences of community health workers in the Philippines. *BMC Health Services Research*, *20*(1), 860. https://doi.org/10.1186/s12913-020-05699-0

Martin. (2023). Climate change. *United Nations Sustainable Development*. https://www.un.org/sustainabledevelopment/climate-change/

Mata, P., Cullano, R. A., Tiu, A. M., Gonzales, G., Selerio, E., Maturan, F., Evangelista, S. S., Burdeos, A., Yamagishi, K., & Ocampo, L. (2023). Public satisfaction with the government's disaster response during Typhoon Odette (Rai). *International Journal of Disaster Risk Reduction*, *84*, 103483. https://doi.org/10.1016/j.ijdrr.2022.103483

McEntire, D. (2012). Understanding and reducing vulnerability: From the approach of liabilities and capabilities. *Disaster Prevention and Management: An International Journal*, *21*(2), 206–225. https://doi.org/10.1108/09653561211220007

McMichael, A. J. (2015). Extreme weather events and infectious disease outbreaks. *Virulence*, *6*(6), 543–547. https://doi.org/10.4161/21505594.2014.975022

Miller, N. P., Milsom, P., Johnson, G., Bedford, J., Kapeu, A. S., Diallo, A. O., Hassen, K., Rafique, N., Islam, K., Camara, R., Kandeh, J., Wesseh, C. S., Rasanathan, K., Zambruni, J. P., &

Papowitz, H. (2018). Community health workers during the Ebola outbreak in Guinea, Liberia, and Sierra Leone. *Journal of Global Health*, *8*(2), 020601. https://doi.org/10.7189/jogh-08-020601

Mirza, H., Bellalem, F., & Mirza, C. (2023). Ethical considerations in qualitative research: Summary guidelines for novice social science researchers. *Social Studies and Research Journal, 11*, 441–449.

Mishra, A. (2014). 'Trust and teamwork matter': Community health workers' experiences in integrated service delivery in India. *Global Public Health*, *9*(8), 960–974. https://doi.org/10.1080/17441692.2014.934877

Mlotshwa, L., Harris, B., Schneider, H., & Moshabela, M. (2015). Exploring the perceptions and experiences of community health workers using role identity theory. *Global Health Action*, *8*(1), 28045. https://doi.org/10.3402/gha.v8.28045

Mohd, S., Fathi, M. S., & Harun, A. N. (2018). Humanitarian aid distribution framework for natural disaster management. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, *XLII-3-W4*, 343–349. https://doi.org/10.5194/isprs-archives-XLII-3-W4-343-2018

Morse, J. M. (2015). "Data were saturated. . . ." *Qualitative Health Research*, *25*(5), 587–588. https://doi.org/10.1177/1049732315576699

Mosadeghrad, A. M., Isfahani, P., Eslambolchi, L., Zahmatkesh, M., & Afshari, M. (2023). Strategies to strengthen a climate-resilient health system: A scoping review. *Globalization and Health*, *19*(1), 62. https://doi.org/10.1186/s12992-023-00965-2

Naeem, M., Ozuem, W., Howell, K., & Ranfagni, S. (2023). A step-by-step process of thematic analysis to develop a conceptual model in qualitative research. *International Journal of Qualitative Methods*, *22*, 16094069231205789. https://doi.org/10.1177/16094069231205789

Nakagawa, Y. (2017). The lived experience of preparing for earthquakes in households: A phenomenological psychological study. *Natural Hazards*, *88*(3), 1825–1844. https://doi.org/10.1007/s11069-017-2948-6

Ndambo, M. K., Munyaneza, F., Aron, M. B., Nhlema, B., & Connolly, E. (2022). Qualitative assessment of community health workers' perspective on their motivation in community-based primary health care in rural Malawi. *BMC Health Services Research*, *22*(1), 179. https://doi.org/10.1186/s12913-022-07558-6

Neubauer, B. E., Witkop, C. T., & Varpio, L. (2019). How phenomenology can help us learn from the experiences of others. *Perspectives on Medical Education*, *8*(2), 90–97. https://doi.org/10.1007/s40037-019-0509-2

Nicholls, K., Picou, J. S., Curtis, J., & Lowman, J. A. (2015). The utility of community health workers in disaster preparedness, recovery, and resiliency. *Journal of Applied Social Science*, *9*(2), 191–202. https://doi.org/10.1177/1936724415587046

Nicholls, K., Picou, S. J., & McCord, S. C. (2017). Training community health workers to enhance disaster resilience. *Journal of Public Health Management and Practice*, *23*, S78–S84.

