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Motivating rural older residents to prepare for disasters: moving beyond personal benefits

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Abstract

In the United States of America (USA), older adults in rural areas are at increased risk for adverse outcomes of disasters, partly due to medical needs, limited or long geographic distances from community resources, and less knowledge and motivation about preparedness steps. Older residents and ageing service providers in a rural community in the USA were interviewed regarding their perceptions about disasters and preparedness, and their reactions to the preparedness training programme using the concepts of the Extended Parallel Process Model. Participants generally indicated low motivation to engage in preparedness behaviours despite perceptions of personal risk and beliefs that preparedness behaviours were easy and could improve disaster outcomes. A theme of social relationships emerged from the data, with participants identifying social relationships as resources, barriers and motivators. People surrounding older adults can support or deter their preparedness behaviours, and sometimes elicit a desire to protect the wellbeing of others. Findings suggest two potential strategies to facilitate preparedness behaviours by moving beyond personal benefits: highlighting older adults' increased ability to protect the wellbeing of younger generations and their community by being prepared themselves, and engaging family, friends and neighbours in preparedness programmes to enhance the resilience of their social groups. Older adults in many cultures have a desire to contribute to their society. Novel and effective approaches to increase preparedness could target their social groups.

Keywords

older adults; disaster preparedness; Extended Parallel Process Model (EPPM); rural health; social relationships

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Background

Older adults are more vulnerable to the health consequences than younger populations in disaster and emergency situations (World Health Organization (WHO) 2008). About half of all deaths during the 2004 tsunami in Indonesia were among older adults aged 60 years and older (Doocy *et al.* 2007). In Japan, 50 per cent of the immediate deaths and 90 per cent of the subsequent deaths related to the 2003 earthquake in Kobe were among older persons (WHO 2013). In the United States of America (USA), adults aged 60 and older accounted for as much as 74 per cent of all reported deaths due to hurricane Katrina (Simerman, Ott and Mellnik 2005). In addition to the usual concerns associated with disasters such as injuries and infectious disease outbreaks that impact the general population, older adults face challenges due to functional limitations, lack of social support, difficulty maintaining medical regimen and limited knowledge about preparedness steps (Li 2009). Although many older adults are able to function independently in normal circumstances, disruption in services such as electricity, meal delivery, home care and access to medication can cause quick decline in health and may greatly diminish their ability to remain independent during and after emergency situations. Inadequate access to services and resources can cause various health consequences including dehydration, malnutrition and delirium.

Efforts have been made to develop disaster and emergency response systems to specifically support older adults. Examples of specific strategies include registries of older adults and those with medical conditions or developing guidelines to assist ageing network organisations in disaster preparedness and response (Administration on Aging 2006). In terms of facilitating emergency preparedness at an individual level, disaster planning information for older adults is available from governmental and non-profit agencies in the USA, such as the Centers for Disease Control and Prevention (CDC 2012), Federal Emergency Management Agency (FEMA 2009), Administration on Aging (2006) and the American Red Cross (2009). Resources provided by these agencies include lists of actions to be taken or resources to be gathered. Despite the efforts of these various agencies, older adults continue to be less prepared or less likely to take disaster preparation steps than younger adults (FEMA 2009). According to the Health and Retirement Survey, in the USA less than 25 per cent of older adults currently have an emergency plan in place and only 10 per cent report that members of their household are signed up for disaster registries (Al-Rousan, Rubenstein and Wallace 2014). This suggests the need to gain a deeper understanding about the underlying factors that may explain lower levels of preparedness for disasters among older adults. For example, older adults often report difficulty preparing due to associated expense, complicated preparation processes and lack of support (Heller *et al.* 2005; Li 2009). In addition to these factors related to self-efficacy, other beliefs such as personal risks and expected outcomes of preparedness behaviours that may impact motivation to engage in disaster preparedness behaviours should be explored. Such understanding is critical in developing effective disaster preparedness programmes that assist older adults to develop and carry out the personalised disaster plans.

