Natural Hazards, Human Vulnerability and Disabling Societies: A Disaster for Disabled People?

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Abstract: The policy and research literature on disaster management constructs disabled people as a particularly "vulnerable group." In this paper, we combine concepts from disaster theory and disability theory to examine this assumption critically. Drawing on primary, secondary and tertiary sources, we assess the vulnerability of disabled people in two globally significant disasters: Hurricane Katrina in August 2005 and the Asian tsunami of December 2004. In both cases, disabled people were adversely affected in terms of their physical safety and access to immediate aid, shelter, evacuation and relief. Using a social model analysis we contest the view that this vulnerability arises from the physical, sensory or cognitive limitations of the individual and show how it may be attributed to forms of disadvantage and exclusion that are socially created. The paper concludes that "natural hazards" are realised disproportionately as "human disasters" for disabled people, and most notably for disabled people in poor communities. Social model approaches and strong disabled people's organisations are key to building greater resilience to disaster amongst "vulnerable" communities in both high-income and low-income countries.

Key Words: natural hazard, vulnerable groups, social model

The unprecedented human disaster that followed the Asian tsunami drew global attention to environmental vulnerability in poor coastal communities throughout the world. In the aftermath of Hurricane Katrina we have begun to understand more clearly the global dimensions of this vulnerability and its relationship to patterns of social inequality. Disabled people are defined as a particularly "vulnerable group" in this context, yet this vulnerability is rarely theorised or explained.

Debates about the disabled people's presumed vulnerability must be framed within the historic shift from individualised interpretations of disability to those focusing on social barriers and human rights. Traditional perspectives, based on assumptions of individual limitation, have shaped the construction of disabled people's vulnerability to natural hazards as tragic yet unavoidable. However, individual model approaches have been challenged in other fields by the activism of the disabled people's movement and the development of a social model approach (Charlton, 1998; Fleischer & Zames, 2001; Oliver, 1990; Priestley, 1998). The application of this approach to disabled people's vulnerability in disaster situations is therefore central to the analysis we present in this paper.

Human Vulnerability and Environmental Risk

In order to understand vulnerability in disasters, it is important to understand the reciprocal relationship between human populations and environments. Thus, the environment itself needs to be understood as "a combination and interaction of natural and human systems, which both produce and are affected by global change" (Klein, 2006). Within this context, the increasing vulnerability of human habitats and livelihoods to climatic hazards must also be seen as socially produced. The idea that vulnerability to natural hazard is socially created is by no means new, and is particularly evident in human geography and political economy analyses

(Blaikie, Cannon, Davis, & Wisner, 1994; Cutter, Boruff, & Shirley, 2003; Cutter, 1996, 2006; Dow, 1992; Liverman, 1990; Timmermann, 1981). Such approaches have generated increasing interest in non-climatic social factors and policies, rather than purely science-driven approaches to vulnerability (Füssel & Klein, 2002, 2006 in press).

In a similar way, the International Disaster Reduction Strategy defines vulnerability as, "The conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards" (United Nations & International Strategy for Disaster Reduction, 2004). This is the definition incorporated in the Hyogo Framework 2005-2015. From this perspective, human vulnerability to natural hazard is framed by social organisation and "by everyday patterns of social interaction and organisation" (Morrow, 1999: 2). Thus:

> "Some patterns of consumption, production and development have the potential for increasing the vulnerability to natural disasters, particularly of the poor and socially disadvantaged groups. However, sustainable development can contribute to reduction of this vulnerability, if planned and managed in a way to ameliorate the social and economic conditions of the affected groups and communities" (International Strategy for Disaster Reduction, 1994).

Looking at the problem in this way, it is easy to see the connection with a social model analysis of disability. Just as disability is no longer perceived as a natural consequence of impairment, within the social model approach, so human disaster is no longer seen as a natural consequence of environmental risk. In contemporary social theory, the causes of both disability and disaster are increasingly viewed as socially produced. By synthesising these approaches it is then possible to deconstruct and reconstruct the specific vulnerability of disabled people in disaster situations.

If human vulnerability to natural hazard can be socially produced, then socially disadvantaged groups are likely to be disproportionately affected. Recent climate change agreements (such as Hyogo, Kyoto, and Gleneagles) highlight the specific vulnerability of poor communities and the Millennium Development Goals suggest a clear link between global poverty reduction and reduction of climate change vulnerabilities (see Yamin, Rahman, & Huq, 2005).

