

Disaster Response for Recovery

*"The most important thing is not to stop questioning:
curiosity has its own meaning for existing."*

A. Einstein

Örebro Studies in Care Science 69



KARIN HUGELIUS

**Disaster response for recovery:
Survivors' experiences, and the use of disaster radio to promote
health after natural disasters**

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Title: Disaster response for recovery: survivors' experiences, and the use of disaster radio to promote health after natural disasters

Publisher: Örebro University 2017
www.oru.se/publikationer-avhandlingar

Print: Örebro University, Repro February/ 2017

ISSN 1652-1153
ISBN 978-91-7529-180-2

Abstract

Karin Hugelius (2017). Disaster response for recovery: survivors' experiences, and the use of disaster radio to promote health after natural disasters. Örebro Studies in Care Science 69.

Disasters occur all over the world, and affect a rising number of people. The health effects of natural disasters depend on several factors present before, during, and after a disaster event. However, there is only limited knowledge of survivors experiences, needs, and health after natural disasters. Disaster radio means a temporary radio station that broadcasts information, music, and support to the affected population. Disaster radio has the potential to function even in a severely affected area, but its effects need to be further evaluated from a health perspective. The context of this thesis was the Haiyan supertyphoon that hit parts of the Philippines in November 2013.

The overall aim was to describe survivors' and health professionals' experiences during and in the immediate aftermath of a natural disaster, the health effects from such a disaster, and how disaster radio as a disaster response intervention can be used and evaluated from a health perspective. The thesis includes four studies using qualitative research methods, including content analysis and a phenomenological hermeneutic method, and quantitative methods with statistical analysis.

The results show that the Haiyan typhoon affected physical, psychological, and social dimensions of health. Disaster radio was used to broadcast health-related information and psychosocial support, and made a positive contribution to recovery from the perspective of the survivors. Being a health professional deployed during the disaster was an experience of being both a helper and a victim. The use of a self-selected internet-based sample recruited via Facebook for a web-based survey mitigated several practical challenges related to disaster research, but also raised questions about the generalizability of the results.

Based on the findings, the importance of an integrated physical, psychological, and social health response to natural disasters is emphasized. Also, the health care system should prepare to use disaster radio as disaster response. In addition, the results suggest that disaster training for health professionals should include personal preparation and coping strategies. Internet-based methods in disaster research need to be further evaluated.

Keywords: natural disaster, disaster response, disaster health, recovery, resilience.

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List of papers

This thesis is based on the following papers, which are referred to in the text with Roman numerals:

- I Hugelius, K., Gifford, M., Örténwall, P. & Adolfsson, A. Disaster radio for communication of vital messages and health-related information: experiences from the Haiyan typhoon, the Philippines. *Disaster Medicine and Public Health Preparedness* 2016, 10(4): 591–7.
- II Hugelius, K., Gifford, M., Örténwall, P. & Adolfsson, A. “To silence the deafening silence”: survivor’s needs and experiences of the impact of disaster radio for their recovery after a natural disaster. *International Emergency Nursing* 2016, 28(1): 8–13.
- III Hugelius, K., Adolfsson, A., Örténwall, P. & Gifford, M. Being both helpers and victims; health professionals’ experiences from working during a natural disaster. *Prehospital and Disaster Medicine*. 2017, 32(2):1–7.
- IV Hugelius, K. Örténwall, P., Gifford, M. & Adolfsson, A. Health among disaster survivors, 30 months after the Haiyan typhoon, using a self-selected internet sample in a web-based survey. (Submitted.)

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List of abbreviations

CI	Confidence interval
COR	Conservation of Resources Theory
CwC	Communication with communities
EQ5D3L	EuroQoL five dimensions three-level
EQ-VAS	EuroQoL visual analogue scale
FRR	First Response Radio
GHQ-12	General Health Questionnaire — 12-item version
GOs	Governmental organizations
IASC	Inter-Agency Standing Committee
NGO	Non-governmental organization
PFA	Psychological First Aid
PTE	Potentially traumatic event
PTG	Post-traumatic growth
PTSD	Post-traumatic stress syndrome
UN	United Nations
UNOCHA	United Nations Office for Coordination and Humanitarian Affairs
WFP	World Food Program
WHO	World Health Organization

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Introduction

Disasters occur all over the world, and, wherever they hit, cause a substantial amount of human suffering, disruption, and desolation. Several terms are used to describe disasters and related phenomena, such as “crises”, “emergencies”, “catastrophes”, “major incidents”, and “disasters”. In these thesis, the term “disaster” will be used. From a management perspective, disasters include elements of unpredictability, uncertainty, dynamic evolution, and lack of resources in relation to the number of people affected ^{1,2}. For the individual affected, the disaster might literally turn the world upside down and affect every aspect of life.

To meet these substantial challenges, methods other than those usually used in the health care system are necessary in order to promote survival and health. By tradition, both practical disaster management and disaster research incorporate several academic and professional disciplines such as nursing, medicine, public health science, technology, sociology, psychology, and logistics. This thesis will therefore include theories and knowledge gained from a wide range of academic disciplines.

Disaster nursing has been said to be about doing the best for the most, with the least, by the fewest ¹. This description implies that the context and focus of disasters and disaster health response demand specific knowledge and strategies to be functional. Though both disasters and disaster management have a long history, there is still a lack of evidence-based knowledge and practice, regarding both the consequences of disasters, and disaster response strategies. There is a strong need to further explore and evaluate these aspects, in order to know what to do, and how to do it, in this specific context.

With one foot in the academic world and one as a nurse with practical experiences from disasters, I hope that this thesis will help build useful bridges between these two sometimes widely separated realities.

Background

Disasters

Disasters are one of the major causes of fatalities and massive suffering among human beings around the world. The number of people affected is rising ³. A disaster can be defined as “a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources” ⁴. A hazard, or an event, is not automatically a disaster, but depending on the community’s ability to respond and cope, a disaster may occur ⁵. By categorizing disasters in terms of the type of triggering event, distinctions between them can be made ⁵. Human-induced disasters include technological events, such as fires or airplane crashes, as well as societal events, such as acts of terrorism. Among natural disasters, several types of triggering events can be mentioned: geophysical (e.g. earthquakes), meteorological (e.g. storms), hydrological (e.g. floods), climatological (e.g. extreme temperatures), and biological (e.g. epidemics). Complex emergencies represent a severe humanitarian situation causing a breakdown of the society, resulting from internal or external conflict, usually requiring international response ^{5,6}. Disasters might also be the result of a mix of events.

Natural disasters and their effects on health

During the period 2003–2014, about 140 million people were affected by natural disasters; most of them in Asia ⁶. The costs of natural disasters during the last decennium have been estimated at about 162 billion US dollars yearly ⁶. In general, the impact of natural disasters on the stricken society depends on the relationship between the hazard, the level of exposure, and the level of vulnerability ⁷. Health effects from natural disasters depend on several factors, such as the geographical, cultural, economic, and pre-existing health situation, as well as the response ^{5,8,9} and the type of natural disaster (see Table 1) ⁹.

Physical health effects

Physical injuries caused by natural disasters generally include traumatic injuries such as fractures, lacerations and associated complications such as infections and crush syndrome ⁹⁻¹¹. In addition, an increased risk of non-traumatic problems such as myocardial infarctions and high blood pressure

have been reported ¹¹. Health effects also depend on secondary effects from the disaster. Displacements of survivors into small areas might cause or increase the risk of spreading any communicable diseases present in the area. Furthermore, chronic conditions such as diabetes or high blood pressure might worsen after a disaster, because of lack of ongoing medication or routine support from the health care system ¹¹.

Most disasters also cause fatalities. A common apprehension in disasters is that the presence of cadavers constitutes a risk of communicable diseases. In most natural disasters, no such risk exists ¹². Though, the presence of cadavers can block drains and sanitary systems, which might lead to secondary health effects. Also, the psychological impact of cadaver presence should not be neglected ¹². Damage to infrastructure and medical facilities is usual after some types of natural disasters, and can impair the ability to manage both acute and chronic health conditions ¹³.

Mental health effects

Mental health is defined as “a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community” ¹⁴. This definition implies that mental health is more than the absence of psychopathological conditions, and should be seen as a continuum of wellbeing and functionality ¹⁵. The term “potentially traumatic event” (PTE) refers to the individual perception of an event that may be experienced as a threat to life or causing serious personal harm ^{16,17}. Such events may include natural disasters, although individual reactions and perceptions vary widely ¹⁸. The mental health effects of natural disasters include a range of problems, some of them psychopathologic, such as stress-related reactions, post-traumatic stress syndrome (PTSD), depression, and anxiety disorders ^{11,16,18-20}. The condition that has been most often in focus in disaster mental health research studies is PTSD ^{18,21}. The prevalence of PTSD after natural disasters has been reported to range from 5% to 46% ^{11,18,22}. Among natural disasters, landslides seem to cause significantly more mental problems as compared to other kinds of natural disasters ²².

Mental health outcomes after a PTE depend on a combination of risk factors and resilience factors ¹⁸. Gender, age, educational level, and pre-existing psychiatric history can all affect the risk of developing mental health problems ¹⁸. The severity of exposure ²³, type of disaster event ¹⁸, emotional and

cognitive flexibility ¹⁸, and the ability to accept ²⁴ have also been reported to be of importance.

Psychosocial consequences from disasters also include disturbances in social relations, economic consequences, and temporary or definitive displacements ^{18,25,26}.

Stress, coping, and caring

There are many theoretical perspectives on stress and coping, ranging from cognitive information process theories to social relation theories ²⁷. The transactional model of stress and coping, described by Lazarus and Folkman ^{28,29}, focuses on stress as an individual, cognitive process where the individual's perception and appraisal of the situation are central for reactions and coping strategies. The primary appraisal process consists of an assessment of the situation and its consequences for the individual, based on both previous experience and the appraisal of clarity and control of the actual situation. The second appraisal involves an evaluation of possible strategies to cope with the situation. The model presented by Lazarus and Folkman was later developed by Bonanno into the regulatory flexibility model ³⁰, which emphasizes the role of the feedback system, consisting of both social input and internal feedback. A setup including different coping strategies and the ability to modify these strategies on the basis of information from the feedback system is essential for a recovery process ³⁰.

Also, the nursing theorists Patricia Benner and Judith Wrubel have in their text on caring ³¹ used the theory of Lazarus & Folkman to understand stress. Caring is described as the primacy of all human beings; it defines how the individual relates to the world and creates meaningfulness for them, but also makes them vulnerable. When a person's context changes, their previous experiences, knowledge, and self-understanding will not be enough and will not fit in with the new situation, and stress will appear. The person will experience a feeling of "losing their footing" ³¹. In order to understand what needs to be done to achieve health and wellbeing, a health provider must understand the needs experienced by the person affected ³¹. Caring is the central value in all interventions aiming to support people in coping with a stressful event and adapting to the situation. In practical terms, this can be done by helping to define the person in the actual situation and guiding them to find meaning in the new context, by mobilizing hope, and by providing emotional, practical, and informative support ³¹.

Recovery and resilience

The term “recovery” is used in this thesis to mean something aimed at easing physical and psychological difficulties for individuals’ families and communities, as well as building and bolstering social and psychosocial wellbeing³². This description demands an approach involving the physical, psychological, and social dimensions, both in scientific terms and in terms of practical disaster response³². It also implies that recovery should be seen as a process, rather than an outcome, with a relation between the individual and the community level in this process³². The desired outcome of the recovery process is resilience and good functioning³². Psychological recovery is a process in which the person experiences moderate to severe levels of initial stress-related symptoms that interfere with their normal function. Over time, most persons return to their normal levels of functioning¹⁸. Even if “recovery” as a term is commonly used and accepted, the process is still not fully understood and the individual variance is wide³³.

A traditional metaphorical description of resilience is being able to “bounce back” after a displacement³⁴. Psychological resilience has been described as the capacity to maintain relatively stable, healthy levels of psychological and physical functioning after a highly disruptive event¹⁷. The most common trajectories of individual psychological reactions after disasters are the resilience and the recovery trajectory^{18,19,35}. Most people, including individuals following the resilience trajectory, experience some levels of distress during and/or immediately after a potentially traumatic event¹⁶, but their stress reactions generally do not hamper their ability to function. Resilience and healthy adaption to stress depend not only on the individual, but also on the available resources²⁴. Social support has been found to be an important mediator of psychosocial wellbeing after traumatic events, including natural disasters^{18,36}.

Several studies have indicated that for some individuals, surviving a disaster may have a positive impact on life, in a process sometimes referred to as post-traumatic growth (PTG)^{37,38}. However, the actual existence of PTG as an outcome of a traumatic event is debated³⁹.

Typhoons and their specific health effects

Between 1980 and 2009, over 400 000 persons were killed and almost 300 000 injured by natural disasters caused by storms, normally named typhoons or cyclones ⁴⁰. Strong winds do not normally cause severe physical injuries themselves, but they often occur in combination with tsunamis or storm surges, whose health effects are similar to tsunamis. These complex mechanisms cause severe damage to infrastructure, including medical facilities and food and fresh water shortages ^{9,40}. They also cause physical injuries, mainly traumatic injuries like wounds and fractures ⁴⁰. Mortality from typhoons is most often due to drowning ⁴⁰. Mental health impacts have been reported to be similar to those from other natural disasters ^{26,41}. Typhoons often force many people to move from their ordinary homes, temporarily or permanently ⁴⁰.

Table 1. Short-term health effects from natural disasters.