Rurality is a contextual factor that may increase vulnerability during a disaster. Although older adults are well supported by their family and friends in some rural areas of the world, increased social isolation has been documented after disasters due to destroyed roadways,

disruptions in service systems and younger adults migrating to cities for employment (WHO 2008). In some countries, older adults did not receive relief funds because it was assumed that their family supported them, even when families were not always capable of doing so (WHO 2008). During the 2003 heat wave in Europe, socially isolated individuals within the community suffered a disproportionate number of deaths compared to the general population (Kosastsky 2003; Rolnick 2006; WHO 2008).

In the USA, where this current study took place, older adults in rural settings tend to be socially isolated (Baernholdt *et al.* 2012). Services and resources such as formal disaster management personnel are often limited in rural communities (US Department of Health and Human Services 2002), and may not always possess adequate skills to provide needed support to older residents, *e.g.* providing assistance on activities of daily living, managing dementia-related symptoms and administering a medical regimen (CDC 2012). About 80 per cent of rural emergency providers are volunteers serving large and sparse geographic regions that have under-developed roadways with limited staff and equipment (Grossman *et al.* 1997). Thus, improving preparedness among older residents and building strong social support networks is especially important in rural areas to mitigate negative impacts and ensure the survival and wellbeing of the residents.

In the USA, about 20 per cent of people live in rural areas of the country (US Census Bureau 2010). This concentration is much higher in Midwestern states such as Iowa, where about 36 per cent of the population live in rural areas, a substantial proportion ofwhom are older adults. During 2008–2009, approximately 444,294 Iowans (15%) were aged 65 and older and 139,313 (32%) of Iowans aged 65 and older had at least one disability, and one in three lived alone (Iowa Department on Aging 2011). During 2008, Iowa residents experienced the worst flooding recorded in the state history that led to the evacuation and displacement of more than 40,000 people, many of whom were older adults (National Weather Service 2014; *The Des Moines Register 2013).* Since 1990, there were nearly 40 presidentially declared disasters in Iowa (FEMA 2014; Iowa Homeland Security and Emergency Management 2014). In 2014 alone, there have been three major disaster declarations already, suggesting the continuing need for Iowa residents to be prepared for disaster and emergency situations.

A previous intervention to enhance disaster preparedness behaviours through education showed the benefits of providing such a programme among Latinos in preparing food and water and developing a family communication plan (Eisenman *et al.* 2009). Although effects on specific preparedness behaviours were not evaluated, another intervention conducted with older adults in an assisted-living setting demonstrated selfreported benefits in preparation for certain types of disasters, such as hurricanes and flooding (Feret and Bratberg 2008). Overall, limited information is available regarding the disaster preparedness behaviours and how such behaviours can be facilitated among community-dwelling older adults. Furthermore, the unique factors that may influence preparedness behaviours of rural residents who live in their own homes or apartments have not been explored.

The current project was conducted in the rural state of Iowa in the USA and involved formative research with older adults living in the community setting and staff from a local ageing service agency who provide community-based programmes such as home health and

home-maker services. The main aim was to understand current disaster preparedness behaviours among older residents in the community and explore underlying psychological factors that may explain their preparedness, with an ultimate goal of developing and implementing a disaster preparedness training programme for older adults in rural communities. In order to gain a comprehensive understanding of psychological factors that facilitate or deter older adults' disaster preparedness behaviours, the concepts of the Extended Parallel Process Model (EPPM) were used (Witte and Allen 2000).

Theoretical framework: EPPM

Well-validated theories can bring tremendous advantages to increase the efficacy of interventions by facilitating an understanding about underlying factors that influence behaviours (van Ryn and Heaney 1992). The EPPM has been used and tested in multiple public health settings that address various health-related behaviours. The Citizen Corps of FEMA adopted this framework to understand disaster preparedness behaviours and recommends its use when developing preparedness strategies for the public (FEMA 2009). EPPM identifies the factors that influence how individuals respond to health messages, including the extent to which individuals perceive that they are at risk for health consequences (perceived susceptibility), that such consequences are severe (perceived severity), that they feel that the recommended strategies are effective in alleviating the risks (response efficacy) and that the recommended actions are easy to take (selfefficacy). When individuals perceive sufficient levels of risk, feel that engaging in the recommended behaviour is beneficial and that the behaviours are easy, they may engage in the recommended actions (danger control process). If individuals perceive threat but feel that engaging in the recommended action will not help or that the recommended actions are difficult, they may avoid thinking about the threat and dismiss recommendations (fear control process). If the health threat is not perceived, individuals may not be motivated at all to take actions.