Disabled people constitute a significant proportion of the poorest communities in both low and high income countries, and up to 80% live in low-income countries, often in disaster or conflict-prone areas of the world (Asian Development Bank, 2000; Department for International Development, 2000; Elwan, 1999). Yet the concept of vulnerability is a complex one and cannot be considered simply as a proxy for poverty. It is also a function of coping, resilience and adaptability within communities:

> "Communities are not homogenous. Sharing climate impacts or threats does not imply that each member of the community is affected in the same way as all others. Whether small or large, communities are highly differentiated in terms of access to resources and factors such as age, gender, class and ethnicity and these differences are highly significant to the vulnerability and adaptive capacity of particular individuals" (Yamin et al., 2005: 2).

In summary, just as disability is not the inevitable outcome of functional impairment, human "disaster" is not the inevitable outcome of natural "hazard." Rather, disabled people's vulnerability to human disasters is embedded within social structures, institutional discrimination and the presence of environmental barriers. The combination of these factors leads us to hypothesise that the presumed vulnerability of disabled people to natural hazards can be usefully explained from a social model perspective. Our analysis uses evidence of risk and vulnerability in relation to two recent case studies. Elsewhere we explore the implications of this analysis for longer-term recovery, disaster preparedness, and the rebuilding of inclusive communities (Priestley & Hemingway, 2006). Here, we focus on explaining the situation of disabled people during the acute phase of immediate impact and disaster response.

Case Studies and Methods

One of the significant paradoxes of global climate change is that environmental hazards, particularly hydrometereological hazards, are becoming both more likely and less predictable (McCarthy, Canziani, Leary, Dokken, & White, 2001). At the same time, the proportion of people living in coastal areas has risen dramatically (around 23% of the world's population lives within 100 kilometres of the coast, predicted to rise to around 50% in the next 25 years). In the tsunami-affected countries, coastal vulnerability was increased by many factors - including population growth, economic dependency on Western coastal tourism, low-cost building design, over-fishing, coral erosion, mangrove deforestation, and the absence of an Indian Ocean tsunami warning system. Similarly, the vulnerability of New Orleans to Katrina's impact had been exacerbated by economic development in high risk areas, by draining coastal swamplands, and by under-investment in ageing flood defences (Bohannon & Enserink, 2005; Travis, 2005). These social and economic developments increased vulnerability to hazard particularly for poorer communities with less resilient social infrastructures (Adger, Hughes, Folke, Carpenter, & Rockstrom, 2005).

Between August 25 and 29, 2005 Hurricane Katrina struck Florida and the Gulf States of Louisiana, Mississippi and Alabama. Whilst the strength of the storm did not exceed that of Hurricanes Wilma and Rita, the scale of damage was immensely greater, as the accompanying storm surge flooded low lying areas of the city of New Orleans. Official figures suggest that around 1,300 people lost their lives and that more than a million were displaced from their neighbourhoods. As a natural hazard Katrina was by no means unique; as a human disaster it was unprecedented for a high income country like the United States.

On December 26, 2004, the Sumatra-Andaman Islands earthquake created tsunamis in the Indian Ocean that wreaked devastation around the South Asian coastline. Although registering 9.0 on the Richter scale, this was only the fourth largest earthquake since 1900 yet it resulted in unprecedented loss to human lives, livelihoods and communities in eleven countries. Estimates suggest that up to 275,000 people may have been killed and that more than a million people remained displaced a year after the event (US Geological Survey, 2005).

In both Katrina and the tsunami, disabled people appeared to be over-represented in local populations. For example, the prevalence of congenital impairment in the Nicobar Islands had been high amongst indigenous people, compounded by recent polio outbreaks (Chari & Padmanabhan, 2005) whilst US Census data reveals that the communities affected by Katrina had significantly higher numbers of disabled people than the national average (e.g. in 2000 more than 20% were recorded as disabled in New Orleans, St Bernard, Jefferson, Hancock and

Jackson). In order to investigate disabled people's vulnerability in these two disaster scenarios we draw on a wide range of data sources.

In a systematic review of research abstract databases we identified 180 articles addressing disability and disaster. These were dominated by research that focused on the psycho-emotional dimensions of post-traumatic stress disorder or on the epidemiology of acquired physical impairment, whereas studies of disabled people's vulnerability, or the social impact of disasters upon them, were very few. By contrast, there was evidence of an emerging "grey" literature that recognises the value of social model approaches, or the role of disabled people's organisations as agents of resilience and change within disaster zones (Blanck, 1995; Center for International Rehabilitation, 2005; Kett, Stubbs, & Yeo, 2005; Wisner, 2002).