	Earth- quakes	High winds	Tsuna- mis	Slow on- set floods	Land- slides	Volcanoes
Deaths	Many	Few	Many	Few	Many	Many
Severe injuries	Many	Moder- ate	Few	Few	Few	Few
Communicable diseases	Potential risk following all major disasters					
Damage to health facilities	Severe	Severe	Severe	Severe but local	Severe but local	Severe
Damage to water system	Severe	Light	Severe	Light	Severe but local	Severe
Food shortage	Rare	Rare	Common	Common	Rare	Rare
Major population movement	Rare	Rare	Rare	Common	Rare	Common

Source: PAHO/WHO Natural Disasters: Protecting the Public's Health, page 2. Scientific publication no 575; 2000. Reproduced with permission.

Disaster response

Disaster response aims to reverse the negative health effects caused by the event, reduce the risk of occurrence of another event, decrease the vulnerability or increase the resilience of the society, and improve the preparedness to respond to future events ⁴². The commonly used disaster management cycle describes disaster management in four phases: mitigation, preparedness, response, and recovery ^{2,43}. The mitigation phase includes strategies to reduce or eliminate threats. The preparedness phase includes activities to prepare individuals and community systems at all levels to manage and cope, for example by conducting educational activities or providing equipment. In the response phase, the focus is on activities to reduce the impact of the disaster event to save lives, to protect health and other aspects (e.g. financial), and to reduce suffering. The recovery phase aims to rebuild the functions of the society to the same level as, or better than, before the disaster event. The phases of the disaster management cycle are not related to specific times, and are usually overlapping ⁴³. This thesis focuses on the response phase.

Disaster response usually involves several actors, including local and national authorities and governmental organizations (GOs), military services, and non-governmental organizations (NGOs). Often, both professional and voluntary staff are engaged. If the local authorities request international support in one or more areas, such support can be organized in many ways, such as bilateral collaborations or via the UN or EU mechanism. In large humanitarian disasters, a cluster system might be activated to promote efficient coordination of the response. There are eleven clusters for specific areas, such as health, sanitation, and protection, and some cross-sectional functions such as coordination and information management ².

Disaster health response

The aim of disaster health response is to save as many lives as possible and to reduce human suffering ¹³. Traditionally, disaster health response includes activities ranging from contingency planning and public health interventions to individual care of trauma patients. Interventions in the acute phase usually focus on physically-related medical care provided by both local and foreign actors such as trauma teams, search and rescue teams, and field hospitals ^{2,44,45}. Although disasters have occurred since the beginning of time, the degree of evidence base in disaster medicine is low ^{8,13,46}.

The very first, and therefore vital, response to any disaster is the response from the local community, for example neighbours, rescue services, and local health professionals ⁴⁶. The health care system's capacity to adapt is essential for post-disaster health ⁴⁷. Studies on the health and wellbeing of first responders and local health professionals in place when the disaster strikes are limited, but have shown the presence of stress reactions, ethical dilemmas ⁴⁸, and an increased risk of mental illness such as PTSD ⁴⁹. Very little has been written about health professionals and other professionals' general experiences, health, or needs during and immediately after a natural disaster of a magnitude that requires international support ⁵⁰⁻⁵².

Disaster mental health response

Seen from a historical perspective, there is now an increased awareness of the mental health impacts of disasters and the demand for psychosocial support ^{53,54}. However, there are still gaps of evidence on how to mitigate the negative psychosocial effects of disasters ⁵³. Recommendations based on the best available knowledge and a "do no harm" principle have been published, such as the concept of Psychological First Aid (PFA)⁵⁵, Inter-Agency Standing Committee (IASC) Guidelines on Mental Health and Psychosocial Support in Emergency Settings ⁵⁴, and the European Union OPSIC project ⁵⁶. These guidelines and recommendations are based on five evidence-based principles for immediate crisis support ⁵⁷, aimed at promoting 1) a sense of safety, 2) calmness, 3) a sense of self-efficacy and community efficacy, 4) connectedness, and 5) hope.

Most people in an emergency will be in favour of basic support, such as the establishment of security and safety and basic services such as food, water, and basic health care, to recover. Some will be able to maintain health if their access to social networks is ensured and interventions like psychoeducation or public information are provided. A smaller group of affected people will require individual or group interventions such as psychological first aid. Although only a minority of all affected people will be in need of individual specialized services to recover ⁵⁴, a review of psychosocial interventions in humanitarian settings or disasters showed that the most common intervention performed was basic counselling for individuals ⁵³.

Crisis communication in disaster health response

Today, crisis communication is considered an integrated part of disaster response, including the health response ⁵⁸. The cluster approach describes crisis communication and communication with the community (CwC) as a cross-sectoral function that has to be present in all clusters ². Emergency communication can be divided into three categories. The first is communication from the disaster area to outside the affected area, which in the cluster system is the responsibility of the World Food Program (WFP). The second is communication for coordination inside the affected area, such as between authorities and organizations involved in the relief work. Often, this communication is based on the VHF radio system. In the UN system, this function is also facilitated by the WFP, but private or volunteer radio amateurs and NGOs can provide additional assistance with one-to-one communication, for example via VHF radio systems. The third category is communication from relief authorities and organizations with the affected community, CwC). This category is facilitated by UNOCHA ⁵⁹.

There are several means to enable communication with the public in disaster situations, ranging from public posters, loudspeakers, traditional papers or flyers, and SMS, to digital solutions like web pages, social media, or mobile phone apps ⁶⁰. Establishing communication and access to reliable information after disasters is suggested to facilitate general health recovery and reduce mortality after disasters ^{54,61,62}. However, general knowledge of the role and impact of crisis communication in a health perspective is limited, and further research is strongly needed ⁵⁸.

Disaster radio

In a historic perspective, public radio has been used worldwide as a mean of communication in many disaster or emergency situations. Mainly, it has been used for early warnings, disaster preparedness, or risk-reducing purposes ⁶⁰. Practical examples of such use include communication of weather warnings, advising how households should prepare for crises, and issuing warnings to boil water after contamination of drinking water ^{58,60,63}. Disaster radio, as the term is used in this thesis, means a temporary radio station operating in a disaster-affected area and transmitting specific disaster-related information, either by temporary technical solutions or by ordinary means ^{64,65}. A related term is “emergency radio”, though this term can also be used for two-way communication such as VHF radio ⁶⁰.

Reports and scientific evaluations of the use of radio in general, or specifically disaster radio, have described this in a crisis communication or general disaster management perspective ^{60,65-67}. The use of disaster radio in a health perspective has been very limited, as so have evaluations of such use. However, after Hurricane Katrina, radio was used to broadcast psychoeducational messages. An increased public awareness of available support for mental health problems could be measured ^{68,69}. Radio was also used as part of the Ebola response in western Africa to increase public awareness and decrease stigmatization, but no evaluations have yet been published ⁷⁰.

Evaluation of disaster response

In order to understand how to promote health after a disaster and maximize the benefits of disaster response, an understanding of their effects on health is necessary ^{21,71}. There are several methodological challenges related to disaster evaluation and research. Formal procedures such as financing and ethical permits may be difficult to implement in a traditional way since disasters strike unpredictably ⁴². Timing of data collection can affect both the availability of reliable data and the results ^{42,71,72}. Data collection procedures is a challenge when physical access to the research area can be difficult. Logistical and safety reasons might impair the researcher's possibilities to enter the affected area, at least in the early stages after a disaster ^{71,72}. Sociopolitical and cultural aspects ^{42,71}, security concerns both for the researcher and for the study participants ⁷¹, and the involvement of affected and possibly traumatized people in studies ⁴² need to be carefully considered before conducting disaster research.

Strategies previously used to get data in disaster health research include the use of documents such as situational reports or medical records from responding organizations and authorities, or integrating researchers into relief teams ^{8,42,72,73}.

There has been some discussion of the extent to which results and knowledge gained from one disaster are transferrable to other disasters ⁷⁴. It has been suggested that the use of a standardized framework of disaster health research as well as detailed descriptions of the situation, intervention, and findings can increase the possibilities for drawing conclusions from disasters ^{5,72,75}. The Framework for Disaster Health Research Studies ⁵ has been used to provide a general structure for planning and reporting of the studies included in this thesis. The framework defines specific terms and how they

relate to each other, as well as recommendations for reporting the characteristics of the disaster event studied.

The development and use of alternative research methods is strongly needed ⁷², since the sudden and unpredictable nature of disasters demands that evaluation methods should be considered and tested beforehand, in order to allow their use in the early stages after a disaster ⁴².

Web-based methods in disaster research

The use of web-based solutions, such as web-based surveys for data collection, in post-disaster situations is a quick way to reach a large number of study participants, in comparison to traditional paper-based surveys ⁷⁶. Web-based surveys on mental health issues contribute to research by offering large samples and facilitating longitudinal studies among populations that might not respond to ordinary mail ⁷⁷. In addition, the flexibility and anonymity of web-based surveys can attract participants who would otherwise not participate, especially in disaster mental health research ⁷⁶. On the other hand, web-based surveys reduce the possibilities for clinical observations that might be of interest in disaster health research ⁷⁶. Also, the obvious need for the internet might reduce the possibilities for their use.

The use of social media in a disaster context is a growing phenomenon, and offers opportunities for future research ⁷⁸. There is an increasing use of social media for the recruitment of participants to health research in general, and the methodology has proved an effective way of reaching a study population as well as being cost-effective and offering follow-up designs ^{79,80}. Social media also offers a way to reach study participants who have previously been hard to reach for research purposes ⁷⁹. However, this recruitment method is associated with selection bias, thus limiting the possibilities to generalize study results ⁸⁰.

The Haiyan supertyphoon

The Philippines, an archipelago country comprising over 7,000 islands with about 98 million inhabitants, is one of the most disaster-prone counties in the world ⁶. Early in the morning of 8 November 2013, parts of the country were hit by the Haiyan supertyphoon, locally called Yolanda. About 14 million people were displaced, 28,000 were injured, and 7,000 died ^{81,82}. The province of Eastern Visayas was the most heavily affected province in the country.

In Tacloban, the capital of Eastern Visayas, which normally has about 250 000 residents but in the immediate aftermath of the typhoon was estimated to hold about half a million people ⁸¹, the typhoon caused severe damage. All medical facilities in the area were damaged, and some remained unable to operate at all for a long time ⁸³. Mass communication systems such as television and radio were disrupted for several weeks after the typhoon ⁸⁴, and there was an almost complete loss of electricity and mobile coverage during the same time.

National and international assistance was requested from the authorities in the early stages. Several actors replied, including national and foreign military services, the United Nations (UN), the Red Cross, and a large number of NGOs ^{81,85}. About 100 foreign medical teams (FMTs) responded to the disaster during the first month. Their role was mainly to compensate for damaged and non-operational medical facilities ⁸⁶. The disaster response was led and coordinated by local authorities in collaboration with UN agencies led by UNOCHA. The cluster system was activated. After the response phase, a massive recovery program ⁸⁵ was established and at the time of writing, this is still being active.

The use of disaster radio after the Haiyan typhoon

As part of the response strategy in the Tacloban area, disaster radio was used to disseminate information and music to the affected population. This was, to the authors' and UNOCHA's knowledge ⁸⁷, the first time disaster radio was used at such an early stage after a natural disaster, and as an integrated part of the response strategy.

The disaster radio, delivered by a team from the NGO First Response Radio (FRR), was on air, 24/7, from day five after the typhoon (see Figures 1-4). A temporary radio tower with a 50 W transmitter was raised on the roof of the city hall in Tacloban, enabling radio broadcast with a limited reach of about 10 km. After a few days, a 600 W transmitter was brought

in to replace the first one, increasing the reach to 40 km ⁵⁹. To enable people to listen to the radio, a large number (approximately 1200) of solar cell driven or wave driven radio transmitters (see Figure 3) were distributed in the affected area, free of charge, by authorities and relief organizations ⁵⁹. Disaster radio was also broadcast through loudspeakers at public places such as evacuation centres. The exact number of people who could benefit from First Response disaster radio in this disaster could not be estimated ⁸⁴. The radio was operated on a voluntary basis by radio journalists from the Philippines who had participated in pre-disaster training arranged by FRR. Officials and organizations participating in the relief work were invited to use the radio to disseminate information and advice to the public, either by having the journalists communicate their messages or by participating themselves. Interviews were broadcast with officials, representatives of relief organizations, and local community leaders such as politicians or religious leaders. All information and interviews were in English and sometimes also in local languages. Music was also played, selected by the radio journalists to be everyday popular music intended to make people feel comfortable and happy ⁶⁴. FRR representatives participated in cluster- and coordinating meetings in the early response phase, and later formed part of the CwC mechanism activated by UNOCHA.

After the immediate response phase, about two months after the typhoon, the ordinary radio stations began to be functional again. The function of First Response disaster radio was then gradually transferred to these ordinary radio stations via collaboration with local radio partners⁶⁴.



Figure 1. Radio in a suitcase.
Photo: M Adams, FFR.



Figure 2. Disaster radio on air
Photo: M Adams, FFR



Figure 3. Wave-driven radio transmitter
Photo: T Lannemo

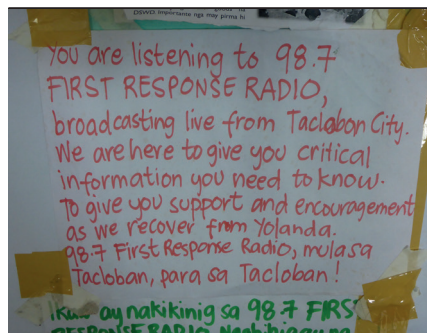


Figure 4. Radio message
Photo: K Hugelius

Theoretical framework

Several theories, some of them already mentioned above, have been used in this thesis to understand central phenomena such as health, stress, recovery, and response in a natural disaster context. The overall theoretical perspective used in this thesis was the biopsychosocial perspective on health.

