

Emergency preparedness and perceptions of vulnerability among disabled people following the Christchurch earthquakes: Applying lessons learnt to the Hyogo Framework for Action

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Abstract

Internationally there is limited research on the experiences of people with disabilities during and following a major disaster. The overall aim of this research was to explore how the Christchurch earthquakes impacted upon disabled people. This paper reports on findings from the research relating to emergency preparedness and perceptions of vulnerability among disabled people who were living in Christchurch over the extended period in which the earthquakes occurred. Qualitative inquiry was carried out, involving purposive sampling and face to face interviews with 23 disabled people and four agency representatives living in Christchurch during the earthquakes. The qualitative research was followed by a pilot quantitative survey involving 25 disabled people living in Christchurch during the earthquakes and 10 people who work in the disability sector. Qualitative interview material was analysed using thematic analysis while quantitative data was analysed using descriptive statistics. All findings are related to sections of the Hyogo Framework for Action. The research identified that prior to the September earthquake, disabled people were not prepared for an emergency. Following the earthquake most people took steps to ensure that they were better prepared. However, few disabled people were able to prepare for an emergency without support. Vulnerability was discussed by participants in relation to personal safety, communication, housing, transport and financial hardship. A lack of community preparedness alongside

insufficient structures to assist disabled people in the disaster response or recovery phases increased exposure to risk. It was relevant to discuss findings with reference to the Hyogo Framework for Action's emphasis on vulnerable communities, given that this international document was under review at the time of writing. Our research suggests that disabled people are more likely to be impacted in a civil emergency and are less likely to be prepared. Emergency preparedness management needs to engage with disabled people in the community and have specific policies to assist disabled people prior to and in the event of a disaster.

Keywords: *disaster, disability, preparedness, vulnerability, risk*

On September 4, 2010 a non-fatal 7.1 magnitude earthquake struck the Canterbury region of New Zealand. This was followed by a fatal 6.3 earthquake centred under the city of Christchurch on February 22, 2011. Two more earthquakes measuring magnitude 6.4 and 6 respectively were centred close to the city in June and December of 2011, causing further damage to city infrastructure. Two years after the first earthquake on the 4th of September 2010, the Government monitoring agency, Institute of Geological and Nuclear Sciences (GNS Science), had recorded more than 11,200 aftershocks in the Canterbury region (Otago Daily Times, 4/09/2012). People with disabilities constitute 17-20 per cent of the total New Zealand population (Human Rights Commission, 2013) making them a significant group in an emergency situation. This paper links findings from research conducted in Christchurch, that explored the reported experiences of disabled people related to the 2010-2011 Christchurch earthquake series, to action strategies within the 2005 Hyogo Framework for Action (HFA) on disaster risk reduction.

Background

Disaster risk reduction, involving promoting awareness, increasing knowledge, facilitating better preparedness and creating sustainable economic development for communities and nations, were objectives of the 2005 World Conference on Disaster Reduction in Kobe,

Hyogo, Japan. The resulting HFA has since been adopted by 168 countries, including New Zealand, as a plan to build resilience to disaster from natural, environmental and technological hazards. Central to the plan is the aim of reducing human, social, economic and environmental losses. Building on the 1994 Yokohama Strategy, the HFA is a layered model for disaster risk reduction, ranging from macro level interventions, such as creating legislative frameworks to mitigate natural hazard risk, to micro level actions, aimed at encouraging individual preparedness. The five key areas identified for development were: ensuring disaster risk reduction is a national and local priority; identify, assess and monitor disaster risks and enhance early warning; use knowledge, innovation and education to build a culture of safety and resilience at all levels; reduce the underlying risk factors; and strengthen disaster preparedness for effective recovery and response at all levels (UNISDR, 2005). The HFA identified that in all action areas, vulnerable groups should be taken into account when planning for disaster risk reduction.