To gain an understanding of the underlying psychological factors that may facilitate or deter disaster preparedness behaviours among community-dwelling older adults, the extent to which older adults perceive their likelihood of experiencing the consequences of disaster and emergency situations in the near future (perceived susceptibility) and severity of such consequences (perceived severity) can be explored. To investigate older adults' perceptions about the usefulness of recommended disaster preparedness behaviours in reducing negative consequences (response-efficacy) and how easy these recommended actions are (self-efficacy), a disaster preparedness programme was presented. Through eliciting reactions about the contents of a programme and perceptions related to disasters and preparedness, factors that may determine whether older adults take danger control processes (*e.g.* take recommended actions or become motivated to do so), fear control processes (*e.g.* dismiss recommendations) or no action were explored. Understanding these psychological processes is critical in improving preparedness interventions to motivate more older adults in the community to engage in danger control processes and to become prepared for disasters.

Methods

Disaster preparedness intervention programme

The disaster preparedness training programme used in this current study was adapted from a programme for families of children with medical care needs in which families of children with physical and emotional disabilities are assisted to develop individualised preparedness plans, which was originally based on a disaster preparedness programme for persons with disabilities in Oregon (Heller *et al.* 2005). This family programme was recently tested in a controlled randomised trial in rural Iowa and shown to be effective in increasing disaster preparedness behaviours among families that received the intervention (Mello *et al.* 2015). The programme contains seven modules: (a) knowing types of emergencies and what to do; (b) vulnerability assessment (alerts/warnings, evacuations, transportation, communication, sheltering, personal care, and medical care and equipment); (c) developing a personal emergency support network (formal list of family/friends and local community members); (d) making an emergency plan; (e) keeping a supply of medication; (f) making an emergency supply kit; and (g) making home, school, work and car travel safer. In the first two modules, participants are informed that disasters can occur to anyone in any community (perceived susceptibility) and that the consequences can be very serious (perceived severity). Through developing emergency plans, support networks and learning how to make kits in the following three modules, participants' self-efficacy to engage in these recommended actions is aimed to be increased. The intervention concludes with the statements highlighting the benefits of being prepared on immediate and longterm outcomes of the disasters (response efficacy).

In this current project, the contents of this family programme were modified to fit the needs of older adults living in the community through reviewing publications related to older adults and disasters from governmental and non-profit organisations. Publications reviewed included: *Disaster Planning Tips for Older Adults and Their Families* by the Health Aging Program of the CDC (2012); Just in Case: Emergency Readiness for Older Adults and Caregivers by the Administration on Aging (2006); *Disaster Preparedness for Seniors by Seniors* by the American Red Cross (200g); *Personal Preparedness in America: Findings from the 200g Citizen Corps National Survey* by FEMA (200g); *It Could Happen to Me: Family Conversations About Disaster Planning* and *The Calm Before the Storm: Family Conversations About Disaster Planning, Caregiving, Alzheimer's Disease and Dementia* by The Hartford Geriatric Education Center (2011a, 2011b); and 30 *Tips for Emergency Preparedness* by the US Department of Homeland Security (2006). Data presented here were obtained as part of a formative research that involved obtaining qualitative feedback from and pilot testing of the programme materials with older residents in the community.

Procedures

Individual interviews.—The contents of the adapted programme, PrepWise, were presented during interviews to ageing network service providers and older adults in Iowa City, Iowa. Five staff participants from the service agency included the executive director, case manager, meals coordinator, nutrition specialist and volunteer coordinator. Five older adults aged 60 and older residing in Iowa City or surrounding areas were recruited through

the participating service agency, a senior centre and the registry of research participants maintained by The University of Iowa Center on Aging, Seniors Together in Aging Research. Participants from the community (non-agency staff) received a US $20 gift card for a local retail store after the interview.