The biopsychosocial perspective on health

The biopsychosocial model was presented by Engel in the 1960s as an alternative to the previously dominant biomedical approach ⁸⁸. The model describes health as a state of physical, mental, and social wellbeing where biological, psychological, and social dimensions of a person's life influence their overall health ⁸⁹. According to the model, the human being depends on and relates to several systems which enclose the person. Such systems range from biomedical systems, such as the cell, to family relations and up to a community level ^{89,90}. In this thesis, the spiritual dimensions of the human being are considered to be included in the psychological dimension, while religious dimensions such as going to church are part of the social dimension ⁹¹. The model is widely used ⁸⁸, and has influenced among other things the World Health Organization (WHO) definition of health: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" ⁹². It has been previously suggested that health consequences from a natural disaster should be seen in a biopsychosocial perspective ⁹³.

Rationale

Despite the long history of disaster occurrence, there is still little knowledge about their consequences and how to promote survival, recovery, and resilience in both an individual and community perspective. In order to understand how to contribute to disaster survivors' recovery and health, a deeper understanding of their experiences and health during and in the aftermath of a disaster is therefore needed. Health professionals, as part of the local disaster response, are essential in ensuring a resilient health care system during and after a disaster. Therefore, their experiences and health are of specific interest.

Crisis communication has been mentioned as an important element in disaster response to facilitate survival and recovery. Disaster radio, in the form of a radio station that broadcast specific disaster information, was used for the first time as part of the general response in the immediate response phase after the Haiyan typhoon. Disaster radio has potential to be practical useful to reach a large number of survivors even in severely damaged areas, but there is only limited knowledge and experience of its use and potential effects in a health perspective. Given that there are several methodological challenges relating to disaster health research and evaluations of response, methods to conduct such research and evaluations must be developed, considered, and tested beforehand.

Aims

The overall aim of this thesis was to describe survivors' and health professionals' experiences during and in the immediate aftermath of a natural disaster as well as health effects from such a disaster, and how disaster radio as a disaster response intervention can be used and evaluated from a health perspective.

The specific aims of each study were;

1. To describe how disaster radio was used to communicate vital messages and health-related information to the public after the Haiyan typhoon.
2. To describe survivors' experiences of being in the immediate aftermath of a natural disaster and the impact disaster radio made on recovery from the perspectives of the individuals affected.
3. To explore health professionals' experiences of working during a natural disaster.
4. To describe survivors' and, as a subgroup of survivors, health professional's 30 months after a natural disaster, and the use of a web-based, self-selected internet sample survey for the evaluation of health effects from disaster response interventions, in the study carried out with a focus on disaster radio.

Overview of studies

Four studies are included in this thesis (see Table 2): studies I, II, III, and IV.

Table 2. Overview of studies.				
	Study I	Study II	Study III	Study IV
Design	Qualitative/ quantitative descriptive	Qualitative descriptive	Qualitative explorative	Quantitative cross sectional
Aim	To describe how disaster radio was used to communi- cate vital mes- sages and health-related information to the public af- ter the Haiyan typhoon	To describe sur- vivors' experi- ences of being in the immediate after-math of a natural disaster and the impact disaster radio made on recov- ery from the per- spectives of the individuals af- fected	To explore health professionals' experiences of working during a natural disaster	To describe sur- vivors' and, as a subgroup of sur- vivors, health professional's 30 months after a natural disaster, and the use of a web-based, self- selected internet sample survey for the evalua- tion of health ef- fects from disas- ter response in- terventions, in the study carried out with a focus on disaster radio
Data	Radio files n=2587	28 survivors	8 health professionals	443 survivors
Time of data collection*	Immediate	At five months	At five months	At 30 months
Main anal- yses used	Content analy- sis, descriptive statistics	Phenomenologi- cal hermeneutic method	Phenomenologi- cal hermeneutic method	Descriptive and analytic statistics

* in relation to the disaster event

Methods

This section offers an overview of the methods and data collection procedures.

Context

In all studies, the study context was the Haiyan typhoon (2013) and the geographical area of Tacloban City, Eastern Visayas, the Philippines. The studies were conducted in English, which is one of the official languages in the Philippines and is understood by 97% of the adult population ⁹⁴.

Data and data collection procedures

Study I

The data in study I consisted of the digital radio logfiles which were automatically and electronically saved by the radio operator (FRR) during broadcasting. In all, radio broadcasts covering 17 days of 24-hour disaster radio were available and included in the study. The 8,400 files were each tagged with a short filename describing the content or the music title, sorted by day and time. In addition, all broadcasted files were available as authentic audio files covering approximately 400 hours of radio broadcast. After separating music and information files, 2587 files covering information, spoken messages, and interviews were included in the analysis, as well as 35 audio files (approximately four hours of radio broadcasts). FRR freely shared all the available data with the research team.

Study II

Interviews for studies II and III were conducted five months after the typhoon, by the researcher (KH) with the help of a local assistant who could also provide interpretation if needed. The assistant did not actively participate in the interviews, for example by asking questions or making comments, but instead helped with practical arrangements. In two of the individual interviews, the assistant provided interpretation of a specific word.

A purposeful sample ⁹⁵ with 28 survivors was used. To participate, a person had to be over 18 years old, to have experienced the Haiyan typhoon, and to have been listening to disaster radio at any time during the first month after the typhoon. Invitations to participate were posted on official boards at a nursing school and an evacuation center in an area that had been

severely affected by the typhoon. Participants could choose to be part of a focus group interview with a set date and time, or an individual interview. Four focus group interviews (totalling 21 participants) and seven individual interviews were performed. The choice to conduct both focus groups and individual interviews was made on a practical basis, and in order to include all persons who volunteered to participate in the study. All participants received complete study information and signed a letter of consent before the interviews.

The interviews lasted from 12 to 125 minutes, with a median time of 45 minutes. They were conducted at the nursing school, at an evacuation center, or at the participants' workplaces (see Table 3). An interview guide (see Appendix 1) was used to provide a general structure for the interviewer and to stimulate an explorative interview⁹⁶. The first question in the interview guide ("Where were you when Yolanda came?") and the last question ("Do you have any more comments or thoughts that you want to share?") were used in all interviews, while the follow-up questions were used if needed to further deepen the interviews. The interviews were audio recorded and thereafter transcribed verbatim by the researcher (KH). After each interview, the interviewer wrote field notes including immediate reflections on the content and general impressions during the interviews; these were later used to contribute to the naïve and comprehensive understanding⁹⁷.

Table 3. Overview of informants and interviews in study II.

Type of interview	Participant gender (n)	Participant age*	Interview time in minutes	Place of the interview
Focus group	Male (3) Female (4)	20-60 years	55 min	School
Focus group	Male (1) Female (5)	20-25 years	60 min	School
Focus group	Female (4)	50 years	72 min	Evacuation center
Focus group	Male (3) Female (1)	20-70 years	20 min	Evacuation center
Individual	Male (1)	40 years	12 min	School
Individual	Male (1)	50 years	35 min	Evacuation center
Individual	Female (1)	50 years	45 min	Workplace
Individual	Female (1)	85 years	125 min	Workplace
Individual	Female (1)	35 years	22 min	Workplace
Individual	Male (1)	55 years	45 min	Workplace
Individual	Female (1)	40 years	18 min	Workplace

* If not spontaneously mentioned by the informant, age was estimated by the researcher

Study III

To participate in study III, a person had to be over 18 years old and to have been deployed as a health professional (medical doctor, nurse, or paramedic) during and immediately after the Haiyan typhoon. A modified snow-ball sample⁹⁵ was used, meaning that a study participant or a supervisor at a medical facility in the study area gave the researcher names of potential participants who matched the inclusion criteria. When a potential participant was identified, an invitation and study information were provided, and if the person volunteered to participate, a letter of consent was approved before the interview. All persons invited (n=8) agreed to participate.

The interviews were conducted at or near the participants' workplaces, and lasted from 20 to 90 minutes with a median of 55 minutes. One interview was interrupted because of an emergency situation, and continued about one and a half hour later. An interview guide was used (see Appendix 2). The first question ("Where were you when Yolanda came?") and the last question ("Do you have any more comments or thoughts that you want to share?") from the interview guide were used in all interviews, but the use of other questions varied widely depending on the progress of the interview. All interviews were performed by the researcher (KH), and were audio recorded and later transcribed verbatim by KH. After each interview the researcher wrote field notes, which were later used in the analysis to contribute to the naïve and comprehensive understanding⁹⁷.

Study IV

Study IV was conducted approximately 30 months after the typhoon as a web-based, self-selected internet sample survey accessed via an internet link. A technical survey platform (ORU Survey) was used to create the survey. To participate, a person had to be over 18 years old and to have experienced the Haiyan typhoon.

Participants were invited to the study by invitations posted on Facebook pages, formulated as a short study invitation text followed by the link to the survey. Individuals who clicked the link were given full study information and were presented with an informed consent declaration which had to be accepted before the actual survey could be accessed. The survey was anonymous, and no personal data such as name, Facebook account name, e-mail address, or other personal or trackable data were asked for or saved. The short invitation text was first formulated as "Invitation to a research study on health after a natural disaster". After five days, the text was changed to a shorter and more proactive text: "Did you experience the

Yolanda typhoon?”. The invitation was posted on five Facebook group pages (closed or public). One group invited Haiyan disaster survivors to share their disaster stories, two groups were aimed at the general population in the specific geographic area of the study, and the remaining two groups were aimed at professional and/or voluntary emergency responders in the same geographical area. In total, all Facebook group pages had about 43250 members, but no information could be obtained about how many of these members were actively using Facebook, if the same persons were members of more than one group, or how many of these persons matched the inclusion criteria. There was also no information about how many had clicked on the invitation link but chose not to participate in the study, or how many had filled in the survey but failed to click on the final button to submit their answers.

Data collection was performed over ten days, starting at 10 pm (local time) on day 1 and closing at 7 am (local time) on day 10. After closing the survey, the data were automatically transferred to an Excel document and imported from there to the SPSS software package (IBM Corp. Released 2016, IBM SPSS Statistics for Windows, Version 23, Armonk, NY, IBM Corp) for further analysis.

Instruments to describe health

The survey consisted of the 12-item General Health Questionnaire (GHQ-12), the EuroQoL five dimensions three-level (EQ5D3L), the EuroQoL visual analogue scale (EQ-VAS), and study-specific questions. The study-specific questions covered demographic data as well as questions that were influenced by the results of studies II and III and previous research concerning factors suggested to be of importance for health and/or recovery after PTEs or disasters^{18,27,98,99}.

In all, 27 study-specific questions were asked. The questions covered demographic information (gender, age, education level, profession) and personal experiences related to the disaster event (loss of family member, whether the informant had suffered any physical injuries related to the disaster, whether the informant had suffered any psychosocial/ mental health problems related to the disaster, whether or not the informant had listened to disaster radio after the disaster, and whether the informant had been deployed during and/or immediately after the disaster and, if so, as a voluntary worker, health professional or other professional). Additionally, informants were requested to evaluate the survey. The questions could be answered with

“yes”, “no”, “do not know/do not remember” or open answer (profession and comments on the survey).

GHQ-12 is a validated, commonly-used instrument to screen for general mental health in adults ^{100,101}. It has been previously used in post-disaster settings ^{99,102}, and has been translated into 38 languages ¹⁰³. The instrument consists of six items measuring inability to perform normal functions and six items on the appearance of new and distressing phenomena. Likert scoring (0-1-2-3) was used in study IV, giving a score range of 0–36. A total of 15 points or more was used as cut-off for affected mental health, and a total score of 20 or more was considered to indicate severely affected mental health ¹⁰⁴. The web/phone/tablet edition in English, Philippines version, was used. Permission to use the GHQ-12 was obtained from GL Assessment.

EQ5D3L is a validated instrument used to measure health-related quality of life ^{105,106}. It has been used in a wide range of contexts, including disasters ¹⁰⁷, and has been translated into 172 languages. It consists of five questions covering dimensions of mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each dimension can be described on three levels: no problems, some problems, or extreme problems. The EQ-VAS, as part of the EQ5D3L, generates information on the participants’ self-perceived overall health by asking them to mark their overall health on a line ranging from 0 to 100 (optimal health).

EQ5D3L can be converted into a specific index, which is mainly used in cost utility analysis ¹⁰⁸. Value sets for a representative sample of the total population are available for several countries; if no country-specific set is available, the United Kingdom sets can be considered ¹⁰⁵. In study IV, the web/tablet/phone version of the instrument ¹⁰⁶ translated into English for the Philippines ¹⁰⁹ was used. Permission to use the EQ5D3L was obtained from EuroQoL.

A pilot study was performed prior to the main study to test both the survey and the technical functioning. Ten Haiyan typhoon survivors living in the same area as the study area were asked to complete the web-based survey and comment on the questions and any potential technical issues. Only minor revisions such as spelling and grammar changes were made after the pilot study.

Analysis

Both quantitative and qualitative analysis methods were used in this thesis. In study I, a mix of qualitative and quantitative methods was used to analyse the data, as described below.