In addition to policy documents produced by government agencies and international donor organisations, we were able to review evaluation reports, policy documents and websites from a wide range of practice-based and advocacy organisations (it is relevant to note that these reviews were conducted between September and December 2005 and that new documents emerged throughout the period). Numerous media reports, press releases and online discussion contributions were also used to identify how disabled people were affected or responded. Primary data was generated through direct contact with key informants in 18 organisations involved in the Katrina or tsunami recovery effort. These included international co-ordinating organisations, international donor organisations, disabled people's organisations, US government and state agencies, and local service providers or community-based projects. The following analysis draws on these diverse sources of evidence first to illustrate the immediate impact and second the initial response.

Immediate Impact

Evidence from previous disasters suggested that disabled people are at greater risk of injury, mortality, disease, destitution and displacement when compared with the general population, while new injuries also swell the disabled population (California Department of Rehabilitation, 1997; Lathrop, 1994; Smith, 2001; World Health Organisation, 2005a). From an individual model perspective, this "vulnerability" is generally taken to imply limited physical or cognitive ability to escape from hazard. However, as recent studies have begun to show, disabling barriers to survival and relief have a significant impact - mirroring those encountered by disabled people in everyday life. For example, experiences from the 9-11 attacks in New York showed how inaccessible warning signs and blocked escape routes impacted directly on those with sensory and physical impairments (Byzek & Gilmer, 2001; Nobody Left Behind, 2004). More generally, Chou et al. (2004: 694) conclude that the "the impacts of a disaster are not random" and can "disproportionately affected sick, moderately disabled, and poorer people."

Reporting on the tsunami, the WHO (2005b) note large numbers of permanent injuries resulting from building collapse and flood debris (e.g. spinal cord injury). However, the worst affected areas saw more fatalities amongst disabled people and fewer new impairments (e.g. Kett et al., 2005). Thus, the mortality rate amongst disabled people in Aceh (Indonesia) and the Andaman and Nicobar Islands (India) appears to have been greater than in Thailand or the Indian mainland, where newly-acquired impairments appear to have been more common (Center for International Rehabilitation, 2005: 5). Disabled people seem to have been particularly vulnerable, and graphic eye-witness accounts were widely reported in the media (e.g. at the Sambodhi home for disabled people in Galle, Sri Lanka, where most of the residents died).

All but two respondents to our own consultation considered disabled people more badly affected than the general population. In both the tsunami and Katrina, disabled people left behind had died waiting for help, but there were also differences. For example, in the USA greater reliance on electrical technologies raised new risks that were not reported in tsunami-affected communities. Cuts in electrical power were known to have disabling, sometimes life threatening, implications for people using electric wheelchairs or respirators following the 1994 Northridge earthquake (Lathrop, 1994) and similar consequences were evident during Katrina. Browne (2005) highlights the risk to those using dialysis, while respondents to our consultation reported that, "Many people died in hospitals and nursing homes because they were dependent on power supplies that gave out during the storm" (questionnaire response, Advocacy Center, Louisiana).

Whilst examples are easy to obtain, systematic data remain at best patchy and at worst non-existent. Some agencies specifically sought to identify disabled survivors. For example, following the tsunami in Sri Lanka, Child Vision identified more than five thousand disabled people in the Eastern province (TamilNet, 2005) while the Department of Census and Statistics surveyed those newly disabled in Grama Niladhari divisions (2005: 5). However, few relief organisations included disability in their evaluation methodologies. For example, the Tsunami Evaluation Coalition (TEC) was established to provide a generic approach and to optimise shared learning. At the time of writing (December 2005), eleven evaluation reports were available yet no reference to disability was made in nine of these (other than passing references to "vulnerable groups"). Specific reference in the other two focused only on inaccessible latrine design in shelters and only one consortium highlighted disability issues more generally – concluding simply that, "All agencies have not sufficiently taken this on board" (Rawal et al., 2005: 44).

Where data have been collected there is evidence that disabled people's lives were put adversely at risk, not simply by individual limitations but by social and environmental factors. These included the vulnerability of buildings and facilities used by disabled people, an absence of specific evacuation plans, inaccessible warning information, lack of accessible evacuation transport, failure of backup systems, and sometimes, the actions of neighbours, staff and rescue workers. This evidence suggests that even at the most basic level of survival it is important always to view "vulnerability" in social model terms and to consider what might be done to balance the risks for disabled and non-disabled people more evenly.