Implementation of the five action strategies within the Hyogo Framework in New Zealand also needs to be cognisant of national and international policy and legislation protecting the rights of disabled people. In September 2008 the New Zealand Parliament ratified the UN Convention on the Rights of Persons with Disabilities (the Convention). Article 11 of the Convention relates to situations of risk and humanitarian emergencies. The article requires that all necessary measures are taken “to ensure the safety of persons with disabilities in situations of risk including situations of armed conflict, humanitarian emergencies and the occurrence of natural disasters” (United Nations, 2006. p.10). The New Zealand Ministry of Social Development as well as government departments, state owned enterprises and local government have responsibilities for ensuring disabled people are not discriminated against, as expressed in the New Zealand Bill of Rights 1990 and the Human Rights Act 1993. The strategic direction and goals for health and disability services are set out in the New Zealand Public Health and Disability Act 2000. The framework for the provision of health and disability services is outlined in the New Zealand Disability Strategy (Minister for Disability Issues, 2001). These Acts and the Disability Strategy need to be taken into account when planning, developing and implementing disaster preparedness planning and recovery responses for disabled people. Research into the experiences of disabled people following the Canterbury earthquakes

provides an opportunity to incorporate lessons learnt into more appropriate responsive emergency management, preparedness, planning and response.

Methods

The following methods were reviewed and approved by the Massey University Human Ethics Committee. The research involved qualitative inquiry using purposive sampling and face to face interviews with 23 disabled people living in Christchurch during the earthquakes, together with four agency representatives. Initial interviews took place with 12 vision impaired participants in January 2011 who were recruited through the Christchurch branch of the Association of Blind Citizens. Eight of the vision impaired participants were re-interviewed in February 2012, about how a year of earthquakes had impacted upon their lives. In April 2011 four representatives from the same disability support agency were interviewed about how the earthquakes had impacted upon their organisation and clients.

In March 2012, the qualitative research was extended to any disability, resulting in a further 11 research participants being interviewed in April of 2012. These participants were recruited through contacts provided by the Office for Disability Issues within the Ministry of Social Development and through cold calling disability advocacy groups and inviting them to nominate a spokesperson to contribute to the research. None of the individuals or organisations approached declined to participate in the research.

In total, 12 of the people interviewed were male and 15 female. Respondents' ages ranged between 20 to over 80 years of age with the most common groupings in 40-49 year old ($n = 9$) and 70-79 year old brackets ($n = 6$). Five of the people interviewed had more than one impairment. Audio-taped interviews lasting up to 90 minutes took place in participants' own homes. The same interviewer conducted all of the interviews, reviewed the information sheet, explained to participants their rights and answered any questions. All participants signed a consent form. Interview transcripts were transcribed verbatim and participants given pseudonyms to ensure confidentiality.

The qualitative research was followed by a pilot quantitative survey conducted in May 2012. This involved a further 25 disabled people living in Christchurch during the earthquakes and 10 people who worked in the disability sector. Prior to administration, the survey

was peer reviewed by staff from the Office for Disability Issues within the Ministry of Social Development. Survey respondents were recruited at a symposium on disability inclusive emergency preparedness and response, which was organised by the Ministry of Social Development and held in Christchurch on the 28-29 of May, 2012¹. Surveys were accessible in large print format and electronically. One disabled person chose to complete the survey electronically. A Christchurch-based reader/writer was also available to help respondents to complete the survey with three disabled people taking up this option. Participants who used a reader/writer signed a consent form after being taken through the information sheet attached to the front of the survey.

The survey included forced response, 5 point Likert scale and short answer questions. Thirteen of the survey respondents were male and 20 female. The average age of the survey respondents was 48 with the range between 21 and 64 years of age. Five people stated that they had more than one impairment and five surveys had missing data relating to the gender and stated disability questions on the survey.

Qualitative interview material was analysed using thematic analysis (see Braun & Clarke, 1996) and quantitative data was analysed using descriptive statistics. Comments written in the short answer sections of the survey, as well as notes written in survey margins by the participants, were included as additional data for qualitative analysis. These data were manually coded alongside interview transcripts and arranged into themes. Themes were then analysed in relation to literature concerning disability and disaster response and recovery. Although meaningful and capturing the important issues for this population of disabled people, the sample cannot be said to be representative of the larger population of those with disabilities.