Content analysis (study I)

Content analysis can be used to analyse different kinds of data such as written, verbal, or visual communication¹¹⁰ and to reach both a manifest and a latent meaning of the data¹¹¹. The method used in study I was based on the ideas of Krippendorff¹¹⁰ as described by Graneheim and Lundman¹¹¹. After transferring the 2587 radio logfiles to Excel (Microsoft Corp, Redmond WA), their qualitative elements were analysed¹¹¹. The suggested first step of the method, condensation of the meaning units, was not performed, as all radio files were already clearly and consistently described and further condensation was not considered likely to improve the quality of the analysis. Therefore, the next step was to divide the file descriptions into 21 different codes that were named after their content. All codes were then compared internally and externally, and assigned to one of the eight categories that emerged from the analysis, showing the manifest content of the data. Thereafter, the categories were assigned into three themes, describing the latent content of the broadcast information and messages¹¹¹. To verify the analysis, all files with an unclear content description and an additional five to ten files randomly selected from each group of codes were listened to as audio files. In total, 35 files covering approximately four hours of radio broadcast were selected for listening. No files were moved from their original code or category after verification, and no files were excluded during the analytical process.

In order to get a more complete understanding of the data, a mixed methods approach^{112,113} was used. After the qualitative elements of the data had been analysed with content analysis, descriptive statistics based on the qualitative findings were used in order to describe the content in relation to day, time, and frequency of the broadcast content.

Phenomenological hermeneutic method (studies II and III)

The phenomenological hermeneutic method, which is based on the philosophy and epistemology of Paul Ricour ⁹⁷, aims to capture the essence and meaning of the lived world experience. The methodology used in studies II and III has been described by Lindseth and Norberg ⁹⁷. The meaning of the texts, as well as metaphors and manifest information, should be explained and understood ^{114,115}. Because interpretation is an always ongoing process where knowledge and insight are constantly changing, the “truth” might change over time ¹¹⁴.

The phenomenological hermeneutic analysis in the present studies was based on the interpretation of texts from interviews. The analysis started with a naïve reading, where the whole of the verbatim texts transcribed from the interviews were read through several times to gain a general understanding of the phenomena studied. The field notes were also used to add information. A naïve understanding was formulated, and then a structural analysis was performed. First, meaning units were identified and marked, and then they were condensed by rewriting their essential meaning in “everyday words”. The condensed units were sorted into subthemes and themes that were reflected on in relation to the naïve understanding. This process was repeated until the naïve understanding and the structural analysis validated each other and did not leave any data behind. In the last step, a comprehensive understanding was formulated by reading the whole text and the themes, and reflecting on them in relation to the original texts, field notes, literature, theories and context of the study ⁹⁷. No distinction was made between data from individual or focus group interviews performed in study II.

In the phenomenological hermeneutic method, the researchers’ pre-understanding is relevant and should be used to contribute to the interpretation. KH had previous experiences from being deployed in different professional roles to several disaster areas around the world, including the Haiyan typhoon and the geographical area of the present study. Among the other authors, AA and MG, who closely monitored and contributed to the analysis, had no professional experiences from natural disaster settings. PÖ, who contributed to the results by a final verification of the analysis, had professional experiences from being deployed to several disaster and conflict settings, but not the specific disaster studied here.

Statistical analysis (studies I and IV)

In study I, the quantitative analysis was calculated manually and in Excel, and presented as numbers, percentages, and diagrams.

In study IV, the statistical analysis was mainly performed through the SPSS software package (IBM SPSS Statistics 20, IBM, New York, US version 23). If a participant had missing values in any dimension in GHQ-12 or EQ5D3L, their total score was excluded^{106,116}. The EQ5D3L index was calculated in Excel, using the TTO value set for the United Kingdom¹¹⁷.

To compare subgroups in the sample in study IV, a chi squared test was used to compare categorical data, Fischer's exact test to compare categorical data with small groups, and Student's t-test for parametric data (EQ-VAS)¹¹⁸. A confidence interval (CI) of 95% and statistical significance of $p < 0.05$ was used. Multiple linear regression was used to analyse variables that influenced the overall health, as measured with EQ-VAS as primary outcome. The predictors included gender (male/ female), age (18-25, 26-65, ≥ 66), level of education (elementary school, high school, university), deployment (health professional, other professional, voluntary worker, no), physical injuries (yes, no), mental health problems (yes, no), loss of family member (yes, no), use of social support (yes, no), being forced to move (yes and still living elsewhere, yes but now returned home, no), and listened to disaster radio (yes, no). Residual diagnostics were performed, and the model was considered well fitted. External health statisticians were consulted to verify the statistical analysis.

Ethical considerations

As for medical research in general, ethical considerations are concerned with balancing the risk and the benefits of the research in relation to the persons involved and society as a whole ¹¹⁹. The Helsinki declaration states that the researcher should ensure the integrity and protection of life, health, and dignity for every person participating in medical research ¹²⁰.

Disasters and disaster research are associated with several specific ethical considerations, for example access to the research area or data ^{71,121}, socio-political and cultural environmental aspects ^{42,71} and security concerns ⁷¹. The inclusion of disaster-affected people in research requires a sensible approach to ensure that no further harm is caused by the research ⁴². On the other hand, research is generally well tolerated by distressed people ⁷³, and failing to conduct disaster-related research because of ethical or methodological challenges may also be unethical ⁷³. When performing the interviews (II, III), the researcher (KH) had the impression that even if the interviews sometimes raised strong emotions or memories among the participants, the persons who volunteered to participate wanted to share their stories and thus contribute to science and future disaster response. In accordance with ethical guidelines ¹²², psychological support for the participants was available in case such a need occurred. The study samples included vulnerable populations, represented by elderly participants (II, IV) ¹²².

The use of web-based solutions in research may arouse ethical considerations concerning protection of the participants' identities and personal or sensitive data. However, if no personal data is requested or saved, web-based solutions offer a better possibility to be anonymous ¹²³. In the studies included in this thesis, no personal data such as name, exact age, address, email address, or Facebook account were asked for, recorded, or saved. Written informed consent was signed physically (II, III) or electronically (IV) before the interviews or survey questions started.

Performing research studies in other countries is not unusual in disaster health research, and entails that the researcher must pay special attention to potential legal, cultural, or other differences ¹²⁴. The collaboration with local contacts and a local assistant contributed to create an understanding of local circumstances as well as in making the practical arrangements for the data collections (II, III).

For the studies included here, ethical permission was obtained from the Philippine Health Research Ethics Committees. The first three studies were assessed and approved by both regional and national ethical committees, in accordance with advice from the regional ethical secretariat (which, for obvious reasons, was not fully functional in the early stages after the disaster). The last study did not need approval from the national ethical committee, in the opinion of the same secretariat.

The application process was considered similar to Swedish procedures, with that difference that the ethical standards also included specific guidelines and regulations for research involving disaster-affected populations¹²². These guidelines were closely followed when designing, inviting to, conducting, and reporting the research studies.

The approval references for the studies were NEC-2014-005-DBR and 20140131977D for studies I, II, and III, and EVHRDC-ERC 2015-05 for study IV.

Results

The results are presented here according to the overall and specific aims of the thesis, merging results from all four studies under each subsection. Information on which study/studies the results are drawn from is presented in Roman numerals after each heading.

Participants' demographics and characteristics (studies I, II, III, and IV)

The data in study I consisted of radio logfiles covering the first 17 days of radio broadcast (n=8,400). All of the available non-music files (n=2,587) were used in the analyses, as well as 35 audio files out of the 2587 logfiles, covering about 4 hours of radio broadcast.

A total of 28 informants participated in study II: 10 men and 18 women, with estimated age ranging from 20 to 85 years (see Table 3). Of these, 14 persons were connected to a nursing school in a severely disaster-affected area, either as a student or as a member of staff. None of the informants had suffered serious injuries or illness caused by the typhoon. Some had lost family members or friends, and all had experienced partial damage to or a complete destruction of their homes. At the time of the interviews, eight of the informants still lived in temporary shelters.

In study III, eight health professionals were interviewed: five men and three women between 20 and 50 years old. Four were medical doctors (two male, two female, all aged between 30 and 50), three nurses (two male, one female, all aged between 20 and 50), and one male paramedic. The informants were employed at five different general health facilities, including general private, city-owned, or governmental hospitals, or at the regional office of the Department of Health. The medical specialties of the health professionals differed, but none were specifically involved in psychiatric care.

A total of 443 people participated in the survey in study IV; 40% (n=175) were male and 60% (n=267) were female. The majority were adults (59%; n=263) or young adults between 18 and 25 years old (37%; n=162), and only 4% (n=18) were 66 years or older. The majority (76%; n=337), had been staying in the Tacloban area (an urban area) at the time of the typhoon. About 3% (n=11) of the participants had elementary school as their highest completed level of education, while 43% (n=190) had high school and 53% (n=235) had studied at university level. Of the whole sample, 16% (n=73)

were health professionals who had been deployed during the disaster; these were analysed as a subgroup compared to participants who had not been deployed at all or had been deployed as workers other than health professionals. In total, 4% (n=18) had been deployed as voluntary workers and 6% (n=26) in professions other than health during the typhoon.

Internal dropouts (study IV)

All 443 participants filled in the GHQ-12 questions, while 3 participants failed to answer all questions in the EQ5D3L and 12 participants did not answer the EQ-VAS. For the study-specific questions, the internal dropout rate on each question varied from 0 to 100 missing answers. The questions with the highest dropout rate were the question on profession (open answer; 23% missing answers, n=100), the question on presence of psychosocial/mental health problems (9%, n=38), the question on whether the participant had listened to disaster radio (7%, n=29) and the question on use of social support (5%, n=23).

Experiences and health among disaster survivors (studies II and IV)

In the immediate aftermath of the typhoon, the survivors described themselves as *being in disaster mode*. This was a strained state of being that included physical, psychological, social, and spiritual dimensions. In order to adapt to the new context, the survival mode was used as a more or less conscious strategy that kept body and mind busy and reduced negative emotions and thoughts. The survivors described several needs related to being in disaster mode (see Figure 5). The most emphasized need was to get in contact with loved ones such as family members; this overwhelmed other needs such as hunger or pain. Feelings of uncertainty and fear and the endeavour to clarify the new conditions of the surrounding world created a need to understand and retake control of the situation they found themselves in. Another need expressed was to get rest from the strenuous process of surviving and coping with the situation. Also, they needed to regain hope and confidence, both in their own ability to cope and recover and for life itself.

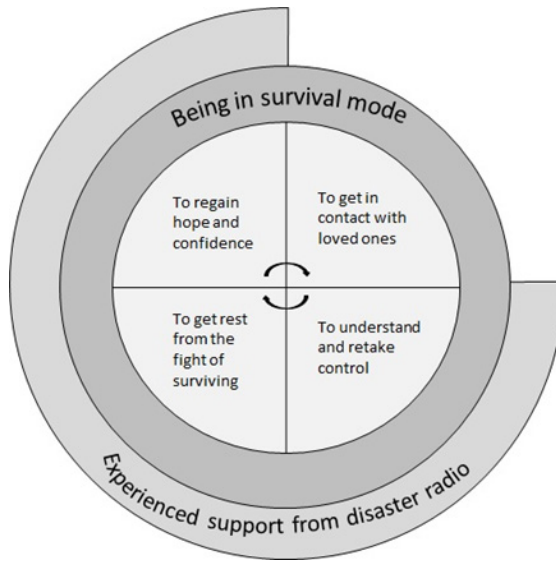


Figure 5. Experiences and needs from being in the immediate aftermath of a natural disaster, and their relation to disaster radio. Previously published in paper II. (Hugelius, et al. "To silence the deafening silence": survivor's needs and experiences of the impact of disaster radio for their recovery after a natural disaster. International Emergency Nursing 2016, 28(1): 8–13.)

Of the participants answering the survey (IV), 16% (n=71) said that they had suffered physical injuries related to the typhoon, and of these, 73% (n=52) had used any kind of medical support for their injuries. About 42% (n=185) stated that they had suffered psychosocial/mental health problems related to the typhoon at any time, and of these, 27% (n=50) said that they had obtained any kind of professional psychosocial support (for example, from a medical doctor, nurse, psychologist, or Red Cross mental health support team). About 39% (n=172) of the participants had lost loved ones such as family members in the disaster, and 57% (n=251) had been forced to move from their ordinary homes.

The majority of the participants (IV) who reported either physical injuries or psychosocial/mental health problems seemed to have recovered during the 30 months which passed between the typhoon and the survey. Of the

participants reporting physical injuries, 5% (n=52) reported persistent physical health problems; and of those reporting psychological problems at any time, 12% (n=52) reported persistent mental health problems 30 months after the typhoon. According to the EQ5D3L, none of the participants reported severe problems with moving around, taking care of themselves, or conducting their usual activities, but several reported some or severe problems with pain/discomfort and/or anxiety/depression 30 months after the disaster (see Table 4).

According to the GHQ-12, about 15% (n=66) showed effected mental health (GHQ-12 score 15 or above) and 4% (n=19) were assessed to have severe mental health problems (scoring 20 or above) 30 months after the typhoon. In addition, 16% (n=69) of the participants still lived somewhere else than their ordinary home, 30 months after the disaster.

The mean of EQ-VAS, in the total sample was 70 (SD 18.17, median 73.00, 25th percentile 58.00, 75th percentile 75.00). No significant differences could be seen between male and female gender ($p=0.574$; EQ-VAS male: mean 71.53, SD 17.22; EQ-VAS female: mean 69.51, SD 1.7) or age of 18-25 compared to age 26-65 ($p=0.082$; EQ-VAS 18-25 years: mean 72.14, SD 17.55; EQ-VAS 26-65 years: mean 68.94, SD 18.28), but participants aged 66 and over had significantly lower EQ-VAS ($p=0.001$; ≥ 66 years: mean 62.53, SD 19.9). The EQ5D3L index in the whole sample was 0.928 (SD 0.15, median 1.000, 25th percentile 0.848, 75th percentile 1).

