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The role of broadcast media in disaster preparedness education; lessons learned in the scientific literature 2002-2012

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Abstract

This paper aims to clarify the role of broadcast media in disaster preparedness education concerning natural disasters such as earthquakes and tsunamis. This is done by means of a systematic review of the scientific literature on this topic over the last 10 years.

The results show that media information is a strong facilitator of awareness of disasters. Preparedness includes action to reduce risks, which also needs community interaction, resources and motivation. It adds to indigenous knowledge and experience of disasters, and may combine self-education by the media, school education and community efforts for disaster risk reduction. An inclusive approach is also called for in order to involve vulnerable groups, such as the elderly or handicapped.

The role of the media is seen in a positive way, such as providing warnings and updated information on the crisis situation, but also in a negative way, such as framing response activities and sensationalizing events, which may result in disseminating an inaccurate picture. In the literature, the role of the media is discussed in relation to the various phases of a disaster.

This paper brings together insights on the topic, identifies the issues addressed and current trends in the scientific literature.

1. Introduction

Initially, the role of the media was seen as informing and warning publics about natural disasters, but in the last few years the media have also been regarded as a mediator, raising awareness of disasters and increasing disaster preparedness. In this paper the role of broadcast media in disaster preparedness education is investigated by overviewing the insights gained over the last 10 years in refereed articles on this topic.

The literature review focuses on preparedness for natural disasters. Different regions are prone to different disasters; for example, a region may have recognized geo-risks, such as earthquakes. This makes preparedness important and also feasible, because one can connect with existing knowledge and experiences in communities.

This paper is a first attempt to bring lessons learned about disaster preparedness education and the use of broadcast media together in the same study.

2. Method

This paper aims to clarify media use in disaster preparedness education by means of a systematic review of the scientific literature published in peer-reviewed journals 2002-2012. The following research questions guided this literature review.

- RQ1. How is disaster preparedness defined in the literature?
 RQ2. What have investigations of previous disasters taught about disaster preparedness education?
 RQ3. What, according to the literature, is the contribution of the broadcast media to disaster preparedness?
 RQ4. What trends are found in research regarding the role of broadcast media in disaster preparedness education?

The search was conducted in December 2012 in multiple databases via EBSCOhost and ProQuest, focusing on peer-reviewed journals. The search fields covered abstracts, titles and keywords, depending on the possibilities offered by the databases. After trying out several search terms, the search words included [disaster] and [preparedness or readiness] and [media, radio, message or broadcast]. The process is explained in table 1. All in all, the initial sample consisted of 392 records. The records were collected in Refworks and scanned for relevance.

The inclusion criteria were that the article dealt with the preparedness or readiness of publics, mentioned broadcast media, and concerned natural disasters such as earthquakes and tsunamis. For example, articles on response, or concerning terrorism or pandemics were excluded. The final sample consisted of 87 articles that were read thoroughly.

Databases	Search words	Number of records
EBSOhost (communication, academic search and e-journals)	[disaster] and [preparedness or readiness]	446
	[disaster] and [preparedness] and [media]	106
	[disaster] and [preparedness] and [radio]	56
	[disaster] and [preparedness] and [message]	58
	[disaster] and [preparedness] and [campaign]	49
	[disaster education]and [media] and [preparedness]	3
	[disaster preparedness] and [broadcast]	6
ProQuest	[disaster] and [preparedness or readiness] and [media or campaign] and [natural]	132
	[disaster] and [preparedness or readiness] and [message]	36
	[disaster] and [preparedness or readiness] and [broadcast]	7
Total of databases	After removing duplicates	392
	Included in the analysis after scanning	87

Table 1. Results of the search

The articles were listed chronologically and coded for the different research questions, using thematic analysis. Some of the articles were relevant to one of the research questions and were assigned one code, while others were assigned more codes according to the number of research questions they dealt with. Relevant data were written down with the help of a predesigned data extraction sheet, including columns for title, informal summary, and the four research questions.

This literature review focuses on articles dealing with severe natural disasters such as earthquakes and tsunamis. Articles about emergency preparedness were included in the analysis, provided they emphasized the use of media. Studies on hurricanes, fires and floods were included whenever they shed new light on the issue of preparedness in natural disasters.

2. Findings

Below, we present the results, reporting how preparedness is defined in the literature, addressing disaster preparedness education and clarifying the contribution of the media, and discussing trends in the literature.

2.1 Preparedness defined in the literature

In the sample, 22 articles illuminated the concept of preparedness by offering a definition or discussing what the concept includes. Half of the articles dealt primarily with this preparedness concept, while the remaining 11 also discussed other topics.

In the literature the concept of 'preparedness' was often used in tandem with 'awareness' (Anderson-berry & King 2005, Ismail-zadeh & Takeuchi 2007). There is no disaster preparedness, if there is no awareness of risk. *Awareness* is related to risk perception; naturally a risk is easier to perceive when there is a history of past experience of disasters (Colten & Sumpter 2009, Paek et al. 2010), but risk perception can also be enhanced via education (Yong-Chan Kim & Kang 2010).

Awareness of natural disasters can be enhanced, or raised by several means, such as information, education and campaigns (Eraybar, Okazaki & Ilki 2010, Koichi Shiwaku & Rajib Shaw 2008, Martel & Mueller 2011). Research studies in Japan have shown that information given to students about the risk of future earthquakes enhanced students' awareness.

Although awareness precedes preparedness (Ismail-zadeh & Takeuchi 2007), it does not automatically lead to preparedness (Rajib Shaw et al. 2004, Koichi Shiwaku & Rajib Shaw 2008). Studies in Japanese schools have proven that self-education and media are good for raising awareness about earthquakes, but have also reported that community and family interaction are necessary to actually being prepared in practice (Rajib Shaw et al. 2004, Koichi Shiwaku & Rajib Shaw 2008).

Rajib Shaw (2004) defines *preparedness* as a willingness to take action to reduce risk (Rajib Shaw et al. 2004). The proposition is that, once the general public is aware of the probability of disaster, preparedness and other preventive actions can then be

implemented (Ismail-zadeh & Takeuchi 2007); this is also called ‘preparation action’ (McClure, White & Sibley 2009).