Results and Discussion

The Hyogo Declaration is used in Aotearoa/New Zealand as one of the key frameworks for disaster risk reduction. The framework encompasses five action areas and a

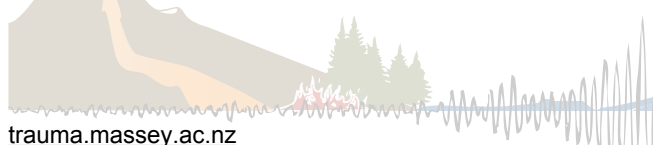
¹ The symposium was organised to discuss how to develop disability inclusive emergency preparedness and response initiatives through learning from the Christchurch earthquakes. The symposium was attended by over 150 people, participants included members of the disability community, NGOs, Civil Defence Emergency Management, the Accident Compensation Corporation, the Canterbury District Health Board, the Christchurch City Council and the Fire Service (Office for Disability Issues, 2012a). The Office for Disability Issues within the Ministry of Social Development took responsibility for issuing invitations and publicising the symposium among disability groups within Christchurch.

range of priorities aimed at mitigating natural hazards including promoting awareness, increasing knowledge, facilitating better preparedness, and creating sustainable economic development for communities and nations. The following sections consider issues that are relevant to disabled people in relation to each of the action strategies within the Hyogo Framework for disaster risk reduction.

1. Policy, legislative and institutional frameworks

A focus on policy, legislative and institutional frameworks sets the context for all other action strategies within the 2005 Hyogo Framework for Action. Based on an all of government approach, this requires policy makers to be aware of the consequences of their decisions for disaster risk reduction and mitigation and encourages coordinated action across a range of sectors including for example: emergency management; public planning; infrastructure investment; health; education; employment; housing; transport; welfare; defence; justice; and finance (UNISDR, 2012; 2005). Disaster risk reduction is supported through adopting new, or strengthening existing, legislation, developing both organisational and human capacity and integrating mechanisms for natural hazard mitigation into policy and planning at all levels of government. Political will as well as adequate resourcing is required if legislation governing policy development and implementation in the area of disaster risk reduction is to be effective. This action strategy should recognise the need for organisational change within government so that barriers to promoting and implementing effective disaster risk management policies for policy makers are removed (UNISDR, 2012). Ensuring that disaster mitigation is both a national and local priority requires empowering local authorities and communities to manage and reduce disaster risks by having access to information, resources and the authority to implement actions.

Aspects of the HFA related to coordinated action across sectors, to develop legislation to mitigate disaster risk for vulnerable groups were identified in the inclusion of disability in the Canterbury Earthquake Recovery Act 2011. Parliament passed this 2011 Act, which expires on the 18th of April, 2016, as a temporary response to the greater Christchurch earthquakes. The Canterbury Earthquake Recovery Authority (CERA) was established on the 29th of March 2011 under the State Sector Act 1988 with its functions and responsibilities mandated in accordance with the Canterbury Earthquake Recovery Act 2011. CERA is tasked with leading coordinated



response and recovery in Christchurch (Ministry of Justice, 2014). In July 2011 Cabinet agreed to the incorporation of cross-government initiatives in the Disability Action Plan on the Canterbury recovery for the next 18 months. This document states that the development of the recovery plans, as required in the Canterbury Earthquake Recovery Act 2011, will have regard to the New Zealand Disability Strategy (Office of the Minister of Disability Issues, 2011).

Between 2011 and 2012, Cabinet identified four priority areas for ensuring disabled people were included in the Canterbury recovery (Office of the Minister for Disability Issues, 2011; 2012). The first priority area involved reviewing the design of government service delivery, considering changed individual, community and business circumstances following the Christchurch earthquakes. Identifying and addressing how changing conditions increase vulnerability for disabled people following the earthquakes links with the HFA's focus on recognising and responding to local risk patterns and trends through mitigating conditions that create additional risks for vulnerable people (UNISDR, 2005; 2012). Attention to legislative support for policies that focus on disaster risk mitigation aligned with the Hyogo Framework may be identified in the second priority area within the Disability Action Plan, which focuses on improving the accessibility of the built environment. Initiatives included ensuring that the repair and rebuild of public buildings, houses, roads, footpaths and urban spaces, to enhance safety and accessibility for disabled people and older family members (Office of the Minister for Disability Issues, 2011).