Overall health (EQ-VAS) was positively influenced by being deployed as a voluntary worker in comparison to not being deployed, and by having listened to disaster radio. EQ-VAS was negatively influenced by loss of a family member, reporting mental health problems, reporting physical injuries, and low education level (high school) in comparison to university (see Table 5). The regression model proved significant ($p < 0.000$), explaining 31.4% of the variation in EQ-VAS.

Table 4. Domains and scoring of EQ5D3L

EQ5D3L dimensions	Scoring	n
Mobility	No problems	417
	Some problems	23
	Severe problems	0
Self-care	No problems	438
	Some problems	2
	Severe problems	0
Usual activities	No problems	403
	Some problems	36
	Severe problems	0
Pain/discomfort	No problems	382
	Some problems	55
	Severe problems	2
Anxiety/depression	No problems	355
	Some problems	84
	Severe problems	1
Total n 440		

Table 5. Variables influencing overall health (EQ-VAS) 30 months after the typhoon.

	Unstandardized coefficient B	95% CI (lower bound; upper bound)	t	Sig.
Gender	1.260	(-2.476; 4.997)	0.664	.507
Age 18-25 years	7.331	(-1.332; 15.993)	1.665	.097
26-65 years	6.334	(-1.951; 14.620)	1.504	.134
Level of education				
elementary school	0.666	(-11.348; 12.681)	0.109	.913
high school	-4.011	(-7.894; -0.127)	-2.032	.043*
Deployed as				
health professional	-3.019	(-8.662; 2.624)	-1.052	.293
other profession	3.508	(-3.722; 10.739)	0.954	.341
voluntary worker	9.946	(2.335; 17.558)	2.570	.011*
Physical injuries	-6.292	(-11.076; -1.508)	-2.587	.010*
Mental health problems	-8.698	(-12.322; -5.075)	-4.722	.000*
Loss of family member	-9.932	(-13.687; -6.177)	-5.203	.000*
Use of social support	0.690	(-3.042; 4.422)	0.364	.716
Forced to move				
Still living elsewhere	-5.486	(-11.009; .037)	-1.954	.052
Returned home	-2.303	(-5.975; 1.369)	-1.234	.218
Listened to disaster radio	8.387	(4.358; 12.415)	4.095	.000*

Multiple linear regression analysis with EQ-VAS as dependent variable. R² = 0.314. * p < 0.05

Health professionals' experiences and health (studies III and IV)

Study III revealed that being a health professional during a natural disaster meant having a multifaceted, powerful, and ambiguous experience of being part of the response system at the same time as being a survivor of the disaster. Both positive and negative experiences were expressed in the main theme: *being a professional and a survivor*. The theme of *being a helper* covered feelings of strengths and confidence, adjustment and acceptance, and satisfaction. In the theme *being a victim*, feelings of being scared, powerless, and helpless were expressed. Strong feelings of being lonely and isolated, both as humans and as professionals, were related both to lack of acknowledgement and support from authorities and FMTs and to the fact that the health professionals were physically distanced from the community. The health professionals felt like they were neither part of the survival community nor part of the unaffected community, but rather somewhere in between.

Feelings of guilt and shame were also expressed, mainly related to a moral conflict of being torn between concerns and obligations for their own family and their professional obligations. Altruistic elements had both positive and negative impacts on the experience of being a health professional. In a positive dimension, altruism contributed to a feeling of doing good, serving others, and being proud of this. On the other hand, failing to fulfil expectations or moral convictions created feelings of shame, guilt, or powerlessness. The individual perception of the situation as well as personal values, moral convictions, and coping strategies contributed to the meaning of being a health professional during the disaster, involving both positive and negative experiences of being a professional and a survivor at the same time.

In study IV, 73 health professionals deployed during the disaster were analysed as a subgroup of survivors. Their health was compared to survivors not deployed at all or deployed in fields other than as health professionals (such as police officers, rescuers, or voluntary workers). Other comparisons were not performed due to small group sizes. Five participants from the whole study sample could not be categorized because of missing data.

Self-reported mental health problems, both at any time and persistent, were more frequently reported among the health professionals compared to survivors not deployed, while no such difference could be observed for physical injuries. Being forced to move from their ordinary home was less frequent among health professionals, and they had also listened to disaster radio and

used social support to a lower extent than other survivors (see Table 6). More health professionals were considered to have some effects on their mental health (GHQ ≥ 15) than other survivors, while no such difference could be seen for severely affected mental health (see Table 6). Thirty months after the disaster, the health professionals reported significantly lower overall health as measured with EQ-VAS, in comparison to other survivors (see Table 6).

Table 6. Overview of reported health in total sample, among survivors not deployed, and among health professionals deployed.

		All survivors		Survivors not deployed at all or not deployed as health professionals		Health professionals deployed during the disaster		p-value: survivors not deployed vs. health professionals deployed
Number		n = 443*		n= 365*		n=73*		
		%	(n)	%	(n)	%	(n)	
Gender	Male	39	(172)	41	(151)	27	(20)	0.024
	Female	61	(268)	59	(213)	73	(53)	
Age***	18-25	37	(162)	42	(153)	8	(6)	< 0.000
	26-65	59	(263)	54	(196)	90	(66)	
	≥66	4	(17)	4	(16)	1	(1)	
Loss of family member		39	(171)	42	(153)	25	(18)	0.007
Forced to move		57	(251)	61	(223)	37	(27)	<0.000
Listened to disaster radio		67	(296)	76	(276)	26	(19)	<0.000
Used social support		61	(272)	65	(237)	48	(35)	<0.004
Physical injuries at any time		16	(72)	18	(66)	8	(6)	0.040
Persistent physical injuries***		5	(20)	7	(20)	0	(0)	<0.000
Psychological problems at any time		42	(185)	38	(126)	83	(59)	<0.000
Persistent psychological problems		12	52	11	(32)	32	(20)	<0.000
Affected mental health								
GHQ ≥15		21	(91)	16	(57)	47	(34)	< 0.000
GHQ ≥		6	(25)	5	(18)	10	(7)	0.117
EQ-VAS score**								
Mean		70.0		71.0		64.0		0.001
SD		18.2		18.3		16.3		
Median		73.0		75.0		65.0		
25 th percentile		58.0		59.0		50.5		
75 th percentile		85.0		85.0		79.5		

* Five participants could not be categorized due to missing data

p calculated with chi squared test. ** p calculated with Student t-test *** p calculated with Fisher's exact test

The use of disaster radio in a health perspective (study I)

Disaster radio was used in the immediate aftermath of the Haiyan typhoon to broadcast vital messages, official information, health-related advice, and psychosocial support to the affected population. The radio provided general information, demonstrated the officials' ability to manage the situation, encouraged and fostered a sense of hope, gave practical advice, and encouraged self-activity.

The content of the information broadcast changed over the 17 days analysed (see Figure 6). Encouragement messages were the most frequently broadcast (in total 1,233 messages); these comprised short encouraging phrases by locally and nationally popular persons (e.g. famous pop stars, religious or political leaders, and others). An example of an encouraging message could be "Taclobanos; stay strong, we will overcome this together!" The next most frequently broadcast types of message were information about official services such as businesses and banks (112 messages), availability of internet access (93 messages), advice to boil water (88 messages), and information on the distribution of relief items (73 messages) (see Figure 6). During the first week, there were frequent broadcasts of information covering registration of missing persons, access to fresh water, availability of petrol, accessible roads, and operational medical facilities. During the second week, the most frequently broadcast messages involved access to shelter, calls for people to report to their jobs, advice to boil water, immunization drives, and psychoeducational messages. This was also when information about relocation plans, security, and general media updates began to be broadcast. From day 11 to day 17 of broadcast, the information focused on disaster preparedness, reopening of schools, and measures to prevent epidemic diseases. Messages about internet availability, general situation updates, media updates, and messages of encouragement were broadcast with the same intensity during the whole period.

Health-related messages comprised a minor part of all information (see Figure 7), and during some periods no health-related information was broadcast. The main parties using the radio to spread health-related information were official health authorities, but private insurance companies and medical facilities also used the radio in this way. The health-related information included information about access to operational medical facilities, calls for immunization programs, information about the policy of a general health insurance company, and advice on how to avoid and recognize specific

health threats such as dengue fever and leptospirosis (see Figure 7). Advice to boil drinking water was the most frequently broadcast health-related message, being broadcast from day 3 to day 11 with a peak on day 5 (10 days after the typhoon) (see Figure 7).

The psychoeducational messages consisted of longer interviews with representatives from psychosocial support teams and UN agencies, as well as information about psychological stress reactions and advice on how to adapt and cope with the situation. Psychoeducational messages were first broadcast on day 1, but then there was a gap until day 9 (Figure 7).

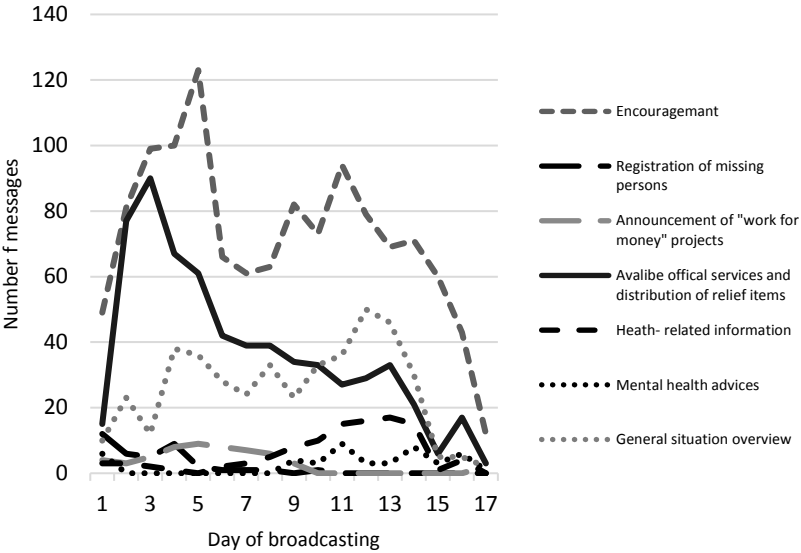


Figure 6. Type of broadcast messages over time.

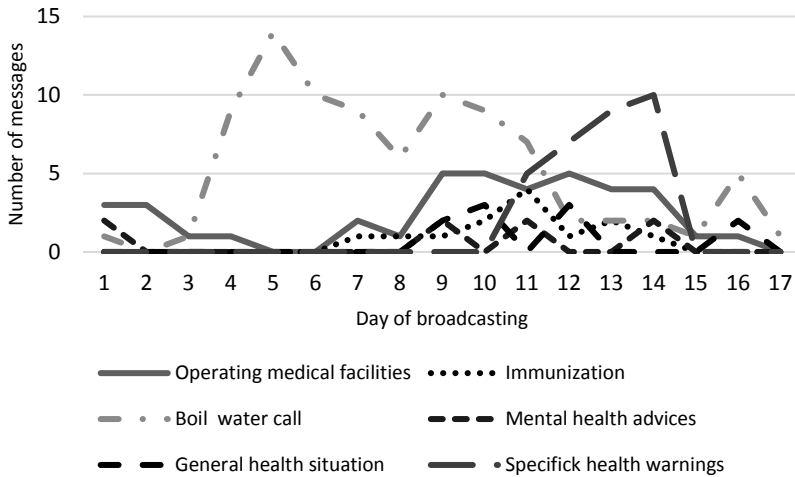


Figure 7. Health-related information over time.

Disaster radio's contribution to recovery (studies II and IV)

Of all participants in the survey (IV), 67% (n=296) stated that they had been listening to disaster radio at any time during the first months after the disaster event. The reasons for listening to the radio were to get practical advice (71%, n=214), for company (57%, n=169), to get information on available services (50%, n=149), to get information on the wellbeing of relatives and friends (33%, n=98), to get a break (30%, n=87), or to get general information (22%, n=65).

Disaster radio contributed to the recovery of the survivors' by providing information and practical advice that helped them physically recover, decreased their fears, and enabled a sense of control and understanding of the new context. Hearing voices and music on the radio reminded the survivors of normality, and offered moments of rest from the fight for survival and recovery. It also reduced feelings of loneliness and helplessness. Some participants in study II expressed that the happy music played influenced them so much that they could feel happiness despite the situation they were in.

In order to meet the need to re-establish social contacts, which was the need most emphasized by the survivors, the radio needed to be complemented by other response interventions.

The multiple linear regression analysis on variables influencing health 30 months after the disaster indicated that listening to disaster radio after the typhoon was one of the variables that positively influenced overall health (EQ-VAS) (see Table 5).

The use of a web-based survey (study IV)

Study IV used a self-selected internet sample answering a web-based survey to describe health after a disaster. The survey was answered by 443 persons during the ten days of data collection. A majority (73%; $n=323$) of the participants stated that they thought the web-based survey would be suitable to use in a post-disaster situation, given the presence of internet access. About 6% ($n=29$) did not think the survey would be usable in a post-disaster setting. The most common ways to answer the survey were via mobile phone (79%, $n=339$), computer (19%, $n=80$), or tablet (3%, $n=12$). The time to fill the survey in was estimated at less than 5 minutes for 74% ($n=320$) of the participants, 6–10 minutes for 25% ($n=103$) of the participants, and more than 11 minutes for 1% ($n=8$) of the participants. The internal dropouts were considered low.

Using social media to recruit study participants enabled the researcher to reach a self-selected non-probability sample of disaster survivors without being physically present in the disaster area. The number of participants answering the survey per day varied from 14 to 101, with a median of 37 participants per day. In total, 2% ($n=4$) of the 443 participants stated either that they had suffered discomfort of any kind by filling in the survey ($n=1$) or that they could not judge if any discomfort or harm had occurred because of the survey ($n=3$). None of the participants requested psychological support.