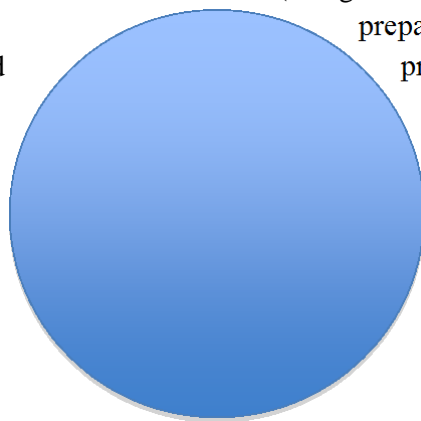
Many researchers see preparedness as something practical (Barnes et al. 2008, Paek et al. 2010, Cloudman & Hallahan 2006, West & Orr 2007), some providing exact lists of items to be acquired in preparation for a given type of natural disaster, such as the ‘ERS’, an earthquake preparedness scale (Spittal et al. 2006). Various measures are listed regarding level of preparedness on the household level, such as having emergency kit, stockpiling medication, knowing the danger areas in the vicinity of the home, the location of shelters and evacuation routes, having family contact information and an escape plan or listening to the weather forecast (Lachlan et al. 2009, West & Orr 2007, Jacob et al. 2008, Nozawa et al. 2008, Tomio, Sato & Mizumura 2012, Tomio, Sato & Mizumura 2011, Burke, Bethel & Britt 2012). In future preparedness guidelines, connectivity should be added, since connecting to the internet is “as important as having batteries and bottled water” (Procopio & Procopio 2007: 85).

Researchers have various ways of explaining the association between awareness and preparedness. Figure 1 shows various explanations. Awareness and preparedness are conceptualized as two parts of a circle, complementing each other. Awareness of the perceived risk increases willingness to prepare (Martel & Mueller 2011). Awareness, both on the individual and collective level, is a starting point for behavioral change in preparedness. Knowledge about disasters, such as newspaper stories on disasters (Smith et al. 2007), is not enough to bring change: knowing how to prepare, and motivation to prepare are also needed for disaster readiness.

According to the literature, disaster preparedness can be viewed from a cognitive and non-cognitive perspective. The *cognitive* perspective focuses on disaster preparedness as a matter of gaining knowledge and information about preparedness, e.g. including a checklist of emergency items (Paek et al. 2010), while the *non-cognitive* perspective underscores appropriate attitudes and beliefs (Burke, Bethel & Britt 2012). But both are needed, as “encouraging people to routinely stock emergency kits requires the full set of emotions and cognitions felt by those who routinely engage in this behavior to be identified” (Veil, Littlefield & Rowan 2009: 450).

Yong-Chan (2010) emphasizes resources and motivation as important parts of preparedness, defining resources as administrative, financial, informative, social and technological, while ‘motivation’ is defined as motivating people to prepare. He also raises disaster preparedness to the communication and social level, proposing that community actors provide knowledge and access during the disaster, while the neighborhood social level network acts as a source of motivation (Yong-Chan Kim & Kang 2010). All in all, effective disaster preparedness is ultimately facilitated by providing knowledge of the risk, specific resources required for by motivating communities to disasters.

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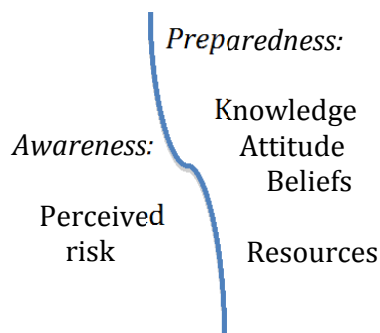


Figure 1. Awareness and preparedness

Preparedness is part of the process of disaster management, and its purpose is to strengthen communities, enabling them to become less vulnerable and more resilient. Improving preparedness entails the loss of fewer lives, and less injuries and material damage (Levental 2012, Eisenman et al. 2009). This calls for the cultivation of a culture of disaster preparedness (Rajib Shaw et al. 2004, Davis & Izadkhah 2008).

To conclude, disaster preparedness consists of preventive action taken by a government, an individual, a household, or a community before, and during the early stages of a disaster, in order to reduce risk. Such actions include the seeking, processing, and sharing or distribution of disaster-related information. The following section describes how both awareness and preparedness can be enhanced through education.

2.2 Disaster preparedness education

This section focuses on what, according to the literature, previous disasters have taught about disaster preparedness education. First, the focus is on the implications of these lessons for designing disaster preparedness messages, and, second, on the role of the local community in the process.

2.2.1 Disaster preparedness education sources

In the sample, 11 articles shed light on disaster preparedness education; six of the articles focused on this topic, while the scope was broader in the remaining five.

Indigenous knowledge has proven to be associated with mitigation of natural disasters. Those who have learned from the behavior of nature in the local area have saved lives, protected livelihoods and have been able to behave appropriately in the face of disasters (Mcadoo, Moore & Baumwoll 2009). This last-mentioned study, conducted on the Salomon island tsunami, showed that immigrant populations on the island were not aware of the danger posed by emptied lagoons after a strong earthquake, while the local populations in turn – based on local knowledge – lived on hills, and had access to paths providing an escape route (Mcadoo et al. 2009).

In addition to indigenous knowledge, past experience provides a framework for risk

awareness and an estimation of the probability of a disaster, and for mindfulness about planning for future natural hazards (Dudley et al. 2011). Sometimes past experience also has a positive effect on the credibility of warning messages (Sharma, Patwardhan & Parthasarathy 2009, Sharma & Patt 2012). However, this experience of disasters, also termed the 'social memory' of the community, may result in the failure of these communities to adapt after new experiences (Colten & Sumpter 2009, Paek et al. 2010, Yong-Chan Kim & Kang 2010).

Not all people acquire indigenous knowledge or have experienced a disaster, and not all communities have the reservoir of social memory that future generations could tap into. Neither indigenous knowledge nor experience does automatically translate into practice. Citizens and communities need to be educated by being given information about the nature of disasters, and shown how to prepare to withstand disasters. A study in a Vietnamese school disaster preparedness study showed that teachers were lacking the knowledge of what to do when a disaster occurs (Tong et al. 2012). The need to educate about both response and the nature of hazards was also found among the survivors of the Samoa tsunami in 2009:

“In contrast to improving our scientific knowledge of the tsunami phenomenon, several interviews revealed a troubling lack of understanding of tsunami waves, which was translated into their embodiment/manifestation/personification as a “thief”, or as “beasts” and “monsters.” Superstition produced a sense of hopelessness or predestination of events, which at the extreme resulted in a feeling of “why bother to prepare.” ... It also seems likely that this feeling of hopelessness increased the psychological stress associated with the event.” (Dudley et al. 2011: 205).