Reducing underlying risk factors through incorporating poverty reduction strategies into policy and planning also forms a key action area within the Hyogo Framework (UNISDR, 2005; 2012). Priority three of the Disability Action Plan addresses high unemployment rates among disabled people through supporting access to employment opportunities in recovery related work. Priority four within the Disability Action Plan recommends using lessons learnt from the Canterbury response to improve emergency preparedness for people with disabilities (Office of the Minister for Disability Issues 2012). This initiative relates to a key objective of the Hyogo Framework which focused upon sharing good practices and lessons learnt in order to improve disaster risk reduction.

The Disability Action Plan may be considered an example of best practice in relation to key objectives in the HFA

which focus upon using legislation to reduce underlying risk factors and to support vulnerable populations. The Building Act 2004 is recognised as a key mechanism for managing hazard risk (Hamilton, 2011). Likewise, The Christchurch Central Recovery Plan requires that all state funded anchor projects, buildings, open spaces, streets and facilities are accessible (Human Rights Commission, 2012). However at the time of writing, it is unclear whether the Christchurch rebuild will deliver a disability accessible city. The New Zealand building code does not mandate disability accessible design standards and the current consents process only encourages developers to adopt generally accessible standards (Human Rights Commission, 2013; Rhodda, 2013). The Human Rights Commission (2012, 2013) has acknowledged that examples of infrastructure rebuilds and repairs that do not meet accessibility standards exist and that there is private sector resistance to providing accessible facilities. Disabled people have also found that some of the new developments within the city are not disability accessible (Rhodda, 2013; Stylianou, 2012). Rebuilding a city that is not fully disability accessible is a wasted opportunity to mitigate hazard risk by avoiding conditions of vulnerability for disabled people that existed prior to the earthquakes.

2. Risk assessment and early warning

The second area of action for disaster risk reduction within the Hyogo Framework focuses upon identifying, assessing and monitoring disaster risks. National and regional risk assessment involves developing indicators of vulnerability to disaster, as well as updating and disseminating natural hazard maps to communities at risk. People-centred early warning systems for those at risk need to be timely and take into account diverse population needs (UNISDR, 2005). Aspects of this action strategy that are relevant to findings from our Christchurch research relate to knowledge of the way in which vulnerabilities change over time as well as developing emergency preparedness information that takes diverse population needs into account.

Following the February 22, 2011 earthquake, environmental conditions altered the range of factors that were creating vulnerability among disabled people. Conditions identified in our research relating to increased earthquake vulnerability include: disruption to infrastructure; inability to access support workers; responding agencies that were not set up to cater for the needs of disabled people; as well as temporary housing and public information that was not disability accessible

(Phibbs, Woodbury, Williamson & Good, 2012). The Canterbury earthquakes have created opportunities for regional emergency management teams to capitalise on increased public awareness of local hazard risks as well as motivation to prepare for an event (Hamilton, 2011). Lessons learnt following the Christchurch earthquakes suggest that increased effort is required to ensure that disaster preparedness planning, response and recovery continues to take into account the needs of disabled people (Phibbs, et al. 2012). These efforts may run against established precedents. For example, Spence, Lachlan, Burke and Seeger (2007) note that the information, and disaster preparedness needs for people with disabilities has been generally overlooked in the literature. Furthermore, disaster preparedness and emergency response systems, public warning systems and advice tend to be designed for people who are able-bodied (Sullivan & Hakkinen, 2006).

For those disabled people who did respond to the September earthquake by thinking about how to prepare themselves for future emergencies, some found that the advice provided by Civil Defence was not appropriate to their situation, because it was too general or made assumptions about people's bodies or lives that did not apply to them. Shane, who has profound hearing loss, made the following comment about Civil Defence emergency preparedness information:

...Round about November [2010] we started preparing ourselves... I found Civil Defence completely useless... because it's not designed for people with a disability (Shane, 2012).