The participants had the possibility to comment on any aspect of the survey. In total, 13 such comments were written, all of which expressed positive experiences of answering the survey. Example of such comments were “*we would like to thank you for this study*”, “*this would surely help us in possible future disasters*” or “*this is valuable for us for the future*”. Four comments consisted of single letters or signs such as “*!*”. These statements indicate that the use of a web-based survey and social media to advertise disaster-related studies can have benefits by signaling concern for the disaster-affected people and their situation.

Discussion

The findings in this thesis contribute knowledge about survivors' health and experiences in the immediate aftermath of a natural disaster, as well as about how disaster radio can be used in a health and recovery perspective. In this section, the results are discussed in terms of four themes: health and recovery from a biopsychosocial perspective, health professionals as a specific group of survivors, disaster radio as a health response intervention, and the use of a web survey and a self-selected internet sample in disaster health research. This is followed by a discussion of methodological considerations and limitations, clinical implications, and suggestions for future studies.

Health and recovery from a biopsychosocial perspective

In order to understand how to respond and promote recovery after natural disasters, knowledge of health impacts and needs among the survivors is necessary^{15,31}. The Haiyan typhoon entailed physical, psychological, and social consequences for the survivors. From a biopsychosocial perspective⁸⁹, these findings were as expected, given that a natural disaster of this magnitude literally turns a society upside down.

Physical dimension

About 16% of the participants in study IV reported physical injuries related to the typhoon, but the majority of these seemed to have recovered and none reported severe problems in mobility, self-care, or performing their usual activities 30 months after the disaster. However, it should be remembered that deceased persons and survivors with severe injuries, such as brain injuries, or injured people still in need of advanced medical care, would not have been able to participate in a survey like this. Previous studies have confirmed a correlation in between physical injuries and mental health conditions among disaster survivors^{18,125}, as found in this study.

In a post-disaster study about consultations of various symptoms after disasters in the Philippines, the most common symptoms were acute respiratory infections, wounds, and high blood pressure¹²⁶. It is important to address both traumatic injuries and other physical health problems in survey questions regarding physical health after disasters. When this was not the case in the present survey, this could have influenced the results. Further conclusions on physical health effects after the typhoon are therefore uncertain. It is also possible that conducting the same study in an earlier state

after the disaster could have showed different results concerning the physical dimension of health after the disaster.

Psychological dimension

According to the results in studies II and V, psychosocial needs and mental health problems seemed to be of greater importance for the survivors themselves, and to last longer than physical health problems. The survivors described a need to understand, in order to navigate and cope in the new context they found themselves in after the disaster event. Clearness and understanding of the situation have been suggested to promote resilience^{28,29}. In a caring perspective³¹, the person has to be able to place themselves in relation to the new context to reduce stress and promote wellbeing. These perspectives harmonize with the findings in this thesis.

About 20% of the participants in study IV were considered to have suffer from affected mental health (GHQ scoring ≥ 15), and 19% reported health problems in the psychological dimension of EQ5D3L, but only 12% reported mental health problems on the direct question “Have you ever suffered from psychosocial or mental health problems related to the typhoon?”. There could be many reasons for this discrepancy between the results of the instruments and the self-reported frequency of mental health problems. Several factors, such as previous history of mental illness, level of exposure and social support has been found to influence mental health after PTE: s^{23,33,127} but were not assessed in the present study. In addition, the meaning of mental health or mental health problems may include several aspects which are not covered by the instruments or the specified domains, but are still of importance for the individual perception of health or wellbeing^{128,129}.

In previous disaster health studies, the proportion of participants with affected mental health has varied from 17% to over 50%²⁷. Without baseline data, and considering the use of a self-selected internet sample, it is hard to draw general conclusions from these findings, but in general it can be said that mental health problems were not unusual, and that the participants reported these more frequently than physical injuries, both in a short-term and a long-term perspective. The results indicate that most survivors, both those who reported physical injuries and those with mental health problems, had recovered over time. This is in line with Bonanno’s description of recovery and resilience after PTEs^{18,19}.

Social dimension

The Haiyan typhoon had several consequences related to the social dimension of life for the survivors. Many of the informants strongly emphasized the need for confirmation of their families' wellbeing and the need to get in contact with loved ones at an early stage after the disaster. Strong feelings of being lonely were also expressed, both by general survivors and by health professionals. Even if the exact mechanism is still not fully understood, the buffering and promotive effects of social relations after PTEs are well known ^{36,53}. Social support has been associated with feelings of being understood, enhancing a feeling of control, increased self-esteem, and social comparison, all factors contributing to recovery and resilience after PTEs ¹³⁰. In the present study, social support was not found to positively influence overall health in a long-term perspective. There may be many reasons for this, including misunderstanding of the term "social support". If measured with a specific instrument for social support, the result might have been different. The loss of a family member had a strong negative influence on the survivors' health in a long-term perspective. This is in line with previous studies ⁹⁹.

Another social consequence of the Haiyan typhoon was displacement. Displacement and relocation have been found to influence health among disaster survivors ²⁵, even if the mechanism behind this relationship remains unclear ¹⁸. In the survey (IV), relocation was not found to influence overall health after 30 months. A possible explanation for this could be that there were no data on pre-disaster living conditions or economic consequences of the disaster for the participants, factors that have been mentioned to explain the previously-described relationship ¹⁸, were explored in study IV.

The knowledge and evidence base on social consequences and their effects on health and recovery among disaster survivors is very limited, and in most studies only related to the very first stage after a disaster ²¹. This thesis has contributed to an increased understanding of social consequences and their meaning for the survivors affected in a health perspective. Altogether, the findings support the idea that disaster response interventions which enable disaster survivors to get confirmation of their loved ones' wellbeing and re-establish social contacts are of great importance for wellbeing and recovery, and should therefore be emphasized in disaster response ^{26,131,132}.

Overall health

Overall health in the whole study sample 30 months after the disaster was 70 on the EQ-VAS (IV). In cross-country rating comparisons of EQ-VAS for general populations, the index ranges from 76.14 (Zimbabwe) to 66.61 (Armenia) ¹⁰⁵. A study of health among elderly refugees reported an EQ-VAS score of 42.6 ¹³³. No comparable data for survivors after a natural disaster has been found. Without specific rating for the Philippines or disaster-affected populations, it is hard to assess this result ^{105,134}. However, the use of EQ-VAS to describe overall health from the individual's own perspective can be useful in future descriptive or longitudinal disaster health studies ^{105,134}.

In the analysis of factors influencing EQ-VAS, physical injuries, psychological problems, and social consequences all had a significant impact. This finding supports the idea that health and wellbeing are an integrated process including physical, psychological, and social dimensions, which is also in accordance with the WHO definition of health.

Health professionals as a specific group of survivors

A resilient health care system is vital to reduce negative health effects among the population in most disasters ^{13,126}, and the burden on this system will persist for a long time after the specific disaster event itself ¹²⁶. In this study, the health professionals were found to have worse overall health after 30 months, and reported mental health problems more frequently than the other survivors (IV). There may be several reasons behind these findings. It should be noted that no data on health status before the disaster was obtained. The survey did not distinguish what kind of mental health problems were experienced and/or reported by the health professionals. Several studies have suggested that rescue personnel are at increased risk of PTSD after participating in disaster response ⁴⁹, and a study among unspecified relief workers deployed in the Haiyan typhoon, reported an increased level of psychological distress among relief workers who had been directly exposed to the disaster, compared to those who had not ¹²⁵. Pre-disaster psychiatric history, greater exposure to the traumatic event, and parallel life stress have been found to be associated with symptomatic PTSD among professional rescuers after a terrorist attack ¹³⁵. The health professionals in study IV had not suffered the loss of family members or physical injuries to the same extent as other survivors, but still rated their health worse than other survi-

vors. There is a possibility that an increased awareness about potential mental health effects from PTEs could have increased the reporting rate among the health professionals.

However, the qualitative findings indicate that the experience to be a health professional include several aspects not addressed by other survivors, that may negatively influence the health. The perception of control and clarity^{30,136} is essential to avoid resignation in stressful situations²⁴. The health professionals described how balancing between acceptance and an endeavour to control was used as a strategy to cope with and adapt to the new coherence that being in the disaster context meant. Acceptance has been found to contribute both to resilience²⁴ and a beneficial adaption strategy among individuals³⁰ or rescue personnel¹³⁵ exposed to severe stress. Although it is not clear to what extent a disaster situation can actually be controlled, strategies to balance the endeavour to control and understand and the use of acceptance as a coping strategy may help health professionals prepare for the demanding experience of being deployed during disaster situations.

Helping behaviour during a disaster event has been positively associated with wellbeing¹³⁷, and altruistic motives has been suggested to buffer stress and contribute to resilience²⁴. In study III, personal values including altruistic elements contributed to moral conflicts and feelings of guilt and shame. These results indicate that altruistic motives also caused negative emotions. The intent to care might create stress among care providers themselves if there is a mismatch between the needs of the survivors and the possibilities to care³¹. The altruistic mechanisms involved in the meaning of being a health professional during a disaster could therefore be seen as both a burden and a protective element.

The health professionals expressed feelings of loneliness, both as persons and as professionals. Part of this experience was based on feelings of being abandoned by agencies who were expected to support them, such as FMTs arriving in the disaster area. Acknowledgement, from managers and from society in general, has been found to be of importance for professionals' recovery after PTEs^{138,139}.

Other factors associated with resilience among professional responders include pre-deployment health status¹⁴⁰, training¹⁴⁰, level of exposure¹⁴⁰, the appraisal of control, and to understand the situation¹⁴¹, leadership¹⁴², and informal social support from colleagues and managers^{141,143}. As the

recovery process itself was not the primary focus in study III, this could be the reason why none of the health professionals mentioned any of these elements.

It should not be forgotten that the experience of working as a health professional during the Haiyan typhoon also included positive aspects, such as an increased professional confidence and a feeling of contributing to the overall situation as well as helping individuals in need; these have also been described by personnel deployed in other disaster situations ^{41,139}. Being deployed as a voluntary worker was found to positively contribute to overall health in a long-term perspective. However, this result must be interpreted with much caution, as the study sample only included 18 voluntary workers and the whole study sample was a convenience sample. Any differences in health between health professionals not deployed, other professionals deployed, and voluntary workers were not analysed, due to small sample sizes.

Feelings of being unprepared for the emotional strain arising when working as health professional during a disaster event have been previously reported ^{141,144}. To enhance resilience and to better prepare health professionals for the challenging situation of being and working in a disaster, the present findings support the idea that disaster training should also include personal preparation ¹³⁹ such as reflection on altruistic values, strategies for coping with stress, and discussion of moral conflicts ^{41,141}. Based on the transactional model of stress and coping, it is also important to develop practical ways to increase the health professionals' understanding and perception of the overall disaster situation ^{136,139}, especially for those deployed inside a hospital, who are unable to connect and interact with the surroundings.

Disaster radio as disaster health response

To provide support to a large number of people in environments that lack functional infrastructure such as electricity, roads, and ordinary means of communication is a great challenge. Such circumstances are the reality in most natural disasters. After the Haiyan typhoon, disaster radio was used to advise people on how to behave in order to reduce health risks, as well as to broadcast self-care strategies covering both physical and mental health aspects. It is possible that the provision of such advice and stimulation of self-care can release resources for specialized interventions for individuals in need of such. It is also possible that such advice could prevent negative secondary health effects, such as communicable diseases.

To support recovery and resilience after PTEs, five evidence-based principles for psychological support in the emergency phase have been identified, all useful in both an individual and a community perspective ⁵⁷. The first principle is to promote a sense of safety. Disaster radio, as used after the Haiyan typhoon, was found to enhance a feeling of safety by providing information about what had happened. Information itself can contribute to a feeling of control and clarity that is important both for the coping and recovery process ^{28,29} and to allow people to assess the threat in a realistic manner ⁵⁷. Information is therefore essential from a recovery perspective.

Disaster radio also contributed to promoting a sense of calming, the second principle, by providing psychoeducation that helped the survivors to understand their stress reactions ⁵⁷. It is therefore worrisome that no psychoeducational messages were broadcast from day 2 to day 9, and that there was a gap in the health-related information flow from day 4 to day 6. The reasons for this are not known. Possible reasons could be that health authorities and organizations were unfamiliar with using disaster radio as a tool to communicate with the community, that other information sources fulfilled the need for health-related information during these days, or that the health organizations were overloaded with work and therefore did not prioritize use of the disaster radio at this time.

Promotion of a sense of self-efficacy and community efficacy ⁵⁷ has been found to be beneficial for people in distress. The perception that one is capable of managing the demands related to a disaster and active engagement ²⁷ is associated with a positive recovery process. Disaster radio contributed to this by describing the authorities' abilities to manage the situation and by encouraging self-supporting activity and self-efficacy.

Disaster radio also helped reduce feelings of being isolated and lonely, which could be seen as a way to promote connectedness, the principle most important to enhance recovery and resilience ^{56,57,130}. When a person lacks their ordinary social support from family or close friends, hearing another voice on the radio can serve as an alternative, ⁵⁷. Disaster radio could therefore make a contribution to promoting social support. It is however important to note that disaster radio must be complemented with other response interventions aimed at reconnecting families and loved ones after disasters.