There is consensus among researchers that educating citizens improves preparedness (Vihalemm, Kiisel & Harro-Loit 2012). Education is transmitted via four channels: community, school, family and self-education. In this classification, the media are placed under 'self-education' (Rajib Shaw et al. 2004:43). Training is called for in schools and by using media for public education in disaster preparedness (Campbell 2005).

Koichi Shiwaku (2007) and Smith (2007) argue that although education enhances awareness (Smith et al. 2007, Koichi Shiwaku et al. 2007), and information and lectures raise awareness, alone they are not enough to create preparedness. For readiness education, participatory methods are called for. One example of such a teaching method was reported in a research study in a Japanese school, where lectures, talks, searching for information on the web, and creative methods such as making wallpaper about disasters, yielded positive results (Koichi Shiwaku & Rajib Shaw 2008). A similar finding on the successes of school education combined with community efforts have been observed elsewhere in Japan (Ronan, Crellin & Johnston 2012).

Vulnerable groups, such as the elderly or handicapped, or those with less formal education or low income, have been recognized as having a special need for education in

preparedness. (Tomio, Sato & Mizumura 2012, Tomio, Sato & Mizumura 2011, Burke, Bethel & Britt 2012, Veil, Littlefield & Rowan 2009, Eisenman et al. 2009).

2.2.2 The role of the local community in disaster preparedness education

In the sample, 18 articles addressed community participation in disaster preparedness education: 11 focused on a community approach, while the remaining seven included it among other topics.

In many areas, and especially within an Asian context, the community forms the basic growth platform of the culture, and the community's collective memory stores myths and family stories from generation to generation. Disaster preparedness plans should take the social memory of the community into account, as it is as critical for resilience as are future-oriented elements (Colten & Sumpter 2009).

The literature included several examples of a community approach where disaster preparedness was addressed via a participatory process. In Taiwan, community groups were established that collected information on past disasters and learned how to analyze vulnerable conditions, solve problems, and establish an organization to implement disaster management tasks (Chien-yuan et al. 2008). In Japan, a voluntary organization (VDPO) in the coastal villages improved community preparedness. A survey showed that residents with a VDPO group in their village were more knowledgeable about evacuation routes, had prepared a disaster backpack, and followed disaster notifications via radio and other media more than the residents of villages who did not have such a group (Mimaki, Takeuchi & Shaw 2009).

Another finding from Japanese community groups, known as 'Jishubo', confirms the usefulness of neighborhood associations in preparedness education, as sense of belonging correlated with perceived learning and perceived practical use of knowledge acquired in the meetings (Bajek, Matsuda & Okada 2008). Community preparedness education was also considered useful in off-track mountain villages that are vulnerable to debris flows, where residents needed to be taught self-rescue skills and the entire community needed to learn to be 'disaster resistant' (Chien-yuan et al. 2008). Research in Nepalese schools showed that community talks and knowledge about vulnerable people and dangerous areas in various neighborhoods had been crucial for students in taking preparedness actions (Koichi Shiwaku et al. 2007).

An analysis of disaster preparedness in Indonesia shows that community outreach should be the main concern in developing an early warning system in Indonesia (Djalante 2012). The author calls for community-based disaster risk reduction (DRR), including improved learning processes through shared knowledge and experiences of different stakeholders (Djalante et al. 2012). In Iran, after the Bam earthquake, the local community had an important role in helping the wounded. As a result, further training of local volunteers for future disasters was proposed, since they are familiar with the cultures, customs and characteristics of the local people (Sadeghi & Ahmadi 2008).

2.3 Contribution of broadcast media to disaster preparedness

This section focuses on the contribution of broadcast media to disaster preparedness. First, it reviews the role of the media in disaster preparedness education as found in the literature. Second, it describes in more detail how the media were used, for example, the kinds of campaigns, messages and channels involved.

2.3.1 The role of the media in disaster preparedness education

In the sample, 20 articles discussed the role of the media in crisis communication; eight dealt exclusively with the media's role, while 12 articles also included other topics.

The role of the media in disaster situations is seen in a controversial light in the literature. In the positive view, the media provide disaster warnings and keep the audience updated about the situation as it unfolds (Savova 2004, Cretikos et al. 2008, Tekeli-yesil et al. 2011), which enhance civil supervision after the disaster (Xu & Lu 2012). In the negative view, the media frame the situation to emphasize, depending on the selected focus, the response by the government or the responsibility of individuals and communities (Barnes et al. 2008, Mirón & Ward 2007, Stock 2007, Belle 2006).

Examples of mixed attitudes towards the media within the same study were also found. One example concerns a study reporting how media personalities provided a vital and trusted link between authorities and the public, while at the same time the media coverage of tropical cyclones was criticized for a tendency to sensationalize, thereby dispensing inaccurate information to residents (Anderson-berry & King 2005). Another study praised the ability of the media to place other people's stories in the public domain, but also reported that residents had expected a more accurate portrayal without sensationalism when covering bush fires (Nicholls, Sykes & Camilleri 2010).

The findings on the role of the media in constructing public perceptions of risk associated with natural hazards are conflicting. While a survey among residents in Rhode Island showed that communication channels (whether media, government, US weather service or friend or family) did not seem to have much effect on residents' perceptions of vulnerability (West & Orr 2007). Another study, using interviews in coastal Indian villages pointed out that the number of media channels reporting on a risk was associated with evacuation behavior, especially when a government warning was confirmed by friends and neighbors, or village leaders, media, or by environmental cues (Sharma, Patwardhan & Parthasarathy 2009). In Bangladesh, while disaster warnings transmitted via television and radio about the cyclone Sidr brought awareness of the threat to residents, other variables, such as being convinced about the seriousness of the threat, or fatalism, resulted in people not evacuating as a preparatory behavior (Paul & Dutt 2010).