Following the February 22, 2011 earthquake, 17 survey respondents agreed that adequate information was provided by Civil Defence. 15 respondents indicated that the information was inadequate. Twenty respondents agreed that emergency information was easy to access, however responses to a different survey question suggested that this information was not disability accessible. Twenty-six pilot survey respondents either strongly disagreed (10) or disagreed (16) that emergency information took into account the needs of disabled people. Disruption to electricity supply, resulting in an inability to watch television or charge cell phones were cited as key reasons for not being able to access emergency information. Text messaging was a key source of information for people who were deaf while vision impaired people needed to be able to access up-to-date verbal information. Response categories relating to the format and type of information that was

made available to the general public were cited as the next most common barriers to accessing emergency information.

Disabled people also found it hard to find disability accessible local information about changes to bus routes, shop closures or public meetings which would have sign language interpreters. Survey respondents were motivated to write additional comments relating to this question in the margins of the survey including: "Too many phone numbers, no emails" (Disabled Person); "Lack of information written in accessible format" (Disabled Person); "Not easy to access written material" (Disabled Person); "It is OK if you can use a computer" (Agency Representative); "Information on back of phone book for normals" (Disabled Person); "Found it hard to receive advice from someone who understands my mobility issues" (Disabled Person). Identifying this range of barriers to accessing emergency information is instructive for people involved in disaster preparedness planning and response prior to a natural hazard event.

3. Information management, education and training

A third area for action identified within the HFA is the use of knowledge, innovation and education to build a culture of safety and resilience at all levels. Encouraging individuals and communities to take action to prepare for a disaster can be achieved by developing local risk reduction plans, providing clear information to people in high risk areas and ensuring trainers are equipped to disseminate information to a range of different users. Improving the knowledge base for disaster risk reduction requires evidence based research, the use of a consistent language around disaster risk reduction, as well as exchanging information about good practice and lessons learnt from previous events. The impact of disasters can be substantially reduced if people are well informed and motivated towards a culture of disaster prevention and resilience. Creating a culture of disaster risk reduction involves targeting school curricula, fostering community development initiatives as well as embedding awareness of disaster risk reduction within government and non-government agencies. It is important to consider that vulnerable communities are entitled to expect equitable access to appropriate disaster preparedness training and educational opportunities (UNISDR, 2005). Findings from our Christchurch research suggested that for the majority of disabled people personal emergency preparedness planning was inadequate.

Preparedness can be an effective indicator of post-disaster resilience (Canterbury Earthquake Recovery Authority, 2014; Paton and Johnston, 2001). Quantitative data from our May 2012 survey supports international research findings that has identified a lack of disaster preparedness among disabled people (Eisenman, Zhou, Ong, Asch & Glik 2009; Rooney & White, 2007). Five of the 25 disabled people that filled out the survey indicated that they had adequate emergency equipment in place prior to the 7.1 earthquake on September 4, 2010. Three out of 25 people indicated that they had developed a workable emergency plan. These results are similar data from a 2008 survey of Canterbury residents which identified that only 13 per cent of the general population had all the items needed for basic preparation² (Canterbury Earthquake Recovery Authority, 2014). The people that we interviewed nonetheless described taking action to ensure that they were better prepared following the September earthquake. The following interview extract gives the example of how Grace, who is vision impaired, reflects on her ability to fend for herself now compared to September, 2010:

[After September] I only had a little round barbeque thing and I had a terrible accident with it because I tried to use it to cook, because didn't have anything to cook with and I put ...the charcoal in it and lit it and then I was tipping the charcoal bag over it to put more on, it caught alight and the whole bag's all going up in flames. And my next door neighbours came running over thinking I've got a fire over here, so they put that fire out and they said "right well, just give us whatever you want to cook and we'll do it on our barbeque and we'll heat water for you and stuff." You know, because I wouldn't go and ask them even though they're next door ...I've always been terribly independent... I've got a big new gas one [BBQ] out there now... I know how to use it so I can use it if I have to... I'm gonna be self sufficient so that's fine.