Group training and focus groups.—After making minor modifications to the contents based on the findings from the individual interviews, the programme was pilot tested in five small-group trainings. Each training session was followed by a focus group to elicit perceptions, reactions and recommendations for changes. A total of 30 older adults participated: local senior centre (two groups; ten participants), church (one group; 8 participants) and a government-subsidised apartment building for older adults (two groups; 12 participants). Participants also completed surveys before and one month after the programme. The baseline survey was distributed at the time of the enrolment and returned on the day of the training. The follow-up survey was mailed and participants either mailed back the completed survey (N = 12) or completed it through in-person (N = 6) or telephone interviews (N= 9). Each participant received a US $20 gift card for a local retail store after completing the baseline survey and participating in the training and focus group, and then received another US $10 gift card after completing the follow-up survey. This project was approved by the Institutional Review Board at the University of Iowa.

Measures

Interview and focus group guides.—Open-ended questions were developed based on the concepts of the EPPM. Questions included: past experiences with disaster and emergency situations; current and planned preparedness behaviours; perceptions about [their own/their elderly clients'] susceptibility to disaster and emergency situations and how severe the consequences would be; perceptions about [their own/their clients'] ability to engage in preparedness behaviours and how such behaviours can avert the threat and consequences of disaster and emergency situations; perceived barriers to these behaviours; and reactions to the contents of the presented programme. Demographic information (*i.e.* age, gender, race, educational attainment, marital status, number of adults in the household and work status) was self-reported at the end of the interview by those who participated in individual interviews or as part of the baseline survey for those who participated in training.

Survey questions.—Baseline and follow-up surveys contained questions about six types of disasters (*i.e.* flood, tornado, fire, severe thunder/wind/hail storms, winter/snow/ice storms, severe heat wave). For each disaster type, respondents used five-point Likert scales to rate their perceptions about the likelihood of experiencing the disaster (perceived susceptibility), severity of the consequences (perceived severity), confidence in preparing for the disaster (self-efficacy) and confidence that being prepared will help them reduce the consequences of the disaster. A variable of *severe weather* was created by taking an average for three of the types: severe thunder/ wind/hail storms, winter/snow/ice storms and severe heat wave. Thus, a total of 16 variables were constructed, four EPPM constructs for four disaster types (*i.e.* flood, tornado, severe weather, fire). Participants also indicated whether they engaged in 16 disaster preparedness behaviours such as having an emergency kit, having emergency plans, and discussing plans with others during the past year (baseline) or

past month (follow-up). Additionally, participants identified barriers to behaviours by indicating which reasons from a list of seven applied to them (*e.g.* others will help me, don't know how, no time).

Analyses

All interviews and focus group discussions were professionally transcribed verbatim, coded and analysed using NVvo 10, a software for qualitative analysis. Themes, both pre-determined (EPPM constructs) and that emerged from the obtained data, were coded, and a template organising style was used to identify thematic patterns (Crabtree and Miller 1999). Coding was conducted by three researchers, with at least two researchers coding each transcript, and reliability of the coding was enhanced through discussion with all team members and investigators. Descriptive characteristics and distribution of the responses for the data obtained through the structured survey were examined and paired sample *t*-tests were conducted to examine the potential changes in perceptions before and after the training using the Statistical Package for the Social Sciences, version 22 (IBM Corporation 2013).

Results

Participant characteristics and experiences with disasters

Five service providers and five older adults participated in the individual interviews and a total of 30 older adults participated in five group trainings and subsequent focus groups. Service providers were between the ages of 56 and 70, with three providers being aged 60 and older. The average age of older community residents was 72 years, ranging from 59 to 92. The majority of the participants were female, white, not currently married and lived alone (Table 1).

Data from the survey show that the majority of the participants had past experiences with winter/snow/ice storms (80%), floods (73%), severe thunder storm/hail (68%) and tornados (63%). The Iowa flood of 2008 was the most recent and frequently mentioned disaster during which service providers assisted their clients and found that many of them had 'no starting place' to cope with the disaster. Some older participants reported loss of valuable possessions and temporary dislocation during and after this event. Tornados were also mentioned frequently, with some reporting associated physical injuries and emotional distress. Older adults talked about their experiences from their childhood and as older adults, and stated that all of these experiences have shaped their risk perceptions about disasters.