Nojavan, M., Salehi, E., & Omidvar, B. (2018). Conceptual change of disaster management models: A thematic analysis. *Journal of Disaster Risk Studies*, *10*(1), 451. https://doi.org/10.4102/jamba.v10i1.451

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, *16*(1). https://doi.org/10.1177/1609406917733847

OCHA. (2022a, January 28). *NDRRMC Situational Report No. 40 for Typhoon ODETTE (2021), January 27, 2022 08:00 am—Philippines | ReliefWeb*.

https://reliefweb.int/report/philippines/ndrrmc-situational-report-no-40-typhoon-odette-2021-january-27-2022-0800-am

OCHA. (2022b, February 2). *Philippines: Super Typhoon Rai (Odette) Humanitarian Needs and Priorities Revision (Dec 2021 - Jun 2022) (2 Feb 2022) - Philippines | ReliefWeb*. https://reliefweb.int/report/philippines/philippines-super-typhoon-rai-odette-humanitarian-needs-and-priorities-revision

OCHA. (2023, September 16). *Situation Report*. https://reports.unocha.org/en/country/philippines/

O'Donovan, J., O'Donovan, C., Kuhn, I., Sachs, S. E., & Winters, N. (2018). Ongoing training of community health workers in low-income and middle-income countries: A systematic scoping review of the literature. *BMJ Open*, *8*(4), e021467. https://doi.org/10.1136/bmjopen-2017-021467

Olaniran, A., Madaj, B., Bar-Zeev, S., Banke-Thomas, A., & van den Broek, N. (2022). Factors influencing motivation and job satisfaction of community health workers in Africa and Asia—A multi-country study. *The International Journal of Health Planning and Management*, *37*(1), 112–132. https://doi.org/10.1002/hpm.3319

Oliver, M., Geniets, A., Winters, N., Rega, I., & Mbae, S. M. (2015). What do community health workers have to say about their work, and how can this inform improved programme design? A case study with CHWs within Kenya. *Global Health Action*, *8*(1), 27168. https://doi.org/10.3402/gha.v8.27168

Olivier, C., Hunt, M. R., & Ridde, V. (2016). NGO–researcher partnerships in global health research: Benefits, challenges, and approaches that promote success. *Development in Practice*, *26*(4), 444–455. https://doi.org/10.1080/09614524.2016.1164122

Ortega, A. C., Valtierra, E., Rodríguez-Cuevas, F. G., Aranda, Z., Preciado, G., & Mohar, S. (2021). Protecting vulnerable communities and health professionals from COVID-19 associated

mental health distress: A comprehensive approach led by a public-civil partnership in rural Chiapas, Mexico. *Global Health Action*, *14*(1), 1997410. https://doi.org/10.1080/16549716.2021.1997410

Ozano, K., Simkhada, P., Thann, K., & Khatri, R. (2018). Improving local health through community health workers in Cambodia: Challenges and solutions. *Human Resources for Health*, *16*(1), 2. https://doi.org/10.1186/s12960-017-0262-8

Palafox, B., Renedo, A., Lasco, G., Palileo-Villanueva, L., Balabanova, D., & McKee, M. (2021). Maintaining population health in low- and middle-income countries during the COVID-19 pandemic: Why we should be investing in Community Health Workers. *Tropical Medicine & International Health*, *26*(1), 20–22. https://doi.org/10.1111/tmi.13498

Pallas, S. W., Minhas, D., Pérez-Escamilla, R., Taylor, L., Curry, L., & Bradley, E. H. (2013). Community health workers in low- and middle-income countries: What do we know about scaling up and sustainability? *American Journal of Public Health*, *103*(7), e74–e82. https://doi.org/10.2105/AJPH.2012.301102

Parray, A. A., Dash, S., Ullah, Md. I. K., Inam, Z. M., & Kaufman, S. (2021). Female community health workers and health system navigation in a conflict zone: The case of Afghanistan. *Frontiers in Public Health*, *9*, 704811. https://doi.org/10.3389/fpubh.2021.704811

Paton, D., Okada, N., & Sagala, S. (2013). Understanding preparedness for natural hazards: A cross cultural comparison. *IDRiM Journal*, *3*(1), 18–35.

Peralta, J. C. A., Lim, M., & Reyes, R. (2023). Transport network efficiency during typhoon relief operations. *The Philippine Journal of Science*, *152*(S1), 185–195.

Perez, A., Jr, C. P., & Ramirez, C. M. (2020). Incentivizing (and disincentivizing) mothers to utilize maternal health services: A focus group study. *Philippine Journal of Nursing*, *90*(1).