When promoting hope, large-scale, community-based interventions may be more effective than individual interventions ⁵⁷. From a caring perspective ³¹, disaster radio can be seen as a practical way to promote hope. According to

the survivors interviewed, the music played on the radio increased their feelings of hope and trust. The power of music in a healing and stress-reducing perspective needs further attention to be fully understood ^{145,146}. It be concluded that the music was an important component of the positive effects of radio on the recovery process, and this should be noted when using disaster radio in the future.

To summarize, disaster radio could be used to provide both health-related information and psychosocial support, and to contribute to recovery and wellbeing from the survivors' perspective and from a caring perspective. Disaster radio has the potential to reach a large population even in severely damaged disaster areas and could therefore be a useful disaster health response strategy in severe disasters. It should however be remembered that these findings are based on a single disaster situation, and there is thus a strong need for further studies of the use of disaster radio in order to increase the knowledge of its use and effects from a health perspective.

The use of web-based methods in disaster health research

Study IV used a web-based survey, a self-selected internet sample, and social media for recruitment of participants. The use of web-based data collection procedures in post-disaster situations has many advantages ⁷⁶.

However, it does not eliminate the lack of baseline data or possibilities to randomize samples, which are the usual problems that limit the possibilities to draw scientific conclusions from disaster research ^{72,75}. Another obvious limitation is that such methods require access to electricity and the internet, which can be a shortage in the early stages after any natural disaster. The use of social media in disasters can be useful as a means of risk communication ¹⁴⁷, to support and re-establish social relations ^{78,131}, to express emotions and provide psychosocial support ⁷⁸, and for research purposes ⁷⁸. Future strategies to prioritize internet access for the disaster-affected public ¹⁴⁸ will thus be important for many reasons, not only to enable web-based research methods but also to enable social contacts and information sharing among the survivors.

The use of social media (specifically, Facebook) to recruit participants to a web-based survey had several advantages. It reduced the need to have a researcher physically in place, which otherwise might raise practical, security, and ethical considerations, especially in the early stages after the disaster. In

addition, the use of social media can facilitate participation even when disaster survivors may have been forced to move from their ordinary homes, and ordinary postal and telephone services might be reduced or eliminated for a long time. This mitigates the common problem in disaster health research of excluding participants who have left the area temporarily or indefinitely ⁷². Once an individual has agreed to participate and shared their contact information, communication through social media allows follow-ups and longitudinal studies regardless of the participant's physical location. Study IV showed that social media can provide a sample with demographics similar to those of the general population in terms of gender, age, and educational level ¹⁴⁹. However, it is likely that the choice of Facebook pages and groups on which to advertise the study information strongly influenced the characteristics of the study sample, and this must therefore be carefully considered when choosing to use social media for such recruitment. Finally, the findings from study IV indicated that the use of the internet to invite participants signalled that someone cared about the people affected, and offered a possibility for the individuals to contribute to disaster health research. Limitations of the use of social media to recruit study participants will be discussed in the next section.

Both the EQ5D3L and the GHQ-12 have been translated into several languages. When disasters strike unexpectedly and in previously-unknown geographical areas, it is important that the instruments used have been translated into several languages. The highest internal dropout from the instruments used was that for EQ-VAS (about 3% of the study sample). The layout of the VAS scale (line and size) in the web format depended on the screen size used to answer the survey. It cannot be judged from this study how that may have affected the answers or the response rate.

Methodical strengths and limitations

The studies included in this thesis had several limitations, some of which have already been mentioned. This section discusses some of the methodological considerations.

There are several aspects of the generalization and transferability of the findings in this thesis that need to be addressed. First, there is the question of the extent to which the results from a study based on a specific disaster event in a specific geographic area and context could be generalized to other disasters. The findings in this thesis rely on data and experiences gained from one disaster event. In addition, the use and impact of response interventions are dependent on the context ⁷⁴, and so it is likely that the same response in another context would have somewhat different effects. The use of a general structure, such as the framework for disaster health research ^{5,75} used in this thesis, can increase the possibilities to generalize study results by offering a standardized description of the event and context, which may also facilitate review studies ⁷⁵.

Using a phenomenological hermeneutic method means that it is not the experience itself, but the meaning of it, that can be transferred from private experiences to public knowledge ¹¹⁵, and the interpretation and understanding of a phenomenon is a constantly developing process in which the “truth” might change over time ¹¹⁴. The transferability from the studies included in this thesis can add knowledge from the Haiyan disaster context which may be applicable to other similar situations ¹⁵⁰, and can also be used to triangulate results from other studies ⁷².

The use of a self-selected convenience sample reduces the possibilities to generalize study results. It has been suggested that convenience samples used in research about mental health after PTEs are more likely to overestimate pathology than population-based samples ¹⁸, but other studies suggest that this is not always the case ²⁷. The context of a natural disaster usually makes it impossible to conduct traditional randomization of study samples ^{42,72} and the use of different non-probability samples is common in all disaster-related research ²⁷. The results can also be affected by sample size, with small sample sizes showing more of reported mental health problems ²⁷. A review showed that among 225 quantitative research studies on disaster mental health, the sample size varied from 11 to 5687 participants, with a median

of 150, and only 7% of all studies had samples with over 1000 participants²⁷. Samples including specific subgroups, such as rescue workers, were more often smaller than 100 participants²⁷. Taking these numbers into consideration, the 443 participants in this study could be considered a relatively large sample.

The use of social media to recruit participants to the web-based survey was considered to mitigate several practical challenges related to data collection in post-disaster settings. Although the use of social media for research recruitment has been found to be economical and effective, researchers must be aware of the limitations in generalizing from the results¹⁵¹. Still, as the possibilities to conduct research studies with classic randomized samples are limited or even absent in disaster contexts^{15,42,72,75}, a large self-selected sample might be an acceptable option that can still contribute to an increased understanding of disaster health¹⁵.

Another commonly described issue in disaster health research is the lack of baseline data^{72,152}. To understand health impacts and evaluate disaster response interventions, it would be preferable to have such data. Still, studies with a descriptive approach as well as “lessons learned” from specific disaster events are considered to contribute to increased knowledge, and to build a basis for future structured reviews that can be more widely generalized^{15,74}.

In qualitative research, the exact number of participants is not central, but it is important that the informants can share their rich experiences of the phenomena studied^{95,153}. There were 28 informants in study II, and eight in study III. As in all qualitative studies, it is possible that other informants or an increased number of participants could have influenced the results in both studies.

There is no consensus about the timing of disaster health research^{5,73}. The timing of data collection for disaster mental health studies has ranged from one month to over 15 years⁹⁹, with a peak at about two months after the disaster event²⁷. Studies on long-term health effects have been more commonly performed in developed countries than in other countries, and 72% of all research studies on mental health after a disaster have been conducted with a cross-sectional design, measuring health at one specific time²⁷. The interviews for studies II and III were conducted about five months after the

disaster, due to practical circumstances and to reduce the potential of interrupting in the acute response and recovery phase ⁷³. The choice to conduct the web-based survey 30 months after the disaster event was based partly on practical reasons, but also on the fact that results from studies II and III were used to influence the design and study-specific questions used in the survey. Previous studies on psychological health and recovery after disasters indicate that recovery is an individual process that may take several years ^{19,154}. The time which passes between a disaster event and data collection means that several confounders and factors which could have influenced the results are not easily detected or accounted for ¹⁵⁵. Although critical situations such as experiencing a disaster are not easily forgotten ¹⁵⁶, recall biases must therefore be considered both in the qualitative and quantitative studies.

Both quantitative and qualitative research methods are useful in studying disaster health ^{42,151}. The choice to use content analysis to analyse the qualitative dimensions of the radio files in study I was influenced by the character and large size of the dataset ¹¹⁰. After conducting the qualitative analysis, a descriptive statistical analysis was performed, based on the qualitative findings. There are several ways to approach the concept of mixed methods. In study I, the methodology used to render a more comprehensive understanding of the data by using both qualitative and quantitative methods on the same data was inspired by Sandelowsky ^{112,157}.

The decision to use a phenomenological hermeneutic method in study II and III was mainly based on epistemological grounds, such as the idea that a lived experience can only be understood in relation to our pre-understanding, and that the researcher's pre-understanding should therefore be used in the analytical process ^{97,158}. The researcher (KH) had experience of being deployed to several disaster areas, including the specific disaster studied in this thesis. This was experienced as an advantage when performing the interviews (II, III), which has also been described by Girraatano ¹⁵¹. Many of the participants mentioned that the interviewer's understanding of the context and the situation helped them to share their memories and experiences, and in that way deepened the interviews. The interpretation of texts means moving beyond understanding what the text says, to understanding what it talks about ¹¹⁴. In the analytical process, the co-authors who had different or no experience of disaster settings contributed to or validated the analysis, which added new perspectives and ensured objective structural analysis ⁹⁷.

The phenomenological hermeneutic method demands the use of theories and other studies to fully understand and deepen the findings, and to formulate a comprehensive understanding. This can challenge traditional research publishing processes.

The interview guide used in study II and III was primarily used to support the interviewer (KH), and offered structure for the interviews by using the same questions to introduce and to end the interviews. The other questions were used as needed, to further deepen and enrich the participants' stories⁹⁶. In study II, both focus group and individual interviews were used. When talking about situations that might rouse negative or traumatic experiences or memories, the use of focus groups can have a buffering effect and promote social support among the study participants¹⁵⁹. The reasons for not conducting all interviews as focus group interviews were mainly practical, as it was not possible for all individuals who wanted to participate in the study to attend interviews with a set time. No difference in content could be seen between the two different types of interviews. Arrangements for psychosocial support via the Red Cross were available if such a need occurred or if such support was requested by any participant. No such need was identified.

Implications for disaster response and further studies

Health and wellbeing after a natural disaster depends not only on the response, but also on pre-existing conditions. The results in this thesis therefore have practical implications in both a response perspective and a preparedness perspective.

In the aftermath of any disaster, the challenge is to correctly identify needs and, given the context, act to promote survival and recovery among a potentially large number of affected people, using practically applicable methods. This might imply that methods normally used by the health care system are less effective, and so alternative methods need to be considered. Disaster radio can be used to broadcast health-related information and lifesaving advice, and to provide psychosocial support. It has the practical advantage of being able to reach a large number of people even in severely damaged areas, by small means and efforts. This thesis has shown that disaster radio was experienced to contribute to recovery among survivors after the Haiyan typhoon. Therefore, the health sector should prepare to use disaster radio as a disaster response tool, when suitable.

Since the typhoon had physical, psychological, and social consequences for the survivors, the suggestion of further integration of psychosocial and mental health response in the traditional, usually physically-oriented, disaster health response^{53,160,161} is supported. Social needs in particular seemed to be of importance for the survivors. Therefore, all kinds of disaster response aiming to support social needs, such as re-establishment of social relations, should be emphasized from an early stage of the response.

In order to build a resilient health care system, the wellbeing and functioning of health professionals in place when the disaster strikes are essential. The results from this thesis support the idea that disaster training for health professionals should not only focus on traditional technical or medical skills, but also include personal preparation^{139,141,162,163} such as reflection on personal values, strategies for coping with stress, and the moral conflicts that may emerge in disaster situations. Practical tools to provide information and support to health professionals deployed during and after the disaster also need to be identified.

A number of questions and suggestions for further research have been identified, some of them mentioned earlier in this thesis. There is a need for more studies exploring the immediate needs experienced by the survivors, in order to plan for adequate and effective response. Studies on health, especially mental health aspects, specific needs, and strategies to support health professionals during and after disasters are also indicated. Increased knowledge about the interaction between local health professionals and FMTs could contribute to a more resilient and effective overall health response after disasters requiring international support.

This was the first time disaster radio was used as part of the general response at such an early stage of a disaster and it seemed to have a beneficial effect on the affected population. However, more studies are needed to confirm these findings and exploring the optimal use of this tool. The role and effects of the music played is of specific interest to explore. The use of disaster radio in other disaster contexts, for example in epidemics or human-induced disasters, as well as long-term follow-ups would be of interest.

Finally, given the practical and methodological challenges related to disaster research, the internet-based methods and other methods used in this thesis need to be further evaluated in order to build evidence in disaster medicine.

Conclusions

- There were short-term and long-term physical, psychological, and social consequences for the survivors as a result of the Haiyan typhoon.
- Disaster radio was used to disseminate health-related information and to provide psychosocial support after the Haiyan typhoon. It was the survivors' experience that disaster radio, both the information and the music, contributed positively towards recovery.
- Being a health professional deployed during the disaster entailed both positive and negative experiences related both to the person and to the professional role. Their health and specific needs are concerns that should be further explored.
- Using a web based survey and social media facilitated recruitment of study participants. However, methodological challenges about external validity were introduced. Internet based methods in disaster research should be further developed and evaluated.

Svensk sammanfattning (Summary in Swedish)

Bakgrund

Katastrofer drabbar miljoner människor världen över varje år, och orsakar både dödsfall, skador och stort mänskligt lidande. Naturkatastrofer inkluderar flera typer av katastrofer såsom jordbävningar, tyfoner, värmeböljor eller vulkanutbrott. Under perioden 2003–2014 drabbades ca 140 miljoner människor av naturkatastrofer, de flesta av dem i Asien. Hälsoeffekter från naturkatastrofer är beroende av flera faktorer både före, under och efter händelsen. Vid naturkatastrofer skadas ofta infrastruktur såsom elektricitet, kommunikationssystem och sjukvårdsinrättningar, samtidigt som ett mycket stort antal människor kan vara i behov av hjälp. I dessa situationer krävs särskilt anpassade insatser för att effektivt kunna hjälpa människor att överleva och att återhämta sig.