Perceptions about disaster and preparedness: EPPM constructs

Perceived susceptibility.—There were differences among the participants in the levels of perceived susceptibility. Participants generally believed that disasters are likely to occur, especially floods, tornados and severe storms. As one participant stated, 'I think in today's world, we're all aware that we're very vulnerable … at a moment's notice to a lot of disaster types'. Service providers, however, felt that their clients had very low levels of perceived susceptibility. Consistent with this report, some older adults in the focus groups did not believe that they would personally be affected by a disaster, 'I've never been through one,

and I've lived here 20 years' or 'That's not gonna happen to me. It's gonna happen down the street'.

Perceived severity.—Service providers felt that older adults in their community were at high risk for adverse outcomes if disaster and emergency situations occur. They were particularly concerned about power outage being detrimental to some of their clients, 'We worry about people who are on oxygen, are stuck in their homes, can't get out. You can't get to them'. Older adults, especially those with personal disaster experiences, felt that the consequences can be very severe, 'Fear of - having been through one - because I've been through some of that stuff'. Many participants shared their recent experiences, 'The tornado … It blew out all my windows and literally … I had a cast on. I had a broken foot' and 'I was in the flood of – I think it's 2008 it was. Lost a lot of my possessions'.

Self-efficacy.—Service providers felt that their clients would have difficulty following the steps recommended in the programme, 'To be honest with you, some of those folks - if they're homebound and without family support - this whole thing would be like difficult anyway'. Perceptions of selfefficacy, however, differed among older participants. Some indicated high levels of self-efficacy, stating that the recommendations provided were 'realistic': 'Well, I don't think they'll be that hard to do' and 'It's fairly simple. It would take a little time to pull it together'. Others acknowledged that some steps, *e.g.* creating the preparedness kit, may be difficult due to financial and physical limitations. As one participant said, 'Cause frankly, when it comes to parting with money to … be able to get those things, it's not as easy as it seems'. Additional barriers reported by older participants include not knowing where to obtain supplies or how to obtain extra medications, and adding to the 'clutter' in the house or apartment with limited space. Several participants also expressed concerns about their neighbours with cognitive disabilities.

Response efficacy.—Service providers felt that most of their clients did not currently have any plans to prepare or are currently prepared for disasters, but believed that doing so will lead to better disaster outcomes. Providers felt that implementing preparedness actions could ease anxiety, develop a sense of security, and lessen potential negative physical and emotional consequences: 'The more people that are prepared, the less trauma there will be at the time it actually occurs. It's very helpful for anybody that tries to go in and assist them'. Older participants generally showed excitement about the presented programme, stating that engaging in these recommended actions would help them better prepare for disasters, 'I think that'll help me with immediate threat preparation. It'll help me be more comfortable'. Another participant said that the programme would have been helpful in disaster situations that he previously experienced. Some participants, however, felt that they did not need to be prepared, stating 'Well, my kids will take care of me' or 'I've gone the route of having a three-day kit, which never works out very well. Put it together, and then forget about it'. Participants also felt that some of the recommended actions were not relevant to them, 'Some of the things, at least in our situation, simply aren't essential'.

Processes of motivation

Much of the focus group discussions centred on participants processing the provided information within their personal contexts considering physical and financial situations. Several participants admitted that they did not want to think about the possibility of a disaster, suggesting their engagement in the *fear control process.* One woman described her feelings, 'Because I don't want to think about it. That's really - I don't want to think about it. Same reason I haven't got my final passage papers written up for when I die'. Another older adult cautioned, 'People think about these things from time to time, and they get scared' and 'I guess the thing you always worry about is getting people too anxious about stuff. You want them to be able to respond, not be so, "Ohhh! Oh, my, gosh!" where they wouldn't wanna deal with it'.