In the literature the role of the media is also discussed in relation to the different phases of a crisis. In Georgia, a survey showed that respondents who paid attention to news about emergencies were more likely to have a survival kit items at home, and were cognitively prepared for emergencies (Paek et al. 2010). This shows that the media can have a facilitating role in the preparedness phase. A survey among residents in Istanbul revealed that the media were seen as the leading source of information about earthquakes; however, they did not provide encouragement or information about precautionary

measures for earthquakes, or how to cope with earthquakes (Tekeli-yesil et al. 2011). In covering the recovery from Hurricane Katrina, the media focused on the role of the political and economic systems, following the concerns of the public in building up the human and social capital component of hurricane vulnerability and risk (Miles & Morse 2007).

The media are recognized as providing crucial information about earthquakes, which can enhance citizens' awareness (Koichi Shiwaku & Rajib Shaw 2008). Information on how to react to an earthquake and to protect oneself could relieve the shock a population experiences during and after a real earthquake (Seid-Aliyeva 2006). This information function applies to tsunami education as well the media explain the nature of a tsunami, its probability, and to inform on what areas are at risk and what is an appropriate response to the warning (Dudley et al. 2011). Thoughtful media advocacy efforts have been shown to have an important role in building public awareness in fire prevention (Smith et al. 2007). Community-based flood-alert and vulnerability education programs targeting flood preparedness with the help of local radio have been initiated in small valleys in Central America (Savova 2004).

A positive example of the impact of radio in disaster preparedness was found in a study in Australia, where radio turned out to be the most useful source of information. The study emphasized that health services should work with broadcast media to promote disaster preparedness, and enhance awareness of the disaster role of broadcast networks (Cretikos et al. 2008).

A tsunami project in Malaysia pointed to television as the most effective means of raising tsunami awareness and knowledge. When it came to warning messages, television was mentioned along with radio, public address, and a patrol car. Local agencies and community leaders rated risk communication, public awareness and education as very important to improve disaster preparedness. Tsunami awareness and education call for both a media and a community approach. (Said et al. 2011)

Another tsunami-related study, on Banda Aceh, Indonesia, revealed that local radio programs had positively contributed to respondents' attitudes to preparedness. According to key informant interviews, mobilizing media outlets in the community is the most efficient way of passing information about preparedness to the community (Romo-Murphy, James & Adams 2011).

In some cases, the traditional media were found to be the primary means of obtaining information about an approaching crisis and the prospects of evacuation, such as in the case of Hurricane Katrina, while the new media were frequently used during the crisis and in the post-crisis situation (Procopio & Procopio 2007, Spence, Lachlan & Griffin 2007).

In crisis communication, trust in the source of information is crucial. Longstaff et al. (2008) analyzed 82 crisis cases, including seven natural disasters, and found that building trusted communications within and among emergency responders, including media, helps to generate rapid reactions in a crisis situation. On the one hand citizens need information from trusted sources, and on the other hand sources tend to be reliable if they trust the people with whom they communicate (Longstaff & Sung-Un Yang 2008).

To conclude, the literature shows the attitude towards the role of the media differs. In the preparedness phase it is mostly a positive role that is mentioned, though in some cases this could not be proven or was just one factor that needed to be co-joined with other factors to have an effect on preparedness. During and after crises, the evaluations were both positive and negative. The negative evaluations were related to framing and reporting in a sensational style. The media can effectively function as a disaster preparedness educator by showing themselves as trustworthy to citizens, and by building self-confidence among citizens that enables them to make constructive preparations. Media participation in disseminating messages on disaster risk reduction is called for by various authors (Barnes et al. 2008, Ismail-zadeh & Takeuchi 2007, Khan & Rahman 2007).

2.3.2 Media campaigns, messages and channels

In the sample, 29 papers discussed media campaigns, messages and channels; 19 of the articles focused on these topics, and ten articles included additional topics.

Past experience in disasters is associated with being prepared for future disasters, although citizen interest in disaster-related issues declines with time following the disaster (Sied, 2006). Therefore, preparedness education should be seen as a continuous process (Paek et al. 2010). Mass media could be active in increasing the educational culture of the population, especially in areas with recognized geo-risks. A well-informed and educated population facilitates sustainable development (Seid-Aliyeva 2006).

Even though the need for public information campaigns and more education on disaster preparedness is increasingly being recognized in the literature (Paek et al. 2010), very few articles deal with the actual topic of 'disaster preparedness education using media'. Little research has been done on communication and media campaigns enhancing citizens' preparedness for natural hazards, and even less on the outcomes of such campaigns (Veil, Littlefield & Rowan 2009). The results of the studies included in this overview may have practical implications for the design of messages geared to preparedness, and for the choice of channels for delivering such messages. Even so, the overall conclusion of findings is that community, along with and social networks are vital in the actual steps leading to preparedness. Media education, complemented by a community participatory approach, is needed (Gamboa-Maldonado et al. 2012).

Research suggests some guidelines concerning the design of media messages for preparedness education. A study on warning messages pointed out that racial and ethnic communities (underprivileged audiences), in particular, are more likely to perceive a message as credible; once it is confirmed by their interpersonal network (Lachlan 2009). The importance of the interpersonal network (besides television and radio) as a source of evacuation information or a warning message is also prevalent among African Americans in the USA (Spence et al. 2011) and among coastal villages in Andhra Pradesh, India (Sharma, Patwardhan & Parthasarathy 2009, Sharma & Patt 2012).

Issues related to educational campaigns in developing countries differ from those faced by developed countries. Whereas in Bangladesh the focus is on radio message content and infrastructure to better support the transmission of the messages, in Australia,

the use of Social Networking Technologies (SNT) during natural disasters receives the most attention. SNT, such as microblogging using Twitter, are an integral part of information transfer for citizens in geographic regions affected by a natural disaster. Their use has been investigated during and in the aftermath of natural disasters in Australia between 2009 and 2011. According to Freeman (2011), traditional methods such as television and radio broadcasts are only one-way, as opposed to SNT technologies, which are dynamic in their approach, allowing for knowledge sharing of all the parties involved.

In message design, cultural sensitivity is needed. Eraybar (2010) studied seismic risk and mitigation perceptions in two districts of Istanbul. While protecting family members is perceived as the most important task, very little is known about structural mitigation. In disaster education, message content needs to deal with e.g. seismic strengthening of houses, obtaining earthquake insurance, and awareness-raising within the family. The default stance in disaster preparedness education in earthquake areas should always be that people do not know much about the risk, as “the notion that people who live in earthquake prone areas are more aware of seismic risk may be misleading” (Eraybar, Okazaki & Ilki 2010: 91). On the other hand, in the case of hurricanes, a study showed that the residents in hurricane areas were very aware of the probability of hurricanes, and that they were prepared for them by having a portable radio (Marla Perez-Lugo 2004).