Katastrofrelaterad forskning innebär många praktiska, etiska och metodologiska svårigheter. Några av dem är att få tillgång till data, logistiska och säkerhetsmässiga utmaningar, brist på information om hur situationen var innan katastrofen samt att överföra och tillämpa kunskaper från en katastrof till en annan. Det saknas idag forskning och evidensbaserad kunskap kring både hälsoeffekter av naturkatastrofer och kring hur man på bästa sätt ska hjälpa människor som drabbas av katastrofer att återhämta sig.

Den här avhandlingen består av fyra delstudier som alla är relaterade till supertyfonen Haiyan, lokalt kallad Yolanda, som drabbade delar av Filippinerna hösten 2013. Den benämns som en av de svåraste naturkatastroferna i modern tid. I katastrofen omkom ca 7000 personer och över 28 000 människor skadades, de flesta i området kring regionhuvudstaden Tacloban, där också skadorna på infrastrukturen blev mycket svåra.

Efter katastrofen användes för första gången katastrofradio i ett tidigt skede. Katastrofradio innebär en radiostation som med enkel teknik sänder katastrofrelaterad information och musik i ett katastrofområde. I Tacloban sändes katastrofradio från dag fem efter tyfonen. Det var radiojournalister från frivilligorganisationen First Response Radio som sände radion på uppdrag av lokala myndigheter och Förenta Nationerna. Alla myndigheter och hjälporganisationer i området erbjöds att använda radion för att kommunicera med den drabbade befolkningen och man sände både information och

musik. Musiken valdes av radiojournalisterna, och den skulle vara ”vardagsmusik” som de drabbade kände igen och skulle bli glada av. Radion kunde höras via radiomottagare som delades ut gratis till hushåll, samt via högtalarsystem på offentliga platser såsom evakueringscenter.

Syfte

Det övergripande syftet med den här avhandlingen var att beskriva överlevandes och sjukvårdspersonals erfarenheter av att befinna sig i, och omedelbart efter, en naturkatastrof, hälsoeffekter av naturkatastrofer och hur katastrof radio som hjälpinsats kan användas och utvärderas ur ett hälso-perspektiv.

Specifika syften med delstudierna var

- I) att beskriva hur katastrof radio användes för att kommunicera viktiga meddelanden och hälsorelaterad information till allmänheten efter tyfonen Haiyan.
- II) att beskriva överlevandes upplevelser av att befinna sig i, och omedelbart efter, en naturkatastrof samt effekterna av katastrofradio återhämtning ur de överlevandes perspektiv.
- III) att undersöka sjukvårdspersonals erfarenheter från att arbeta under och i det omedelbara skedet efter en naturkatastrof.
- IV) att beskriva överlevares och sjukvårdspersonals hälsa 30 månader efter en naturkatastrof samt användningen av en webb baserad enkät med självvalda deltagare rekryterade via sociala medier för utvärderingar av katastrofinsatser, i studien med fokus på katastrofradio.

Metod

Delstudie 1

I den första delstudien analyserades 17 dygns katastrofradiosändningar, från dag fem till dag 22 efter katastrofen. Totalt 8400 radiofiler analyserades. De 2587 filer som innehöll information eller meddelanden separerades från musikfilerna, och dess kvalitativa innehåll analyserades med innehålls-analys. För att verifiera analysen lyssnades också på ca fyra timmars radiosändningar i sin helhet. Därefter gjordes statistiska beräkningar utifrån i vilken omfattning, dag och tid för när olika typer av information sänds.

Delstudie 2

I den andra delstudien intervjuades 28 överlevanden som lyssnat till katastrofradio vid något tillfälle efter tyfonen Haiyan om deras omedelbara behov och deras upplevelse av katastrofradions betydelse för deras återhämtning. Intervjuerna skedde genom fokusgruppsintervjuer och individuella intervjuer omkring fem månader efter katastrofen. Samtliga intervjuer genomfördes på engelska, ett av de officiella språken i Filippinerna. Deltagarna rekryterades genom skriftliga anslag och muntlig information på en sjuksköterskeskola och i ett evakueringscenter i Tacloban. Intervjuerna genomfördes av forskaren (KH) med stöd av en lokal assistent, tillika tolk. Utöver intervjuerna skrevs fältanteckningar kring innehållet och omständigheterna kring intervjuerna. Intervjuerna transkriberades därefter ordagrant och analyserades med fenomenologisk hermeneutisk metod.

Delstudie 3

Den tredje delstudien bestod av intervjuer med åtta sjukvårdspersonal som arbetat under och omedelbart efter tyfonen Haiyan. Bland de intervjuade fanns läkare, sjuksköterskor och ambulanssjukvårdare som arbetade på både statligt- stads och privatägda sjukhus, samt på hälsomyndighetens regionala kontor. Deltagarna rekryterades genom ett modifierat snöbollsurval. Intervjuerna genomfördes ca fem månader efter katastrofen och skedde på eller i närheten av studiedeltagarens arbetsplats. Intervjuerna transkriberades och analyserades därefter med fenomenologisk hermeneutisk metod.

Delstudie 4

Den fjärde delstudien var en kvantitativ studie där en webbaserad enkät innehållande instrumenten GHQ-12, EQ5D3L och EQ- VAS samt studie specifika frågor användes. För att rekrytera deltagare till studien publicerades en inbjudan till studien på olika Facebooksidor under tio dagar, ca 30 månader efter katastrofen. Totalt deltog 443 överlevande i studien. Data analyserades med olika statistiska metoder för att beskriva hälsan hos deltagarna, och undersöka vilka faktorer som påverkade den.

Resultat

Resultaten från de fyra delstudierna visade att tyfonen påverkade både fysiska, psykiska och sociala dimensioner av hälsan hos de överlevande. De omedelbara behoven, såväl bland överlevande i allmänhet som bland sjukvårdspersonal, var främst relaterade till sociala sammanhang, såsom att få bekräftelse på anhörigas välbefinnande och att återskapa sociala relationer.

Att få information för att kunna förstå och hantera det nya sammanhang som den överlevande befann sig i var också viktigt. Att arbeta som sjukvårdspersonal under katastrofen var en komplex erfarenhet som innehöll både positiva och negativa känslor. Sjukvårdspersonalen som deltog i delstudie IV rapporterade högre förekomst av psykiska problem och sämre generell hälsa än andra överlevande gjorde, 30 månader efter katastrofen.

Katastrofradio användes för att sprida både allmän och hälsorelaterad information. Radion bidrog positivt till de överlevandes återhämtning. Den information som gavs hjälpte de överlevande till fysisk återhämtning genom praktiska råd, minskade rädslor och skapade en känsla av kontroll och förståelse för det nya sammanhanget de drabbade befann sig i. Musiken bidrog till att skapa känslomässig uthållighet och hopp, och minskade känslor av ensamhet och hjälplöshet.

Användningen av en webbaserad enkät och sociala medier för att rekrytera deltagare minskade flera av de praktiska utmaningar som annars är vanliga i samband med katastrofrelaterad forskning. Nackleden med metoden var att den inte erbjöd ett icke slumpmässigt urval. Detta minskade möjligheten att generalisera resultaten till andra än de personer som ingick i studien.

Betydelse för katastrofhantering i framtiden

Hälsa och välbefinnande efter en naturkatastrof är inte bara beroende av de hjälpinsatser som görs efter att en katastrof inträffat, utan även på faktorer före katastrofen. Därför har resultaten i denna avhandling praktisk betydelse ur både ett respons- och förberedelseperspektiv.

Efter en allvarlig katastrof behöver behoven hos de drabbade först identifieras, och därefter är ett snabbt agerande för att bidra till överlevnad och återhämtning viktigt. När ett stort antal drabbade människor i en extrem situation behöver hjälp fungerar ofta inte de metoder som normalt sett används av hälso- och sjukvården. Katastrofradio har fördelen med att kunna nå ett stort antal människor med små insatser också i sådana sammanhang. Denna avhandling har visat att katastrofradio kunde bidra till återhämtning bland överlevande efter tyfonen Haiyan. Därför bör hälso- och sjukvården förbereda sig för att använda katastrofradio som ett verktyg för att hjälpa i samband med katastrofer.

Vidare föreslås att ett biopsykosocialt perspektiv på hälsa används i katastrofsammanhang, och att en ytterligare integrering av psykosociala inslag sker i den traditionella, oftast fysiskt orienterade, katastrofmedicinska hjälpen. Speciellt sociala behov tycks vara av stor betydelse för de överlevande. Därför är det viktigt att alla former av katastrofinsatser som syftar till att stödja sociala behov och att återupprättande av sociala relationer prioriteras, också i ett tidigt skede efter en katastrof.

För att sjukvården ska kunna motverka negativa hälsoeffekter i samband med katastrofer är hälsan hos sjukvårdspersonalen som finns på plats när katastrofen inträffar viktig. Därför bör katastrofmedicinsk utbildning och träning inte bara fokusera på organisatoriska eller medicinska kunskaper, utan även inkludera personliga förberedelser såsom reflektioner kring personliga värderingar och stresshantering.

Slutligen föreslås att användningen av internetbaserade metoder i katastrofrelaterad forskning bör användas och utvärderas vidare.

Slutsatser

- Tyfonen Haiyan orsakade fysiska, psykologiska och sociala konsekvenser för de överlevande, både på kort och längre sikt.
- Katastrofradio användes för att sprida hälsorelaterad information och ge psykosocialt stöd efter tyfonen. Katastrofradio upplevdes bidra positivt till återhämtning, från de överlevandes perspektiv. Både informationen och musiken som sändes i radion hade betydelse.
- Att arbeta som sjukvårdspersonal under katastrofen innebar både positiva och negativa upplevelser relaterade till både den privata personen och yrkespersonen. Deras hälsa och specifika behov under en katastrof behöver studeras vidare.
- Användningen av en webbaserad enkät och sociala medier för att rekrytera studiedeltagare innebar flera praktiska fördelar, men skapade också nya utmaningar. Därför behöver de utvärderas ytterligare.

Acknowledgements

I would first like to thank all the brave and strong people who played a part in this thesis by sharing their personal experiences and wisdom in order to contribute to the improvement of disaster response. Your knowledge and strength have impressed me most of all, and always will.

I also wish to thank:

Annsophie. To guide a sometimes certain, sometimes uncertain, sometimes quite frustrated, and sometimes very busy student takes time, patience, concern, and wisdom. You have guided and encouraged me not only in terms of scientific discussion and advice, but also in entering the academic world. It has been a pleasure to be your PhD student.

Mervyn. Your professional and encouraging attitude has encouraged and added new perspectives during this time. I should also not forget to thank you for language support, not only in a grammatical sense, but also for knowing exactly which word I'm looking for when I try to describe something with about a hundred word.

Per. The journey from the tents, heat, and dust of Haiti to this thesis has been an adventure, and I am very happy that you accepted my request to be co-supervisor on this project. Even if not always physically present, you have always backed me up with your rich experiences from both the science and the reality of disasters.

Professor *Ulrica Nilsson*, for valued guidance and encouragement during the process to become a researcher.

Karin Startzmann, statistician, and *Dr Karl Wahlin*, statistician, for valuable support and guidance in statistical analysis.

Dr R. Balderian, the *nursing school*, and *J. Mercado* for practical support.

The Research committee of Region Örebro County Council, *Fortifikationskårens forskningsfond*, *Örebro University*, *Helge Axel Johnssons minnesfond*, and *Vårdförbundet*, for financial support.

Mike Adams, international coordinator of First Response Radio, for generously sharing not only data, but also your rich experience of disaster radio. And for your contribution in implementing the results of my research in a practical, useful context.

Annika Hickisch, for involving me at Örebro University from the very beginning, and for long and important discussions about prehospital and emergency nursing.

Lena Adolfsson, Börje Chemnitz, Vincent Carpenter, Anna-Lena Kjellgren, Mikael Reinholdsson, and all my colleagues at the Karlskoga Hospital ambulance department, for supporting my research studies and missions abroad. This would not have been possible without your support.

Karuna, Malin, and Ulrika, for our never-ending discussions on everything from the core values of nursing science to French statistics and for many, many laughs and some tears. What would this time have been without you?

Sara Johansson, for sharing your deep and exclusive knowledge and experiences of psychosocial needs and support in crises.

To my *field staff colleagues within the MSB*, with whom I have shared some really strange, challenging, and moments of clarity during deployments to disaster areas around the world. Thank you for letting me be part of the team. It has been an honour, and I hope to see you out there again soon.

To my beloved family; my fiancé *Johan*, my sister *Anna*, my mother *Kerstin*, and my father *Sören*. Thank you for your never-ending belief in what I do and what I want, including when I said I wanted to be a PhD student. And for trusting me, also when I go to places from where everybody else wants to leave. And thank you *Johan* for waiting for me, with the “leverpastej” in the refrigerator, whenever I return back home from missions abroad or from the world of science....

To *Molly* and *Ester*, for reminding me of what’s important in life.

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Appendix 1

Interview guide used in study II

1. Where were you when Yolanda came?
What were the major concerns for you at that time?
What do you think were the major needs among the people at that time?
Why did you listen to the radio?
What was important to you? Why?
2. If you would give any advice to anyone who would be in the same situation as you in another disaster, what would that be?
Can you give any example?
Why is that important?
3. Do you have any other comments or thoughts you want to share?

Appendix 2

Interview guide used in study III

1. Where were you when Yolanda came?
 - What was the main concerns for you at that time?
 - What were the challenges for you?
 - What did you do at that time?
 - What was important to you? Why?
2. If you would give any advice to anyone who would be in the same situation as you in another disaster, what would that be?
 - Can you give any example?
 - Why is that important?
3. Do you have any other comments or thoughts you want to share?

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