Conversely, many participants stated that the programme motivated them to become prepared, suggesting their willingness to engage in the *danger control processes.* Participants felt that the programme made them aware of the things previously not considered. As one participant said, 'It makes me feel more likely to prepare. I mean, one can see the wisdom of it. Instead of just throwing it off, this is gonna encourage me to think about it more'. Others were already aware of the dangers of the disasters and how to prepare, but the training reminded and encouraged them to take actions, 'I knew this. I just needed to be reminded'. Some participants also shared their specific plans, 'I think I'll make more effort to get the food supply thing and a clothing plan. I can just stick that downstairs, no sweat'. Several participants also indicated their intent to initiate conversations with family about their needs.

Table 2 presents data from 27 participants who completed both the baseline and follow-up surveys. The average perceived susceptibility of all disaster types was 2.98 (standard deviation (SD) = 0.53), indicating 'somewhat likely' to experience disasters at baseline, and that increased to 3.41 (SD = 0.69), indicating between 'very likely' and 'extremely likely' one month later. For perceived severity, the average at baseline was 2.97 (SD = 0.66), indicating 'somewhat severe', and it increased to 3.51 (SD = 0.90) at follow-up, indicating between 'very severe' and 'extremely severe'. The results of the paired sample *t*-tests showed significant increase in overall perceived susceptibility ($p = 0.006$) and severity ($p < 0.001$). The levels of self-efficacy and response efficacy did not change significantly, with average self-efficacy being around 3, 'somewhat confident', and average response efficacy being around 3.7, between 'somewhat' and 'very confident'.

Disaster preparedness behaviours

Participants reported various levels of preparedness at the time of the programme. Some believed that they were somewhat prepared, while others felt like they were not at all prepared, especially after learning the programme contents, 'I don't know if I'm quite as prepared like I need to be'. Some participants reported their current behaviours during the focus group, encouraging others to do the same, 'What I have done … being here alone, living in Iowa with no close, immediate family … on my door at my apartment, I have all my emergency numbers taped right to the door'. According to the survey data (Table 3), many already had supplies needed for emergency situations such as a flashlight (88.9%), three-day supply of medication (88.9%) and fire extinguisher (76.9%), whereas fewer had an

emergency kit put together (25.9%). However, ten participants who reported not having a kit at baseline reported having one at follow-up. Similarly, six participants who did not have a radio and five who did not have extra batteries at baseline reported having them one month after the training Furthermore, ten additional people had alternate sheltering and eight additional people reported discussing their plans with neighbours at follow-up. Participants reported having an average of 7.59 (SD = 2.59) and 8.74 (SD = 2.64) out of 12 supply items assessed at baseline and follow-up, respectively. This increase was statistically significant based on a paired sample t-test ($t = 2.76$, $p = 0.010$). For four action questions (*i.e.* identified sheltering, discussed with household, neighbours, family/ friends), participants reported engaging in an average of 1.30 (SD= 1.23) and 1.93 (SD = 0.96) actions at baseline and follow-up, respectively ($t = —2.77$, $p = 0.10$). In terms of perceived barriers, ten individuals who said 'other people will help me' and nine who said 'I don't know what to do' at baseline no longer reported these as barriers at follow-up. On the other hand, seven who did not select 'no time' at baseline reported this as a barrier at follow-up, potentially showing that some participants actually tried to act upon the recommendations after the training but were not able to do so in one month.

The emerged theme: 'social relationships'

Participants frequently talked about their relationships with family and friends when discussing disasters and related behaviours. Further analyses revealed that the social relationships older adults have with others have three main roles in terms of their disaster preparedness: social relationships as (a) resources, (b) barriers and (c) motivators.

Social relationships as resources.

Participants talked about social support they receive from family and friends, and resources available in their community. Most participants identified children and siblings as the primary source of support in the event of an emergency. Some also discussed the role of neighbours and friends, 'She went door to door telling everybody that there was a storm coming'. These supports, however, were identified as available in the event of an emergency (emergency response). Both service providers and older adults pointed out the need for support systems to help them take preparedness actions (*e.g.* purchase items for emergency kit, plan escape routes). Participants recommended that members of their personal support network (family, friends and neighbours) be included in the training or be provided with information to make them aware what types of support are needed.

Social relationships as barriers.