Perry, H. B., Chowdhury, M., Were, M., LeBan, K., Crigler, L., Lewin, S., Musoke, D., Kok, M., Scott, K., Ballard, M., & Hodgins, S. (2021). Community health workers at the dawn of a new era: 11. CHWs leading the way to "Health for All." *Health Research Policy and Systems*, *19*(3), 111. https://doi.org/10.1186/s12961-021-00755-5

Perry, H. B., Zulliger, R., & Rogers, M. M. (2014). Community health workers in low-, middle-, and high-income countries: An overview of their history, recent evolution, and current effectiveness. *Annual Review of Public Health*, *35*(1), 399–421. https://doi.org/10.1146/annurev-publhealth-032013-182354

Poletti, P., Ajelli, M., & Merler, S. (2012). Risk perception and effectiveness of uncoordinated behavioral responses in an emerging epidemic. *Mathematical Biosciences*, *238*(2), 80–89. https://doi.org/10.1016/j.mbs.2012.04.003

Pratama, A. Y., & Sariffuddin, S. (2018). Community-based disaster management: A lesson learned from community emergency response management in Banyumas, Indonesia. *IOP Conference Series: Earth and Environmental Science*, *123*, 012003. https://doi.org/10.1088/1755-1315/123/1/012003

PreventionWeb. (2010, November 19). *Philippines: Disaster council to inspect hazard-prone areas in Negros Oriental*. https://www.preventionweb.net/news/philippines-disaster-council-inspect-hazard-prone-areas-negros-oriental

Radović, V., & Iglesias, I. (2020). Extreme weather events: Definition, classification, and guidelines towards vulnerability reduction and adaptation management. In W. Leal Filho, A. M. Azul, L. Brandli, P. G. Özuyar, & T. Wall (Eds.), *Climate Action* (pp. 464–476). Springer International Publishing. https://doi.org/10.1007/978-3-319-95885-9_68

Rafiq, M. Y., Wheatley, H., Mushi, H. P., & Baynes, C. (2019). Who are CHWs? An ethnographic study of the multiple identities of community health workers in three rural districts in

Tanzania. *BMC Health Services Research*, *19*(1), 712. https://doi.org/10.1186/s12913-019-4563-6

Rajabi, E., Bazyar, J., Delshad, V., & Khankeh, H. R. (2022). The evolution of disaster risk management: Historical approach. *Disaster Medicine and Public Health Preparedness*, *16*(4), 1623–1627. https://doi.org/10.1017/dmp.2021.194

Rameshshanker, V., Wyngaarden, S., Lau, L. L., & Dodd, W. (2021). Health system resilience to extreme weather events in Asia-Pacific: A scoping review. *Climate and Development*, *13*(10), 944–958. https://doi.org/10.1080/17565529.2020.1870425

Rana, I. A., Asim, M., Aslam, A. B., & Jamshed, A. (2021). Disaster management cycle and its application for flood risk reduction in urban areas of Pakistan. *Urban Climate*, *38*, 100893. https://doi.org/10.1016/j.uclim.2021.100893

Rataj, E., Kunzweiler, K., & Garthus-Niegel, S. (2016). Extreme weather events in developing countries and related injuries and mental health disorders—A systematic review. *BMC Public Health*, *16*(1), 1020. https://doi.org/10.1186/s12889-016-3692-7

Ravago, M.-L. V., Mapa, C. D. S., Aycardo, A. G., & Abrigo, M. R. M. (2020). Localized disaster risk management index for the Philippines: Is your municipality ready for the next disaster? *International Journal of Disaster Risk Reduction*, *51*, 101913. https://doi.org/10.1016/j.ijdrr.2020.101913

Raven, J., Wurie, H., Baba, A., Bah, A. J., Dean, L., Hawkins, K., Idriss, A., Kollie, K., Nallo, G. E., Steege, R., & Theobald, S. (2022). Supporting community health workers in fragile settings from a gender perspective: A qualitative study. *BMJ Open*, *12*(2), e052577. https://doi.org/10.1136/bmjopen-2021-052577

ReliefWeb. (2021, December 22). *The Philippines: Super Typhoon Rai (Odette) - Path of Typhoon Rai (Odette) - as of 17 Dec 21 - Philippines*. https://reliefweb.int/map/philippines/philippines-super-typhoon-rai-odette-path-typhoon-rai-odette-17-dec-21

ReliefWeb. (2022a, February 11). *Philippines: Super Typhoon Rai (Odette) - Situation Report No. 4 (As of 11 February 2022) - Philippines*. https://reliefweb.int/report/philippines/philippines-super-typhoon-rai-odette-situation-report-no-4-11-february-2022

ReliefWeb. (2022b, July 30). *Philippines, Asia Pacific: Typhoon Rai (Odette) - Emergency Appeal No. MDRPH045 - Operation update #3 - Philippines*. https://reliefweb.int/report/philippines/philippines-asia-pacific-typhoon-rai-odette-emergency-appeal-no-mdrph045-operation-update-3

Rizzoli, V., Tagliacozzo, S., Morsut, C., Di Bucci, D., Fagà, G., Casarotti, C., & Polese, M. (2024). A methodology for identifying, documenting and extrapolating potential good practices in disaster risk management. *International Journal of Disaster Risk Reduction*, *108*, 104477. https://doi.org/10.1016/j.ijdrr.2024.104477