Barriers to Shelter and Relief

Social and environmental barriers also disadvantage disabled people in accessing shelter and basic relief during the acute phase (McClain-Nhlapo, 2005) and evidence from the two case studies illustrate how disabled people were often excluded from full participation and equality in these areas. Where there are barriers to accessing formal information or shelter, disabled people may also be overlooked in the distribution of essentials such as food, water, medical care and other basic relief (Wisner, 2002), especially if they have been omitted from emergency registration systems (Oosters, 2005). Information can save lives, conserve resources and reduce anxiety in disaster situations but top-down approaches can be problematic (Wisner, 2002). Communication in accessible formats is therefore important (a U.S. Federal Communications Commission (FCC) requirement), yet barriers to information were widely reported with deaf people amongst the most excluded (National Organization on Disability, 2005). Despite available guidance on shelter accessibility (e.g. SEEDS, 2001) frequent difficulties were

encountered by wheelchair-users and people with visual, hearing or cognitive impairments (HIC, 2005; Kett et al., 2005). Where disabled people were able to access shelters or temporary living centres, latrines were often inaccessible to those with mobility impairments (Center for International Rehabilitation, 2005; Mashni, Reed, Sasmitawidjaja, Sundhagul, & Wright, 2005; Rawal et al., 2005). Inaccessibility combined with lack of knowledge meant that, in some areas, "…Disabled people were being turned away from relief camps despite the high levels of resources and numerous references to the need for disability access in humanitarian relief documents" (questionnaire response, DfID). Since shelters and temporary living centres are key providers of other relief this raises considerable concerns for the basic safety and welfare of disabled survivors:

> "The lack of accessibility created not only problems for the immediate need of shelter, but also other problems of access. To the extent that additional relief services, such as food distribution or medical services, were concentrated through the shelters, these services also became inaccessible" (Center for International Rehabilitation, 2005: 6).

Distribution services may also be biased in unexpected ways. For example, HelpAge expressed concern when emergency food packages did not cater for the dietary requirements of tsunami survivors with diabetes or high blood pressure (Mudur, 2005).

In the U.S., the immediate needs of disabled people were known from earlier emergencies. For example, in the wake of the 1989 Loma Prieta earthquake, the San Francisco Disability Program drew attention to issues of communication, mobility, and shelter accessibility (Imperiale, 1991). After Hurricane Katrina, there was less direct criticism of physical accessibility in shelter design. However, there were access difficulties with temporary accommodation and trailers provided by FEMA (questionnaire response, unnamed state agency, Louisiana). Disabled people were also discouraged from reporting to shelters and urged to call "triage" telephone lines with requests for accessible accommodation (access to federal relief assistance was also contingent on prior registration of disability status).

To summarise, there was considerable evidence from evaluation reports, relief agency sources and key informants that disabled people were disadvantaged in the delivery and design of immediate relief due to physical and social barriers. This evidence, and the illustrative examples, suggests that disability issues remain inadequately integrated in relief and planning. Relief agencies and managers therefore require mechanisms for mobilising the rapid involvement of disability expertise to ensure equity of provision to disabled people.

The Role of Disabled People's Organisations

Shaw and Goda (2004: 21) highlight the importance of local communities in relief and recovery. Using examples from the Kobe earthquake, they point to the effectiveness of information, knowledge, leadership and technologies within community-based organisations. More specifically:

> "Organizations with a history of specialized service delivery to the disability and aging populations have built their reputations on unique and credible connections trusted by the people they support. Their refined skill-sets and expertise represent

a unique know-how and understanding that is a valuable, but often overlooked, source of knowledge. These organizations must be included as partners during emergency planning, preparedness, response, recovery and mitigation activities" (National Organization on Disability, 2005: 3).

In the context of this paper, the significance of this expertise extends beyond the local to the wider international disabled people's movement. Indeed, a distinctive feature of the two case studies, when compared to previous disasters, was the rapid response capacity of disabled people's organisations and their support networks.

Although there was little evidence of early targeted assistance to disabled people from mainstream relief organisations in either case, disability organisations moved quickly to fill gaps. However, they did not share in the "over-funding" reported by other international NGOs and, with limited resources, exploited peer-to-peer requests for support. For example, within days of the tsunami Disabled People's International (DPI) had established a relief fund, via its Asia-Pacific Regional Office in Thailand, while DPI assemblies in Japan and Indonesia were already assisting disabled people in affected areas (DPI Indonesia also opened two "Awareness Aceh" crisis centres in Jakarta). Relief funds were also established locally (e.g. by the Spinal Injuries Association of Sri Lanka) while offers of prosthetic or mobility devices were also common (e.g. donations from the California-based Free Wheelchair Mission or the Society for the Disabled of Phuket).