Participants also identified strong support from family and community as one of the barriers in taking preparedness steps. Participants stated 'My kids will take care of me' or indicated that they would be taken care of through the disaster plans that are in place in the community by the fire and police departments. Thus, disaster preparedness programmes should emphasise the need for preparedness at both community (*e.g.* response plans) and personal levels (*e.g.* need to be self-sufficient until responders can reach and assist them).

Social relationships as motivators.

When asked about reasons for not taking some of the preparedness steps, many participants stated that they did not feel the need to be prepared due to their age. As participants stated, 'If we're too old, we don't give a darn' or 'We're all old enough though that we have this philosophy, whatever's gonna happen's gonna happen. We might not be as worried about tomorrow'. This suggests that the concepts of the EPPM, participants' perceptions about personal risks and benefits may not be strong enough motivators to encourage preparedness behaviours. On the other hand, participants often indicated that they would engage in preparedness behaviours if they needed to protect others. A quote summarises this theme that arose in most of the focus groups: 'We have our families raised. We've lived our lives. We don't have those other people close and living with us. Had we family living with us, then it would be an altogether different situation'. In discussion about social relationships during the focus groups, many indicated their increased motivation to take actions as they became aware that having enough food and water would help their family, friends and neighbours in case of emergency.

Discussion

This study explored the psychological factors that may underlie older adults' motivation to engage in disaster preparedness behaviours using the concepts of the EPPM. Figure 1 presents a summary of the findings of this study and provides guidance for future research and practice. Findings suggest that, in addition to the perceptions of personal risks and benefits, considering the roles of social relationships and addressing risks and benefits to important others such as family and friends may be beneficial in motivating preparedness behaviours among community-dwelling older adults. In addition, facilitating co-operative actions by involving family and friends in intervention programmes may be appealing to older adults who desire to ensure the preparedness and wellbeing of their entire social groups.

In general, participants believed that they were at risk of encountering disaster and emergency situations in the near future and that their consequences can be severe, listing potential physical injury, emotional distress, and social and financial consequences. Participants who had never experienced disaster or emergency situations reported lower levels of perceived susceptibility, thus, efforts to increase risk perception may focus on those individuals. The perceptions of severity of negative consequences, however, were already high and may not need to be further influenced through interventions. Some participants indicated that they sometimes avoided thinking about potential risks due to fear. Thus, careful considerations should be made in interventions to avoid increasing the fear too high so that it would not deter older adults' motivation to engage in preparedness behaviours (Witte and Allen 2000). To motivate actions, stronger emphasis may be placed on increasing perceived susceptibility rather than severity.

When presented with the materials of the disaster preparedness programme, participants expressed different levels of self-efficacy to engage in the recommended behaviours. This perception depended on the nature of the behaviour with some behaviours being perceived as easier than others. However, in some cases, behaviours that were perceived as 'easy' by

some participants were considered difficult by others (*e.g.* store food and water, practise escape route) due to the physical and financial situations. Such behavioural barriers were also pointed out in previous literature (Heller *et al.* 2005; Li 2009). Thus, interventions aiming to facilitate preparedness behaviours among older adults should carefully assess theirsocial and physical contexts to identify optimal support strategies. Participants generally reported high levels of response efficacy, stating that engaging in the recommended behaviours would improve disaster outcomes. Participants specifically pointed out the perceived benefits of developing a personal support network, keeping three to seven days of medication and medical supplies, and storing a three-day supply of water. However, not all recommendations were seen as relevant and some participants felt overwhelmed by the number of recommendations made in the programme. Therefore, intervention programmes should assist older adults in identifying essential actions and developing feasible tailored plans. Doing so will help increase their self-efficacy and ultimately facilitate preparedness behaviours.