Robielos, R. A. C., Lin, C. J., Senoro, D. B., & Ney, F. P. (2020). Development of vulnerability assessment framework for disaster risk reduction at three levels of geopolitical units in the Philippines. *Sustainability*, *12*(21), Article 21. https://doi.org/10.3390/su12218815

Roteza, G., Cantillas, M., & Viray, M. (2023). *Public Administration and Disaster Management: Assessment on the Prevention, Preparedness, Response, and Recovery efforts of the Cebu City Government to Typhoon Odette*. 2023. https://doi.org/10.37502/IJSMR.2023.6104

Sadri, A. M., Ukkusuri, S. V., Lee, S., Clawson, R., Aldrich, D., Nelson, M. S., Seipel, J., & Kelly, D. (2018). The role of social capital, personal networks, and emergency responders in post-disaster recovery and resilience: A study of rural communities in Indiana. *Natural Hazards*, *90*(3), 1377–1406. https://doi.org/10.1007/s11069-017-3103-0

Safapour, E., Kermanshachi, S., & Pamidimukkala, A. (2021). Post-disaster recovery in urban and rural communities: Challenges and strategies. *International Journal of Disaster Risk Reduction*, *64*, 102535. https://doi.org/10.1016/j.ijdrr.2021.102535

Saldaña, J. (2013). *The Coding Manual for Qualitative Researchers* (Second). SAGE Publications. https://us.sagepub.com/en-us/nam/the-coding-manual-for-qualitative-researchers/book273583

Santiago, J. S. S., Manuela Jr., W. S., Tan, M. L. L., Sañez, S. K., & Tong, A. Z. U. (2016). Of timelines and timeliness: Lessons from Typhoon Haiyan in early disaster response. *Disasters*, *40*(4), 644–667. https://doi.org/10.1111/disa.12178

Sarin, E., & Lunsford, S. S. (2017). How female community health workers navigate work challenges and why there are still gaps in their performance: A look at female community health workers in maternal and child health in two Indian districts through a reciprocal determinism framework. *Human Resources for Health*, *15*(1), 44. https://doi.org/10.1186/s12960-017-0222-3

Sarin, E., Sooden, A., Kole, S. K., & Lunsford, S. S. (2016). Identification of challenges and needs to improve community health workers performance: Narratives of Accredited Social Health Activists (ASHA) from two Indian districts. *Journal of Public Health in Developing Countries*, *2*(2), 173–182.

Saulnier, D. D., Hean, H., Thol, D., Ir, P., Hanson, C., Von Schreeb, J., & Mölsted Alvesson, H. (2020). Staying afloat: Community perspectives on health system resilience in the management of pregnancy and childbirth care during floods in Cambodia. *BMJ Global Health*, *5*(4), e002272. https://doi.org/10.1136/bmjgh-2019-002272

Sawalha, I. H. (2020). A contemporary perspective on the disaster management cycle. *Foresight : The Journal of Futures Studies, Strategic Thinking and Policy*, *22*(4), 469–482. https://doi.org/10.1108/FS-11-2019-0097

Schaaf, M., Warthin, C., Freedman, L., & Topp, S. M. (2020). The community health worker as service extender, cultural broker and social change agent: A critical interpretive synthesis of roles, intent and accountability. *BMJ Global Health*, *5*(6), e002296. https://doi.org/10.1136/bmjgh-2020-002296

Scheelbeek, P. F. D., Hamza, Y. A., Schellenberg, J., & Hill, Z. (2020). Improving the use of focus group discussions in low income settings. *BMC Medical Research Methodology*, *20*(1), 287. https://doi.org/10.1186/s12874-020-01168-8

Schneider, H. (2018). The governance of national community health worker programmes in low- and middle-income countries: An empirically based framework of governance principles, purposes and tasks. *International Journal of Health Policy and Management*, *8*(1), 18–27. https://doi.org/10.15171/ijhpm.2018.92

Schneider, H., Okello, D., & Lehmann, U. (2016). The global pendulum swing towards community health workers in low- and middle-income countries: A scoping review of trends, geographical distribution and programmatic orientations, 2005 to 2014. *Human Resources for Health*, *14*(1), 65. https://doi.org/10.1186/s12960-016-0163-2

Scolobig, A., Prior, T., Schröter, D., Jörin, J., & Patt, A. (2015). Towards people-centred approaches for effective disaster risk management: Balancing rhetoric with reality. *International Journal of Disaster Risk Reduction*, *12*, 202–212. https://doi.org/10.1016/j.ijdrr.2015.01.006

Scott, K., Beckham, S. W., Gross, M., Pariyo, G., Rao, K. D., Cometto, G., & Perry, H. B. (2018). What do we know about community-based health worker programs? A systematic review of existing reviews on community health workers. *Human Resources for Health*, *16*(1), 39. https://doi.org/10.1186/s12960-018-0304-x