Another study shed light on public information campaigns related to service interruptions, e.g. electricity, gas, running water, and medical services during disasters. The study showed that by increasing participants’ anticipation of service interruptions, it is possible to increase their intentions to prepare for a disaster. Regardless of the type of disaster, “much of preparedness can be achieved by a universal and relatively small set of actions needed to compensate for basic service interruptions” (Martel & Mueller 2011: 307).

Message framing may affect intentions to prepare for disasters. Messages need to outline the steps that individuals can take to reduce their susceptibility to risk (Lachlan et al. 2009). A study in New Zealand concluded that the negative framing of outcomes enhanced judgment of the importance of earthquake preparation (McClure, White & Sibley 2009). Moreover, a study on websites showed that when educating children fear appeals should be avoided; as in a campaign this triggers responses to control the feeling of fear, instead of preparedness responses (Ryan, Hocke & Hilyard 2012).

The content of media messages after the disaster needs to be positive, as shown by an experiment measuring adolescents’ reactions while watching the news (Lau, 2010). With respect to post-traumatic stress disorder and other psychological distress outcomes, protective factors for young people’s mental health included: (1) a sense of security obtained from significant others, (2) post-earthquake social support, and (3) exposure to positive media messages about the earthquake (Lau et al. 2010).

In the health care sector, it is understood that communication needs attention, both before and during the disaster, incorporating lessons learned into future disaster plans, and acknowledging that, next to warning messages and information via the media during the disaster response, public education is needed for disaster preparedness (Rebmann, Carrico

& English 2008). A study among the Latino community in the USA concluded that key public health messages need to be transmitted via trusted sources such as health care personnel, community leaders, radio and television announcers as well as Spanish-language newspapers, while trained volunteer health promoters also proved effective in conducting educational sessions, and emphasizing practical steps in preparedness (Carter-Pokras et al. 2007). To reach low-income or disadvantaged communities, a grassroots approach is needed that relies on trusted agencies and leaders in risk communication activities (Rowel et al. 2012).

As media-use habits differ among public groups, a multi-channel approach is recommended, taking into account that in order to emotionally cope with a disaster, citizens may need more than institutionally framed warnings, information from the web or informal networks, or reliance on their own views (Vihalemm, Kiisel & Harro-Loit 2012). To conclude, disaster preparedness campaigns and their messages should be tailored to the local culture and media landscape, i.e. the media used and trusted in the community.

2.4 Trends in the literature

Of the articles in the sample, 15 explicitly addressed trends in the literature: nine of these focused on research trends and six addressed such trends while also dealing with other matters. Looking at the sample as a whole, attention to the topic increased after 2007. Of the total of 87 articles, 26 were published during 2002-2007, and the remaining majority was published from 2008 onwards. The year 2007 seems to be a turning point in the disaster preparedness literature. Hurricane Katrina was the main topic of ten articles, while several Asian disaster cases were also discussed. In 2012, the emphasis in the literature was on community participation in preparedness. Consequently, the earlier focus on media messages as such had shifted towards the media as being just one important part of the preparedness training system.

Much of the literature in the sample addressed a specific disaster, such as a hurricane, tsunami or earthquake. Preparedness studies in America have increased in the aftermath of several hurricanes in the USA and Central America. For example, response to the hurricanes Mitch, Katrina and Wilma has been investigated (e.g. Savova 2004; Barnes et al. 2008, Lachlan et al. 2009; Baker 2011). Lessons learned from these studies were that there should be more research on failures to prepare, and that media should focus more on preparedness.

In Asia, the Great Indian Ocean tsunami started an influx of preparedness research, with the emphasis on resilient communities (Levental 2012). During the past ten years, Asia has faced several natural disasters, prompting researchers to study how community resilience can be enhanced: for example, the tsunamis in Indonesia, Malaysia and Japan (e.g. Romo-Murphy, James & Adams 2011; Said et al. 2011; Ronan, Crellin & Johnston 2012), earthquakes in China, Central Asia, New Zealand and Indonesia (Yang et al. 2009, Eraybar, Okazaki & Ilki 2010; McClure, White & Sibley 2009; Kusumasari & Alam 2012). The overall conclusion, in the literature, leans towards the necessity of disaster

preparedness; especially considering since the scientific community observes the probability of natural disasters increasing as a result of climate change.

Although the need for disaster preparedness is recognized in publications, as there is evidence of failing to be prepared, most of the articles deal with disaster management or the creation of models for predicting future disasters, rather than the actual preparation of ordinary citizens for disasters. However, calls have been made during the past few years for preparedness as an integral part of the disaster cycle (Hilliard, Scott-Halsell & Palakurthi 2011, Maricle 2011).

The media were mentioned in various ways. Much has been written about media coverage of disasters, and critical voices have been raised against the framing of citizens as victims (Camp 2009, Tekeli-yesil 2006), or the tendency of the media to focus on well-known organizations instead of contacting local level information sources (Robinson & Reed 2010). A few, mostly recent, studies are attentive to the role of the media as a possible source for disaster preparedness education. Media campaigns to familiarize residents with warning signals have been called for (Nicholls, Sykes & Camilleri 2010). The issue of ownership has been used as one measure of disaster preparedness (Baker 2011), however, little has taken place on evaluating the significance of radio, and other media, in improving the disaster awareness and readiness of citizens and communities.

4. Conclusions

This paper brings together insights on disaster preparedness education, clarifies issues addressed and identifies current trends in the scientific literature. Increased attention has been paid to the topic since 2007, in the aftermath of several hurricanes in the USA and Central America, and the Great Indian Ocean Tsunami. However, despite recognition of the need for disaster preparedness, little research has been carried out on the subject of disaster preparedness education or campaigns related to it. Most of the articles reviewed here focus on disaster management or building models for predicting future disasters, rather than the actual preparations of ordinary citizens in the event of disaster.

Awareness of risks 'precedes' but does not automatically 'lead to' disaster preparedness that includes action to reduce risks. Preparedness education adds to indigenous knowledge and experience of disasters, and may combine self-education via the media, school education and community efforts for targeting disaster risk reduction.