Internet contacts within the disability movement were significant and rapidly exploited, with disability activists and their allies utilising existing websites and global email networks within the first 24 hours. Using Internet searches, websites and mailing lists we were able to locate numerous examples of self-initiated offers and requests from disabled people's organisations in affected and non-affected countries. The rapidity of these peer-to-peer interventions (the majority logged within one week of the event) and their international reach (e.g. email lists reaching 50-100 countries) indicates both the readiness and extent of global disability action networks that can be exploited in emergency situations.

In response to Katrina, disability organisations were also quick to establish specific relief funds, from Paralyzed Veterans of America and the National Alliance for the Mentally Ill to the International Association of Assistance Dog Partners. Email discussion groups and informal websites, like http://katrinadisability.info, were launched to locate and support disabled people displaced in the disaster, and to match offers of expertise with requests for assistance. These community-led initiatives were often distinctive from mainstream relief efforts in adopting a social model, legal rights or independent living approach (e.g. in facilitating access to disability advocates, legal rights attorneys, disability access consultants, assistive technology specialists, personal assistance services, etc.). Within two weeks, rapid response teams from the National Organization on Disability's Emergency Preparedness Initiative had assessed response and recovery issues for disabled people and other "special needs populations" (NOD 2005). The initial report, noted "systemic failures" at all levels of government and concluded that disabled populations were "woefully under-prepared" for the emergency.

By contrast, community-led organisations at the local level were targeting disabled people's needs. For example, the Louisiana Association of the Deaf collected funds and supplied video phones while Centres for independent living in Shreveport, Baton Rouge, and Lake Charles were assisting evacuees and calling for supplies (those in Biloxi, Mississippi and New Orleans were damaged or destroyed). This active engagement led at least one organisation to

conclude that the "best shelters were run by the community not FEMA or the Red Cross" (questionnaire response, Families Helping Families, Louisiana).

To summarise, there was considerable evidence in both case studies of the readiness and capacity for disaster response among disabled people's organisations and community-led advocacy organisations. This readiness was reflected in informal networks of support and communication and in specific forms of disability expertise that were not readily available within the mainstream disaster response systems.

Conclusion

Disabled people have been made more vulnerable to natural hazards through historical processes of exclusion and impoverishment. As a consequence, their experience of disaster may be more acute and long-standing than non-disabled populations. These effects are accentuated in poor communities throughout the world where disabled people remain amongst the poorest of the poor. Moreover, when disaster strikes, disabled people encounter inequities in access to shelter or relief and are often excluded from full participation in response and recovery.

The analysis in this paper suggests that there is considerable mileage in applying a social model of disability perspective to the assessment and evaluation of disabled people's vulnerability in disaster situations. In particular, important distinctions between "impairment" and "disability" mirror the established distinction between "natural hazards" and "human disaster." The synthesis of concepts from disability and disaster theory is productive in exposing a critique of medically-driven assumptions about disabled people's "natural" vulnerability. Examining vulnerability from a structural, socio-economic, perspective reveals how inequalities within societies can be as significant as those between them. Whether in Aceh or Louisiana, there must be concern that disabled people remain amongst the poorest of the poor, and that specific vulnerabilities arise at the intersections of disability, class, gender, and ethnicity. Drawing on a wide variety of evidence from the two case studies, and from previous disasters, we conclude that disabled people are disproportionately vulnerable to natural hazards primarily as a consequence of social disadvantage, poverty and structural exclusion.

On a practical level, the research illustrates the very real and heightened risks that disabled people face in disaster zones, including greater risk of death, injury and displacement. As survivors, disabled people may be further disadvantaged by the ways in which immediate information, shelter, evacuation and relief systems are designed and managed. It is also clear that such risks are compounded where there are pre-existing barriers to disabled people's full participation in local communities and their equitable access to appropriate housing, transport, education or service provision. Significantly, the case studies suggest that similar kinds of vulnerability may be experienced in both low-income and high-income societies. We conclude that the structural vulnerability of disabled people to disaster must not be considered only as a problem for developing countries.

One of our key findings was the increasing readiness of the disabled people's movement to respond in disaster relief. Examples from Katrina and the Asian tsunami suggest that centres for independent living, disabled people's organisations and informal networks throughout the world now hold great capacity to respond in disaster situations. Internet communications and the growth of strong community-based organisations have increased this capacity and fostered a new resilience against vulnerability. However, it was also clear that such organisations lacked adequate resources to sustain their contribution and that their expertise was underutilised within

the disaster relief effort. We conclude therefore that improvements in resilience to disaster must include investments in the full participation and equality of disabled people within "vulnerable" communities.

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