Shah, R., Miller, N. P., & Mothabbir, G. (2019). Approaches to support continued iCCM implementation during a flooding emergency in rural Bangladesh. *Journal of Global Health*, *9*(2), 021001. https://doi.org/10.7189/jogh.09.021001

Sharma, K., Kc, A., Subedi, M., & Pokharel, B. (2018). Post disaster reconstruction after 2015 Gorkha earthquake: Challenges and influencing factors. *Journal of the Institute of Engineering*, *14*(1), 52–63. https://doi.org/10.3126/jie.v14i1.20068

Sharpe, I., & Davison, C. M. (2021). Climate change, climate-related disasters and mental disorder in low- and middle-income countries: A scoping review. *BMJ Open*, *11*(10), e051908. https://doi.org/10.1136/bmjopen-2021-051908

Shen, S., Shi, K., Huang, J., Cheng, C., & Zhao, M. (2023). Global online social response to a natural disaster and its influencing factors: A case study of Typhoon Haiyan. *Humanities and Social Sciences Communications*, *10*(1), 1–15. https://doi.org/10.1057/s41599-023-01922-5

Sholokhova, S., Bizzari, V., & Fuchs, T. (2022). Exploring phenomenological interviews: Questions, lessons learned and perspectives. *Phenomenology and the Cognitive Sciences*, *21*(1), 1–7. https://doi.org/10.1007/s11097-021-09799-y

Siekmans, K., Sohani, S., Boima, T., Koffa, F., Basil, L., & Laaziz, S. (2017). Community-based health care is an essential component of a resilient health system: Evidence from Ebola outbreak in Liberia. *BMC Public Health*, *17*(1), 84. https://doi.org/10.1186/s12889-016-4012-y

Silverio, S. A., Sheen, K. S., Bramante, A., Knighting, K., Koops, T. U., Montgomery, E., November, L., Soulsby, L. K., Stevenson, J. H., Watkins, M., Easter, A., & Sandall, J. (2022). Sensitive, challenging, and difficult topics: Experiences and practical considerations for qualitative researchers. *International Journal of Qualitative Methods*, *21*, 16094069221124739. https://doi.org/10.1177/16094069221124739

Smith, S., Deveridge, A., Berman, J., Negin, J., Mwambene, N., Chingaipe, E., Puchalski Ritchie, L. M., & Martiniuk, A. (2014). Task-shifting and prioritization: A situational analysis examining the role and experiences of community health workers in Malawi. *Human Resources for Health*, *12*(1), 24. https://doi.org/10.1186/1478-4491-12-24

Smittenaar, P., Ramesh, B. M., Jain, M., Blanchard, J., Kemp, H., Engl, E., Isac, S., Anthony, J., Prakash, R., Gothalwal, V., Namasivayam, V., Kumar, P., & Sgaier, S. K. (2020). Bringing greater precision to interactions between community health workers and households to improve maternal and newborn health outcomes in India. *Global Health: Science and Practice*, *8*(3), 358–371. https://doi.org/10.9745/GHSP-D-20-00027

Speers, S. J., Lau, L. L., Neufeld, H. T., Servano, D., Go, D. J., Kipp, A., Brubacher, L. J., & Dodd, W. (2023). Caring in crisis: The experiences of local religious leaders meeting community food needs in the Philippines during the COVID-19 pandemic. *Wellbeing, Space and Society*, *5*, 100154. https://doi.org/10.1016/j.wss.2023.100154

Sripad, P., Casseus, A., Kennedy, S., Isaac, B., Vissieres, K., Warren, C. E., & Ternier, R. (2021). "Eternally restarting" or "a branch line of continuity"? Exploring consequences of external shocks on community health systems in Haiti. *Journal of Global Health*, *11*, 07004. https://doi.org/10.7189/jogh.11.07004

Steege, R., Taegtmeyer, M., McCollum, R., Hawkins, K., Ormel, H., Kok, M., Rashid, S., Otiso, L., Sidat, M., Chikaphupha, K., Datiko, D. G., Ahmed, R., Tolhurst, R., Gomez, W., & Theobald, S. (2018). How do gender relations affect the working lives of close to community health service providers? Empirical research, a review and conceptual framework. *Social Science & Medicine*, *209*, 1–13. https://doi.org/10.1016/j.socscimed.2018.05.002

Tobin, G. A., & Begley, C. M. (2004). Methodological rigour within a qualitative framework. *Journal of Advanced Nursing*, *48*(4), 388–396. https://doi.org/10.1111/j.1365-2648.2004.03207.x

Uichanco, J. (2022). A model for prepositioning emergency relief items before a typhoon with an uncertain trajectory. *Manufacturing & Service Operations Management*, *24*(2), 766–790. https://doi.org/10.1287/msom.2021.0980

UNDRR. (2015). *Sendai Framework for Disaster Risk Reduction 2015—2030*.