Some lessons can be learned from studies related to warnings about disasters, and from preparedness education studies. First, it is important that a warning message communicates the seriousness of a risk in an accurate, simple, and timely manner, without creating too much fear. Second, the message should acknowledge the citizen's need for control, and include practical steps for implementing preparedness. Finally, the message should originate from a trusted source and fit the local culture.

Similar preparedness-related issues were found in studies on Asian communities and in studies on Latino and African American communities in the USA. One such similarity is the need for preparedness messages to be confirmed by the individual's interpersonal network. Besides the traditional media, a person's social network is used to validate

information. An inclusive approach would also involve vulnerable groups, such as the elderly or handicapped.

The media position themselves in several roles in disaster situations, including warning, informing and advising on future preparatory actions. However, the literature reveals conflicting findings on media disaster-related performance. On the positive side, the broadcast media inform publics about risks and how to prepare for natural disasters, while on the negative side, the media frame response actions and may resort to sensationalism, which in turn may result in presenting an inaccurate picture of the situation.

In the literature, the role of the media is discussed in relation to the various phases of a disaster. The review shows that media information is a strong facilitator of disaster awareness. The media are also, in many cases, seen as a primary source of information about an approaching or developing crisis. Apart from advice on how to prepare, the media should inform citizens about the nature of the disaster. Their role is valuable, if they are perceived as a trusted source in volatile situation, providing sensationalism doesn't get the upper hand.

In the recent literature, the media are studied as a part of the wider preparedness training system. Mobilizing media outlets in the community helps dissemination of information within communities. Preparedness calls for both the media and the community approach. Many factors need to be taken into account. In designing preparedness education via media, it is important to remember to take nothing for granted, and also to adopt an approach that embraces disaster preparedness education as sustained component of everyday life.

References

- The Asian tsunami: An urgent case for improved government information systems and management. 2007. *Disaster Prevention & Management* 16 (2), 188-200.
- Adams, T., Anderson, L., Turner, M. & Armstrong, J. 2011. Coping through a Disaster: Lessons from Hurricane Katrina. *Journal of Homeland Security and Emergency Management* 8 (1), 1.
- Ainuddin, S. & Routray, J. K. 2012. Earthquake hazards and community resilience in Baluchistan. *Natural Hazards* 63 (2), 909-937.
- Anderson-berry, L. & King, D. 2005. Mitigation of the Impact of Tropical Cyclones in Northern Australia through Community Capacity Enhancement. *Mitigation and Adaptation Strategies for Global Change* 10 (3), 367-392.
- Bajek, R., Matsuda, Y. & Okada, N. 2008. Japan's Jishu-bosai-soshiki community activities: analysis of its role in participatory community disaster risk management. *Natural Hazards* 44 (2), 281-292.
- Baker, E. J. 2011. Household preparedness for the Aftermath of Hurricanes in Florida. *Applied Geography* 31 (1), 46-52.

- Barnes, M. D., Hanson, C. L., Novilla, L. M. B., Meacham, A. T., McIntyre, E. & Erickson, B. C. 2008. Analysis of Media Agenda Setting During and After Hurricane Katrina: Implications for Emergency Preparedness, Disaster Response, and Disaster Policy. *American Journal of Public Health* 98 (4), 604-610.
- Belle, D. 2006. Contested Interpretations of Economic Inequality Following Hurricane Katrina. *Analyses of Social Issues & Public Policy* 6 (1), 143-158.
- Boon, H. J., Cottrell, A., King, D., Stevenson, R. B. & Millar, J. 2012. Bronfenbrenner's bioecological theory for modelling community resilience to natural disasters. *Natural Hazards* 60 (2), 381-408.
- Burke, S., Bethel, J. W. & Britt, A. F. 2012. Assessing Disaster Preparedness among Latino Migrant and Seasonal Farmworkers in Eastern North Carolina. *International Journal of Environmental Research and Public Health* 9 (9), 3115-3133.
- Camp, J. T. 2009. "We Know This Place": NeoLiberal Racial Regimes and the Katrina Circumstance. *American Quarterly* 61 (3), 693-717.
- Campbell, S. 2005. Responding to international disasters. *Nursing Standard* 19 (21), 33-36.
- Carter-Pokras, O., Zambrana, R. E., Mora, S. E. & Aaby, K. A. 2007. Emergency Preparedness: Knowledge and Perceptions of Latin American Immigrants. *Journal of Health Care for the Poor and Underserved* 18 (2), 465-81.
- Chien-yuan, C., Lien-kuang, C., Fan-chieh, Y., Sheng-chi, L., Yu-ching, L., Chou-lung, L., Yu-ting, W. & Kei-wai, C. 2008. Characteristics analysis for the flash flood-induced debris flows. *Natural Hazards* 47 (2), 245-261.
- Cloudman, R. & Hallahan, K. 2006. Crisis communications preparedness among U.S. organizations: Activities and assessments by public relations practitioners. *Public Relations Review* 32 (4), 367-376.
- Colten, C. E. & Sumpter, A. R. 2009. Social memory and resilience in New Orleans. *Natural Hazards* 48 (3), 355-364.
- Cretikos, M., Eastwood, K., Dalton, C., Merritt, T., Tuyl, F., Winn, L. & Durrheim, D. 2008. Household disaster preparedness and information sources: Rapid cluster survey after a storm in New South Wales, Australia. *BMC Public Health* 8, 195-203.
- Davis, I. & Izadkhah, Y. O. 2008. Tsunami early warning system (EWS) and its integration within the chain of seismic safety. *Disaster Prevention and Management* 17 (2), 281-291.
- Djalante, R., Thomalla, F., Sinapoy, M. S. & Carnegie, M. 2012. Building resilience to natural hazards in Indonesia: progress and challenges in implementing the Hyogo Framework for Action. *Natural Hazards* 62 (3), 779-803.
- Dudley, W. C., Whitney, R., Faasisila, J., Fonolua, S., Jowitt, A. & Chan-Kau, M. 2011. Learning from the victims: New physical and social science information about tsunamis from victims of the September 29, 2009 event in Samoa and American Samoa. *Earth-Science Reviews* 107 (1), 201-206.
- Eisenman, D. P., Glik, D., Maranon, R., Gonzales, L. & Asch, S. 2009. Developing a Disaster Preparedness Campaign Targeting Low-Income Latino Immigrants: Focus