Acquiring and having the confidence to use a new gas barbeque was associated with being able to maintain independence and to be self-sufficient should another earthquake occur. After the non-fatal September 2010, earthquake survey respondents reported changes in individual preparedness as well. At the time of filling out the survey 32 participants indicated that they felt more prepared for an earthquake than they were prior to September 2010. The following bar chart provides

² The Canterbury Earthquake Recovery Authority (2014) defined basic preparation as a three day supply of food and water and a household emergency plan.

an overview of the range and type of actions taken to prepare for an emergency following the September earthquake among disabled people who were surveyed in May 2012.

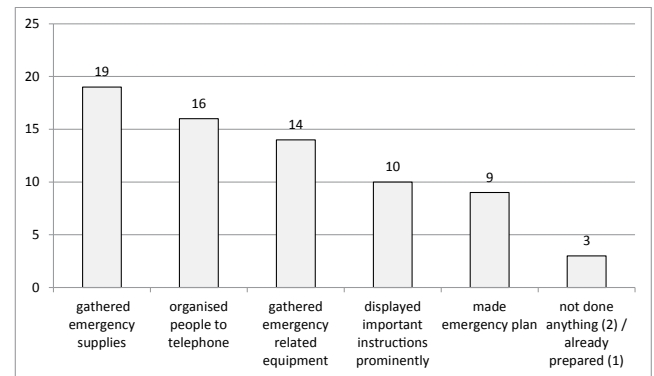


Figure 1. Actions taken to ensure emergency preparedness following the 4 September 2010 earthquake (n = 25)

Most disabled people surveyed (92%) indicated that they had either: put together emergency supplies or equipment (22); organised people to telephone (16); and/or put in place an emergency plan (9). Twelve people had taken one or two actions and 10 people had taken 3-5 actions to ensure preparedness. Twenty two (88%) of the 25 disabled people surveyed in 2012 felt that they were somewhat prepared (11) or well prepared (11) for an earthquake. Seven of the disabled people who had taken four or more actions to ensure emergency preparedness indicated that they felt well prepared for an earthquake. Additional comments written by disabled people in the survey margins, which indicated that they were actively involved in preparing and responding to a disaster, included: "prepared in February but not enough water" and "we had to restock due to [supplies] being used". These figures for post-earthquake preparedness among disabled people compared favourably with 2012 figures for emergency preparedness in Canterbury, from Statistics New Zealand (2013) which identified that 40 per cent of all households met the basic emergency preparation requirements.

Engaging in activities to ensure emergency preparedness would foster resilience (Paton & Johnston, 2001) as well as increase the likelihood of being able to shelter at home following an emergency. Taking action to prepare for an emergency indicates that the majority of participants expected that they would be able to look after themselves in the wake of a natural hazard event. Severe disruption to infrastructure, including roads, shopping facilities and public transport, meant that most disabled people needed help to replenish their

emergency supplies between earthquakes. Disabled people who answered the May 2012 survey reported that cost was the main barrier to accessing emergency supplies. Disabled people are more likely to experience poverty and disadvantage (World Health Organisation, 2003) and this is identified as a key underlying risk factor for exposure to hazard events and for the erosion of resilience in the post disaster period (Mileti & Gailus, 2005).

4. Reduce the underlying risk factors

A fourth area for action within the HFA (UNISDR, 2005) focuses upon reducing the underlying risk factors in three key areas: environmental and natural resource management; social and economic development; and land use planning. Sustainable management of ecosystems is needed, through integrated resource management programmes that are cognisant of disaster risk reduction as well as the impacts of climate change. Incorporating disaster risk assessment into urban planning as well as the design and placement of infrastructure will reduce exposure to future disasters. Hazard mitigation involves strengthening public facilities and infrastructure including schools, hospitals, communication and transport lifelines - so that they are able to continue operating following a disaster. In order for communities to be resilient, a comprehensive social security safety net is needed that protects vulnerable people from poverty and is able to respond appropriately to populations affected by a disaster. Spreading risk through insurance and reinsurance against natural hazards and developing public private partnerships to foster a culture of disaster prevention are also included in this area for action (UNISDR, 2005).