UNDRR. (2022, January 12). *Impacts of super typhoons and climate change*. https://www.preventionweb.net/news/impacts-super-typhoons-and-climate-change

UNDRR. (2024). *Disaster risk management*. http://www.undrr.org/terminology/disaster-risk-management

United Nations. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development*. https://sdgs.un.org/2030agenda

Uscher-Pines, L., Chandra, A., & Acosta, J. (2013). Household preparedness is not enough: The challenges and opportunities in assessing community readiness for disasters. *Journal of Public Health Management and Practice*, *19*, S70. https://doi.org/10.1097/PHH.0b013e318294ea11

van Nes, F., Abma, T., Jonsson, H., & Deeg, D. (2010). Language differences in qualitative research: Is meaning lost in translation? *European Journal of Ageing*, *7*(4), 313–316. https://doi.org/10.1007/s10433-010-0168-y

Villacin, D. T. (2017). *A review of Philippine government disaster financing for recovery and reconstruction*. https://www.econstor.eu/bitstream/10419/173598/1/pidsdps1721.pdf

Wei, J., Han, Z., Han, Y., & Gong, Z. (2022). What do you mean by community resilience? More assets or better prepared? *Disaster Medicine and Public Health Preparedness*, *16*(2), 706–713. https://doi.org/10.1017/dmp.2020.466

World Health Organization. (2015). *Operational framework for building climate resilient health systems*. World Health Organization. https://iris.who.int/handle/10665/189951

World Health Organization. (2019). *Health emergency and disaster risk management framework*. World Health Organization. https://iris.who.int/handle/10665/326106

World Health Organization, PEPFAR, & UNAIDS. (2007). *Task shifting: Rational redistribution of tasks among health workforce teams : global recommendations and guidelines*. 88.

Wulandari, R. D., Laksono, A. D., & Rohmah, N. (2021). Urban-rural disparities of antenatal care in South East Asia: A case study in the Philippines and Indonesia. *BMC Public Health*, *21*(1), 1221. https://doi.org/10.1186/s12889-021-11318-2

Wyngaarden, S., Humphries, S., Skinner, K., Lobo Tosta, E., Zelaya Portillo, V., Orellana, P., & Dodd, W. (2023). 'You can settle here': Immobility aspirations and capabilities among youth from rural Honduras. *Journal of Ethnic and Migration Studies*, *49*(1), 212–231. https://doi.org/10.1080/1369183X.2022.2031922

Yella, T., & Dmello, M. K. (2022). Burnout and sleep quality among community health workers during the pandemic in selected city of Andhra Pradesh. *Clinical Epidemiology and Global Health*, *16*, 101109. https://doi.org/10.1016/j.cegh.2022.101109

Yonson, R., Noy, I., & Gaillard, J. (2018). The measurement of disaster risk: An example from tropical cyclones in the Philippines. *Review of Development Economics*, *22*(2), 736–765. https://doi.org/10.1111/rode.12365

Yu, V. G., Lasco, G., David, C. C., & Baysic, I. S. (2023). 'Kontra-partido': Untangling oppositional local politics and healthcare devolution in the Philippines. *Health Policy and Planning*, *38*(7), 840–850. https://doi.org/10.1093/heapol/czad039

Zafar, S., Fruchtman, C. S., Bilal Khalid, M., Zia, Z., Khalid Khan, F., Iqbal, S., & Muñoz, D. C. (2022). Lessons learnt of the COVID-19 contact tracing strategy in Islamabad Capital Territory, Pakistan using systems thinking processes. *Frontiers in Public Health*, *10*. https://doi.org/10.3389/fpubh.2022.909931

Zou, X.-Y., Peng, X.-Y., Zhao, X.-X., & Chang, C.-P. (2023). The impact of extreme weather events on water quality: International evidence. *Natural Hazards*, *115*(1), 1–21. https://doi.org/10.1007/s11069-022-05548-9

Appendices

Appendix A: Interview guide for semi-structured interviews with research participants

INTERVIEW GUIDE: Community Health Champions & Extreme Weather Events	
Interviewer: Date: Assigned pseudonym: Affiliated ICM regional base:	Translator: Y / N
General	
Could you tell me a bit about yourself to start? Where you are from, your occupation, etc.?	
Community: Education level completed: Household size:	Age: Date first started with ICM (Month/Year): Date joined the CHC program (Month/Year):
1. Profile of individuals and their communities	
Questions	**Prompts**
1 Can you tell me about your community?	*Mountains/coast? How far away is your community? Anything unique about your community?*
2 Can you tell me about the role(s) you play within your community?	*Occupation and volunteer positions, other positions besides being a CHC*
3 Can you describe your caregiving responsibilities?	*Children, senior members of family, other family members, community members*