- Group Results for Project PREP. *Journal of Health Care for the Poor and Underserved* 20 (2), 330-45.
- Eraybar, K., Okazaki, K. & Ilki, A. 2010. An exploratory study on perceptions of seismic risk and mitigation in two districts of Istanbul. *Disasters* 34 (1), 71-92.
- Freeman, M. 2011. *Fire, Wind and Water: Social Networks in Natural Disasters*. Hershey, United States, Hershey.
- Gamboa-Maldonado, T., Marshak, H. H., Sinclair, R., Montgomery, S. & Dyjack, D. T. 2012. Building Capacity for Community Disaster Preparedness: A Call for Collaboration Between Public Environmental Health and Emergency Preparedness and Response Programs. (Cover story). *Journal of Environmental Health* 75 (2), 24-29.
- Hilliard, T., Scott-Halsell, S. & Palakurthi, R. 2011. Elements that Influence the Implementation of Crisis Preparedness Measures by Meeting Planners. *Journal of Contingencies & Crisis Management* 19 (4), 198-206.
- Ismail-zadeh, A. & Takeuchi, K. 2007. Preventive disaster management of extreme natural events. *Natural Hazards* 42 (3), 459-467.
- Jacob, B., Mawson, A. R., Payton, M. & Guignard, J. C. 2008. Disaster Mythology and Fact: Hurricane Katrina and Social Attachment. *Public health reports* 123 (5), 555-566.
- Jonientz-trisler, C., Simmons, R. S., Yanagi, B. S., Crawford, G. L., Darienzo, M., Eisner, R. K., Petty, E. & Priest, G. R. 2005. Planning for Tsunami-Resilient Communities. *Natural Hazards* 35 (1), 121-139.
- Khan, M. R. & Rahman, M. A. 2007. Partnership approach to disaster management in Bangladesh: a critical policy assessment. *Natural Hazards* 41 (2), 359-378.
- Koichi Shiwaku & Rajib Shaw 2008. Proactive co-learning: a new paradigm in disaster education. *Disaster Prevention & Management* 17 (2), 183-198.
- Koichi Shiwaku, Rajib Shaw, Ram Chandra Kandel, Surya Narayan Shrestha & Amod Mani Dixit 2007. Future perspective of school disaster education in Nepal. *Disaster Prevention & Management* 16 (4), 576-587.
- Kusumasari, B. & Alam, Q. 2012. Bridging the gaps: the role of local government capability and the management of a natural disaster in Bantul, Indonesia. *Natural Hazards* 60 (2), 761-779.
- Lachlan, K. A., Burke, J., Spence, P. R. & Griffin, D. 2009. Risk Perceptions, Race, and Hurricane Katrina. *Howard Journal of Communications* 20 (3), 295-309.
- Lau, J. T. F., Yu, X., Zhang, J., Mak, W. W. S., Choi, K. C., Lui, W. W. S. & Chan, E.Y.Y. 2010. Psychological Distress among Adolescents in Chengdu, Sichuan at 1 Month after the 2008 Sichuan Earthquake. *Journal of Urban Health* 87 (3), 504-523.
- Levental, S. 2012. A New Geospatial Services Framework: How Disaster Preparedness Efforts Should Integrate Neogeography. *Journal of Map & Geography Libraries* 8 (2), 134-162.

- Longstaff, P. H. & Sung-Un Yang 2008. Communication Management and Trust: Their Role in Building Resilience to "Surprises" Such As Natural Disasters, Pandemic Flu, and Terrorism. *Ecology & Society* 13 (1), 1-14.
- Maricle, G. 2011. Prediction as an Impediment to Preparedness: Lessons from the US Hurricane and Earthquake Research Enterprises. *Minerva: A Review of Science, Learning & Policy* 49 (1), 87-111.
- Marla Perez-Lugo 2004. Media Uses in Disaster Situations: A New Focus on the Impact Phase. *Sociological Inquiry* 74 (2), 210-225.
- Martel, L. D. & Mueller, C. W. 2011. The Effect of Anticipated Service Interruptions on Disaster Preparedness Intentions. *Journal of Applied Social Psychology* 41 (2), 298-311.
- Mcadoo, B. G., Moore, A. & Baumwoll, J. 2009. Indigenous knowledge and the near field population response during the 2007 Solomon Islands tsunami. *Natural Hazards* 48 (1), 73-82.
- McClure, J., White, J. & Sibley, C. G. 2009. Framing effects on preparation intentions: distinguishing actions and outcomes. *Disaster Prevention and Management* 18 (2), 187-199.
- Miles, B. & Morse, S. 2007. The role of news media in natural disaster risk and recovery. *Ecological Economics* 63 (2), 365-373.
- Mimaki, J., Takeuchi, Y. & Shaw, R. 2009. The role of community-based organization in the promotion of disaster preparedness at the community level: a case study of a coastal town in the Kochi Prefecture of the Shikoku Region, Japan.
- Mirón, L. & Ward, R. 2007. Drowning the Crescent City: Told Stories of Katrina. *Cultural Studies/Critical Methodologies* 7 (2), 154-168.
- Nicholls, S., Sykes, J. & Camilleri, P. 2010. The role of the media and communication in recovery from natural disasters: A case study of the Canberra 'firestorm' and its aftermath 2003-2007. *Australian Journal of Communication* 37 (3), 33-50.
- Nozawa, M., Watanabe, T., Katada, N., Minami, H. & Yamamoto, A. 2008. Residents' awareness and behaviour regarding typhoon evacuation advice in Hyogo Prefecture, Japan. *International Nursing Review* 55 (1), 20-26.
- Paek, H., Hilyard, K., Freimuth, V., Barge, J. K. & Mindlin, M. 2010. Theory-Based Approaches to Understanding Public Emergency Preparedness: Implications for Effective Health and Risk Communication. *Journal of Health Communication* 15 (4), 428.
- Paul, B. K. & Dutt, S. 2010. Hazard Warnings and Responses to Evacuation Orders: the Case of Bangladesh's Cyclone Sidr. *Geographical Review* 100 (3), 336-355.
- Procopio, C. H. & Procopio, S. T. 2007. Do You Know What It Means to Miss New Orleans? Internet Communication, Geographic Community, and Social Capital in Crisis. *Journal of Applied Communication Research* 35 (1), 67-87.
- Rajib Shaw, Koichi Shiwaku, Hirohide Kobayashi & Masami Kobayashi 2004. Linking experience, education, perception and earthquake preparedness. *Disaster Prevention and Management* 13 (1), 39-49.