For effective implementation of action strategies two and three within the HFA, an understanding of social, economic and environmental vulnerabilities to disaster is also required (UNISDR 2005; 2012). In March 2011 the New Zealand Government submitted its first report on implementing The United Nations Convention on the Rights of Persons with Disabilities. Ongoing challenges identified in that report include continuing disadvantage and poor outcomes in health, education and employment. Disabled people also experience discrimination, physical and environmental barriers, as well as difficulties accessing services (Office for Disability Issues, 2011b). Health status and socio-economic status are important determinants of earthquake vulnerability but little is known about how these factors increase exposure to hazards or impact

upon recovery needs (Chou, Huang, Lee, Tsai, & Chen *et al.*, 2004). Disabled people are more likely to be poor and to live in low income neighbourhoods, both of which are risk factors for earthquake vulnerability and the erosion of resilience during the disaster recovery phase (Paton, 2000). Financial hardship increases stress, erodes resilience and prolongs dependency. Many disabled people that we interviewed talked about extra expenses incurred that were not recognised or reimbursed, such as replacing medicines or personal items that were lost in the earthquakes and increasing transport costs. Fear of using public transport, in case another major aftershock left them stranded, and closure of local services meant that many disabled people used taxis to travel to appointments and to the supermarket. Rāngimarie, who has cerebral palsy and uses a power chair, stated that having to travel longer distances to access services meant that:

...the cost of transport became horrendous... I had to close my insurance because it got too expensive. So I'm putting money aside for that. I used to have insurance, but now it's too ... expensive (Rāngimarie, May, 2012)

In a situation where several large earthquakes occurred over the course of a year the inability to afford personal insurance potentially increased Rāngimarie's financial exposure to risk. Rāngimarie's home was destroyed in the February 22 earthquake and she was forced to relocate to temporary accommodation in another part of the city. In May 2012 Rāngimarie reported that finding a disability accessible home was still proving difficult:

I'm still waiting for an accessible house, but I'll be waiting for a while... I can't afford market rates... so social housing is my only option.

Rāngimarie's experiences in relation to the Christchurch earthquakes are consistent with international literature which suggests that people who are sick, moderately physically disabled or otherwise vulnerable and/or who live in poverty are more likely to be impacted by a disaster (Chou *et al.* 2004; Klinenberg, 2002). They are also less likely to have access to the social and economic resources necessary for recovery (Klinenberg, 2002). An epidemiological study by Chou *et al.* (2004), for example, identified that people with moderate disabilities, those with mental disorders or who had been hospitalised in the week prior to the 1999 Taiwan earthquake, were most at risk of injury. The degree of vulnerability increased with decreasing monthly wage. Disabled

people are also more likely to have high health care needs, to live alone (Office for Disability Issues, 2011a; Spence, Lachlan, Burke, & Seeger 2007), to be unable to respond quickly during an emergency (Chou *et al.* 2004) and to be reluctant to evacuate, due to concerns that emergency shelters will not be able to meet their needs (Rooney & White, 2007). In our research 32 of the survey respondents also reported that they had reservations about evacuating to a welfare centre. Key concerns included lack of disability accessible buildings, facilities and services as well as other people's attitudes towards disabled people.

5. Strengthen disaster preparedness and response

The fifth and final area for action, strengthening disaster preparedness for effective response at all levels, incorporates the need for coordinated action so that authorities, individuals and communities are well prepared and ready to act. Included in this aim is that individuals, communities and agencies are equipped with knowledge and capacities for effective disaster management. Fostering a holistic approach to disaster risk reduction requires consolidating institutional capacities for local emergency management, evaluation, policy, practice and readiness - both within and between the emergency management sector, local communities, relevant agencies and institutions. Adequate funding, ongoing dialogue as well as regular disaster preparedness exercises are needed to develop capacity among agencies responsible for risk reduction readiness and response (UNISDR, 2005). Within this action strategy the requirement to review disaster preparedness policies and plans with a particular focus on the most vulnerable groups is particularly relevant to the current research.

In 2011 New Zealand submitted an interim report outlining national progress on implementing the HFA between the years 2009-2011 (Hamilton, 2011). The National Civil Defence Emergency Strategy aimed to develop a "resilient New Zealand" with communities understanding, managing and responding to their hazards (Hamilton, 2011. P. 6). Since the Christchurch earthquakes, progress has been made in documenting (Office for Disability Issues, 2012b) and in incorporating lessons learnt into New Zealand's national emergency management frameworks (Ministry of Civil Defence and Emergency Management, 2013). The Ministry of Civil Defence and Emergency Management, for example, now has a disability accessible website, and

Civil Defence has developed a wider range of disability accessible preparedness information (Ministry of Civil Defence and Emergency Management, 2014).