4	Do you experience any additional caregiving or community responsibilities following extreme weather events?	*Provision of care, extra household responsibilities, extra professional responsibilities, increased challenges*
5	What do you see as your role during extreme weather events or disasters in your community?	*As a community member, as a CHC*
6	Can you tell me about a time where you supported someone in your community during/after an extreme weather event?	
7	How might certain groups within your community be affected differently by extreme weather events?	*Experiences of men vs. women? Experiences of children vs. youth vs. older adults?* *Difference between certain disasters/events?* *Difference in geographical region?*
	2a. Experiences of Typhoon Odette	
1	Can you tell me about your experiences of Typhoon Odette?	
2	How did Typhoon Odette impact your health and the health of your family?	*New health conditions/diseases, challenges with existing health conditions, access to healthcare, availability of medications, food and water security*
3	Did you feel adequately prepared for Typhoon Odette?	*Knowledge/awareness, adequate warning/timing, household preparations, availability of necessary supplies and resources*
4	If *yes,* what helped you feel prepared? If *no,* what do you think would have helped you feel better prepared?	*Knowledge/awareness, education, activities within the home, additional warning, community*

		connections/support, availability of supplies and resources
5	How did you respond to Typhoon Odette within your own household?	*Roles within the household, activities within household*
6	Who did you rely on and trust when responding to Typhoon Odette?	*Family, community members, local government*
7	How did Typhoon Odette impact your community?	*Infrastructure/facility damage, financial impacts, food and water availability, new conditions/diseases, additional health challenges*
8	How was access to healthcare impacted by Typhoon Odette?	*Access to services, access to medication and equipment, impact on healthcare facilities, supply chains, etc.*
9	What was the community response to Typhoon Odette?	*Who oversaw response efforts within the community?* *Roles within community, responsibilities, tasks, timing/order of activities*
10	Did any organizations beyond your local government provide support following Typhoon Odette?	
11	How has your community recovered from Typhoon Odette?	*Impacts, challenges, access to and navigation of health systems, availability of supplies and resources, current food and water security*
12	Are you still experiencing the impacts of Typhoon Odette?	*Lasting health impacts (physical and mental), access to medications/health facilities, food and water security*
2b. Experiences of other extreme weather events/disasters		

1	What other extreme weather events or disasters are most common within your community?	*Floods, fires, landslides, etc.*
2	Did you feel adequately prepared for these different events?	*What helped you feel prepared/what would have helped?* *Knowledge/awareness, adequate warning, timing, household preparations, availability of necessary supplies and resources*
3	How have these disasters impacted your family?	*Health impacts and diseases, financial/livelihood impacts, infrastructure/facility damage, food and water availability*
4	Can you tell me about how these events have impacted your health and the health of your family?	*New health conditions, existing health conditions, access to care, diseases, food and water security, child health concerns*
5	What are the most common health impacts you observe in your community following these extreme weather events/disasters?	*Healthcare accessibility, infrastructure/facility damage, injuries, diseases, food and water availability, child health concerns*
6	What are your greatest concerns when an extreme weather event or other disaster occurs within your community?	*Access to healthcare, increase in diseases, physical injury, infrastructure, financial impacts, impacts to livelihood*
7	How might existing health challenges be exacerbated by extreme weather events/disasters?	*Current diseases, access to healthcare, access to equipment and medication, nutritional concerns*
8	How does the type of weather event/disaster impact the response of the community?	*Activities and tasks, roles and responsibilities, support/social networks needed, necessary resources and supplies*

9	How might you respond if multiple disasters/weather events occurred at the same time (ie: Typhoon Odette and pandemic)?	*Extra burden, compounding challenges, access to services and facilities*
10	Who oversaw response and recovery efforts to these disasters?	*Community members, organizations, local government*
11	How have you recovered from these disasters/events?	*Current challenges, lasting impacts, access to and navigation of health systems, availability of supplies and resources, any food and water security concerns*
12	How did the COVID-19 pandemic interfere with extreme weather event response and recovery?	*Social distancing, healthcare access, impact on existing health challenges*
3. Role of CHCs and extreme weather events		
1	What do people in your community think or say about your role as a Community Health Champion?	*Positive/negative perceptions, community structure, effectiveness of role*
2	Do you think your role as a Community Health Champion impacts disaster preparedness in your community? If so, how?	*Does knowing there are people to rely on (CHCs) help community members when preparing for disasters?*
3	After extreme weather events, do you think it makes a difference that you are a Community Health Champion?	*Ability to provide services/care within community, social networks and connections, recognition of role from community members, challenges encountered*
4	How do extreme weather events impact your ability to carry out your role as a Community Health Champion?	*Visiting in person, ability to go door to door, assess for follow ups*

5	What resources do you think would be necessary to support the families you work with following extreme weather events?	*Nutritional resources, medical supplies, other physical materials/supplies, additional social support*
6	How do you think the training and education you receive as a Community Health Champion could be improved to better support disaster response and recovery in your community?	*Other resources or tools that could provide additional support, future opportunities for connection*

Other questions to ask (follow up questions from first round of CHC interviews, trip 1)

Back in April, you participated in an interview and/or participatory feedback session related to your experience as a CHC. I have a few follow-up questions, based on what we learned from those initial conversations.