- Rebmann, T., Carrico, R. & English, J. F. 2008. Lessons Public Health Professionals Learned From Past Disasters. *Public Health Nursing* 25 (4), 344-352.
- Robinson, S. E. & Reed, J. W. 2010. Media Relations and Effective Evacuations of Gulf Coast Communities. *Public Manager* 39 (3), 50-55.
- Romo-Murphy, E., James, R. & Adams, M. 2011. Facilitating disaster preparedness through local radio broadcasting. *Disasters* 35 (4), 801.
- Ronan, K. R., Crellin, K. & Johnston, D. M. 2012. Community readiness for a new tsunami warning system: quasi-experimental and benchmarking evaluation of a school education component. *Natural Hazards* 61 (3), 1411-1425.
- Rowel, R., Sheikhattari, P., Barber, T. M. & Evans-Holland, M. 2012. Introduction of a Guide to Enhance Risk Communication Among Low-Income and Minority Populations: A Grassroots Community Engagement Approach. *Health Promotion Practice* 13 (1), 124-132.
- Ryan, E. L., Hocke, T. M. & Hilyard, K. M. 2012. Ready or not, here it comes. *Journal of Children & Media* 6 (3), 300-316.
- Sadeghi, N. & Ahmadi, M. H. 2008. Mental health preparedness for natural disasters in Iran. *Natural Hazards* 44 (2), 243-252.
- Said, A. M., Ahmadun, F., Mahmud, A. R. & Abas, F. 2011. Community preparedness for tsunami disaster: a case study. *Disaster Prevention & Management* 20 (3), 266-280.
- Savova, N. 2004. Small River Valleys Step Ahead of Nature. *Americas* 56 (4), 56-57.
- Seid-Aliyeva, D. 2006. Role of Mass Media in the Disaster Preparedness and Sustainable Development of Society. *AIP Conference Proceedings* 825 (1), 79-83.
- Sharma, U. & Patt, A. 2012. Disaster warning response: the effects of different types of personal experience. *Natural Hazards* 60 (2), 409-423.
- Sharma, U., Patwardhan, A. & Parthasarathy, D. 2009. Assessing adaptive capacity to tropical cyclones in the East coast of India: a pilot study of public response to cyclone warning information. *Climatic Change* 94 (1), 189-209.
- Smith, K. C., Cho, J., Gielen, A. & Vernick, J. S. 2007. Newspaper coverage of residential fires: an opportunity for prevention communication. *Injury Prevention* 13 (2), 110-114.
- Spence, P. R., Lachlan, K. A. & Griffin, D. R. 2007. Crisis Communication, Race, and Natural Disasters. *Journal of Black Studies* 37 (4), 539-554.
- Spence, P. R., McIntyre, J. J., Lachlan, K. A., Savage, M. E. & Seeger, M. W. 2011. Serving the Public Interest in a Crisis: Does Local Radio Meet the Public Interest? *Journal of Contingencies & Crisis Management* 19 (4), 227-232.
- Spittal, M. J., Walkey, F. H., McClure, J., Siegert, R. J. & Ballantyne, K. E. 2006. The Earthquake Readiness Scale: The Development of a Valid and Reliable Unifactorial Measure. *Natural Hazards* 39 (1), 15-29.
- Stock, P. V. 2007. Katrina and Anarchy: a Content Analysis of a New Disaster Myth. *Sociological Spectrum* 27 (6), 705-726.
- Tekeli-yesil, S. 2006. Public health and natural disasters: disaster preparedness and response in health systems. *Zeitschrift für Gesundheitswissenschaften* 14 (5), 317-324.

- Tekeli-yesil, S., Dedeolu, N., Braun-fahrlaender, C. & Tanner, M. 2011. Earthquake awareness and perception of risk among the residents of Istanbul. *Natural Hazards* 59 (1), 427-446.
- Tomio, J., Sato, H. & Mizumura, H. 2012. Disparity in disaster preparedness among rheumatoid arthritis patients with various general health, functional, and disability conditions. *Environmental Health and Preventive Medicine* 17 (4), 322-331.
- Tomio, J., Sato, H. & Mizumura, H. 2011. Impact of natural disasters on the functional and health status of patients with rheumatoid arthritis. *Modern Rheumatology* 21 (4), 381-90.
- Tong, T. M., Thi, Shaw, R. & Takeuchi, Y. 2012. Climate disaster resilience of the education sector in Thua Thien Hue Province, Central Vietnam. *Natural Hazards* 63 (2), 685-709.
- Turner, M. M. & Underhill, J. C. 2012. Motivating Emergency Preparedness Behaviors: The Differential Effects of Guilt Appeals and Actually Anticipating Guilty Feelings. *Communication Quarterly* 60 (4), 545-559.
- Veil, S. R., Littlefield, R. S. & Rowan, K. E. 2009. Dissemination as success: Local emergency management communication practices. *Public Relations Review* 35 (4), 449-451.
- Vihalemm, T., Kiisel, M. & Harro-Loit, H. 2012. Citizens' Response Patterns to Warning Messages. *Journal of Contingencies & Crisis Management* 20 (1), 13-25.
- Walters, G. & Mair, J. 2012. The Effectiveness of Post-Disaster Recovery Marketing Messages—The Case of the 2009 Australian Bushfires.
- West, D. M. & Orr, M. 2007. Race, Gender, and Communications in Natural Disasters. *Policy Studies Journal* 35 (4), 569-586.
- Xu, J. & Lu, Y. 2012. Meta-synthesis pattern of post-disaster recovery and reconstruction: based on actual investigation on 2008 Wenchuan earthquake. *Natural Hazards* 60 (2), 199-222.
- Yang, C., Yang, J., Luo, X. & Gong, P. 2009. Use of mobile phones in an emergency reporting system for infectious disease surveillance after the Sichuan earthquake in China. *Bulletin of the World Health Organization* 87 (8), 619-623.
- Yong-Chan Kim & Kang, J. 2010. Communication, neighbourhood belonging and household hurricane preparedness. *Disasters* 34 (2), 470-488.