The challenge is to improve risk management and disaster mitigation processes and to maintain capacities for emergency response and recovery for vulnerable groups across all sectors. For disabled people, socio-economic factors are significant drivers of vulnerability, suggesting that an all of government approach to poverty reduction strategies is needed in order to mitigate disaster risk. Across the emergency management sector, human rights and equal opportunities legislation relating to people with disabilities still needs to be taken into account for developing policies and delivering programmes related to emergency preparedness and response. In order for the disabled community to be well prepared and ready to act, further work is needed to develop participatory and collaborative approaches that engage stakeholders within the disability sector in strategies for disaster risk reduction, as well as in emergency management and planning. This requires an ongoing effort to incorporate inclusive disaster mitigation, preparedness and response initiatives across natural, built, social and economic environments that take into account the needs of disabled people.

Conclusion and Recommendations

The HFA for Disaster Risk Reduction includes attention to vulnerable communities and groups. It is timely to consider how disability issues may be relevant to the action strategies and priorities within the HFA, given that this international framework was under review at the time of writing, and due for renewal in 2015. Research into the experiences of disabled people during the Christchurch earthquakes provides information related to disability inclusive emergency preparedness planning and response that has wider relevance to international organisations as well as government agencies both within and beyond New Zealand. Local and international research has identified that disabled people are more likely to experience poverty and disadvantage. Deprivation is a key underlying risk factor for exposure to hazard events and for the erosion of resilience in the post disaster period. Community recovery following the Canterbury earthquakes provides an opportunity to improve pre-disaster conditions, through integrating a disability accessible built environment into the reconstruction of the city. Individuals, communities and responding agencies could learn from the experiences

of disabled people, in order to develop emergency preparation and response initiatives that enhance opportunities for autonomy among vulnerable groups.

This research has identified that additional disaster risk reduction strategies are needed, to enhance opportunities for disabled people to maintain their independence in an emergency situation. Recommendations arising from the current research include:

1. Work with stakeholders within the disability community to identify ways to increase disaster preparedness among disabled people.
2. Review emergency management disaster preparedness and response policies, plans, infrastructure, facilities services and information resources with a particular focus on the needs of disabled people.
3. Address underlying risk factors through implementing poverty reduction strategies and improving accessibility to the build environment for disabled people.

Findings from this research have wider relevance to other groups that are also identified as vulnerable to earthquake hazards, such as the elderly and children. Further research is needed on how disability and socio-economic status increase exposure to hazards and impact upon recovery needs. Additional research is also needed on how disabled people prepare for and respond to disasters, as well as how they are included in recovery related initiatives.

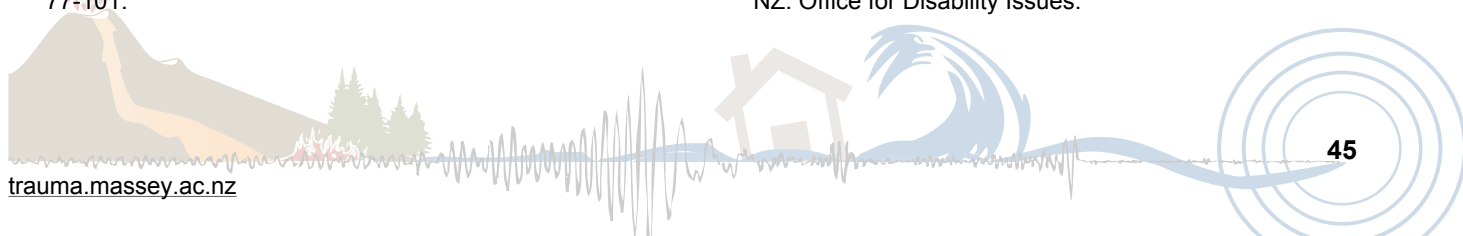
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