1.	How do you work together with other frontline health workers (e.g., *barangay* health workers; nurses; midwives) to provide maternal and/or child healthcare in your community?	*Any form of collaboration/partnership to support maternal and/or child health?* *e.g., working together to identify pregnant women to support with antenatal care*
2.	Does this relationship to other frontline health workers change in extreme weather events or other emergencies?	*Does the collaboration/partnership you mentioned change in any way in an emergency (different roles/responsibilities)?*
3.	What did you think of the group feedback session you participated in?	*Likes/dislikes? Was the activity interesting? Did you feel comfortable sharing your perspectives on the CHC program?*
4.	Any recommended changes to how these sessions could be conducted in the future?	*Different format; activities; number of participants; overall mode of sharing program feedback?*

5.	Anything else you would like to share about what you liked in this feedback process, or what you would recommend changing in the future?	

Thank you for your time and feedback! Our research team is sharing summarized experiences and stories from CHCs with ICM, in a way that protects your confidentiality. We have heard very valuable feedback and insights so far from CHCs across Negros Oriental. We hope in the future, there will be more opportunities like this for you to share your experiences and help to improve the CHC program moving forward.

Conclusion

Thank you for sharing everything you have today. That is all of the questions I have for you, but before we finish our interview…

1	Is there anything else you would like to say about:		
	a.	Your experiences preparing for, responding to, and recovering from extreme weather events?	
	b.	Your role as a Community Health Champion?	

Appendix B: Research ethics approval, University of Waterloo

UNIVERSITY OF WATERLOO

Notification of Ethics Clearance to Conduct Research with Human Participants

---

Principal Investigator: Warren Dodd (School of Public Health Sciences)

Student investigator: Chantelle Ramsundar (School of Public Health Sciences)

Co-Investigator: Hannah Tait Neufeld (School of Public Health Sciences)

Administrative Support: Bridget Elizabeth Beggs (School of Public Health Sciences)

Co-Investigator: Lincoln Lau (International Care Ministries)

File #: 43710

Title: Exploring experiences with and operations of an NGO-led community health worker program in the Philippines: A qualitative study

---

The Human Research Ethics Board is pleased to inform you this study has been reviewed and given ethics clearance.

Initial Approval Date: 05/11/22 (m/d/y)

University of Waterloo Research Ethics Boards are composed in accordance with, and carry out their functions and operate in a manner consistent with, the institution's guidelines for research with human participants, the Tri-Council Policy Statement for the Ethical Conduct for Research Involving Humans (TCPS, 2nd edition), International Conference on Harmonization: Good Clinical Practice (ICH-GCP), the Ontario Personal Health Information Protection Act (PHIPA), the applicable laws and regulations of the province of Ontario. Both Boards are registered with the U.S. Department of Health and Human Services under the Federal Wide Assurance, FWA00021410, and IRB registration number IRB00002419 (HREB) and IRB00007409 (CREB).

This study is to be conducted in accordance with the submitted application and the most recently approved versions of all supporting materials.

Expiry Date: 05/12/23 (m/d/y)

Multi-year research must be renewed at least once every 12 months unless a more frequent review has otherwise been specified. Studies will only be renewed if the renewal report is received and approved before the expiry date. Failure to submit renewal reports will result in the investigators being notified ethics clearance has been suspended and Research Finance being notified the ethics clearance is no longer valid.

Level of review: Delegated Review

Signed on behalf of the Human Research Ethics Board

Joanna Eidse, Research Ethics Officer, jeidse@uwaterloo.ca, 519-888-4567, ext. 47163

This above named study is to be conducted in accordance with the submitted application and the most recently approved versions of all supporting materials.

Documents reviewed and received ethics clearance for use in the study and/or received for information:

file: Recruitment - Email - CHC Recipients of Care.docx

file: Recruitment - Email - CHCs.docx

file: Recruitment - Email - Health Trainer.docx

file: Recruitment - Email - ICM Research Team.docx

file: Recruitment - Telephone - CHC Care Recipient.docx

file: Recruitment - Telephone - CHC Trainers.docx

file: Recruitment - Telephone - CHCs.docx

file: Recruitment - Telephone - ICM Research Team.docx

file: 4 Interview Guides_revised.docx

file: Completed_General_Consent_Form_Revised.docx

file: Completed_General_Info_Form_research team and health trainers.docx

file: Information Form_CHC and recipient of care.docx

file: Oral Consent Script.docx

file: Oral Consent Log.docx

file: Appreciation Letter_revised_v2.docx

Approved Protocol Version 4 in Research Ethics System

This is an official document. Retain for your files.

You are responsible for obtaining any additional institutional approvals that might be required to complete this study.