Although the concepts of the EPPM helped us understand preparedness behaviours and motivations among older adults to some extent, not all participants who reported the perceptions of personal risk and high levels of self-efficacy and response efficacy expressed their intent to follow recommended actions. Through further analyses of the qualitative data, a theme that frequently recurred, ‘social support’, provided additional insights. The analyses revealed three main roles of social relationships as sources of support, barriers and motivations. Family, friends and community were seen as sources of support in disaster and emergency situations. However, participants reported little support availability in terms of facilitating preparedness behaviours, suggesting the need for support programmes to help older adults within the community to engage in preparedness behaviours, such as helping with shopping and making modifications to their homes. In addition, some participants identified having a strong support system from family and the community as a barrier to the preparedness behaviours because they tended to trust that they would be taken care of. However, through focus group discussions, many participants realised that they had never discussed such reliance with those on whom they depend, and that they needed to take actions to either become prepared or make their family aware of their needs. Finally, many older adults indicated that they would be motivated to take preparedness actions if they needed to protect others (*e.g.* children, grandchildren), whereas they were less motivated about improving their own disaster outcomes as they were ‘old’ and had lived their lives.

These findings suggest the benefits of utilising social relationships of older adults to facilitate reciprocal interactions and exchange of resources. Research on the concept of generativity shows that older adults desire to contribute to the wellbeing of future generations and society in later life, and being able to engage in generative activities led to psychological benefits among older adults (Erikson 1982; McAdams and de St. Aubin 1992). This phenomenon has been reported in many cultures including the USA (Choi and Kim 2011; McAdams 2006), the United Kingdom (McMunn *et al.* 2009; Wahrendorf and Siegrist 2010), Canada (Misener, Doherty and Hamm-Kerwin 2010; Narushima 2005), Australia (Parkinson *et al.* 2010), Singapore (Schwingel *et al.* 2009) and Hong Kong (Cheng 2009). Participants in the current study clearly indicated their desire to contribute to the wellbeing of their children, grandchildren and neighbours more so than ensuring their own

wellbeing. Strong evidence also exists for the psychological benefits of engaging in reciprocal social relationships in which support and resources are both provided and received (Heaney and Israel 2008; House, Landis and Umberson 1988). Therefore, disaster preparedness programmes for older adults may capitalise upon this desire to engage in generative activity and aim to increase awareness that being prepared increases their ability to become valuable resources for their family and community.

Family resilience, 'the ability of social units to mitigate hazards, contain the effects of disasters and conduct recovery activities in ways that minimise social disruption' (Bruneau *et al.* 2003: 735), has been shown to be associated with the extent to which family members engage in risk-reduction measures (National Science and Technology Council 2005). Thus, encouraging older adults to help enhance resilience of their social groups is likely to strengthen their groups' ability to mitigate hazards successfully and recover from disasters better. The findings of this current study suggest that such approaches to empower and motivate older adults may be more effective than highlighting their personal risks and wellbeing. The WHO (2008) promotes the enhancement of the 'positive contribution made by older persons during emergencies'. In some countries like Cuba and Indonesia, older adults are relied upon for their advice and assistance in disaster preparedness and management due to their past experiences with disaster situations (WHO 2008). Although older adults actively participate in local committees for disaster preparedness, response and recovery in these countries, other countries consider older adults as unable to participate or exclude them by using age restrictions (WHO 2008). Providing structure and opportunity for older adults who are willing to assist in emergencies to become active participants and role models in emergency planning can bring great benefits to communities at risk for disaster situations.

Limitations

This was a small project conducted as part of the formative research to translate and pilot test a disaster preparedness intervention programme for community-dwelling older adults. Therefore, all participants came from one community in Iowa that had a particular set of disaster experiences such as the Iowa flood of 2008. However, this study was successful in involving participants from various socio-economic backgrounds by recruiting from different settings including a government-subsidised low-income housing building. Although the findings may not be readily generalised to other populations with different cultural and historical backgrounds, the data obtained through in-depth interviews and focus groups provide insights on some of the reasons why older adults may or may not engage in disaster preparedness behaviours. The key motivator of preparedness behaviours among older adults identified in this study, a desire to engage in generative activity, is relevant to many cultures in various countries and provides a potential point of departure for future research and practice in many cultural settings. Due to the small sample size, survey data can only be assessed through evaluating the changes in descriptive statistics. However, these data provide insights on the potential changes in perceptions and behaviours after the intervention programme. As discussed above, the programme appears to have helped to increase awareness about disasters and reduce some perceptions related to behavioural barriers (*e.g.* thinking that others will help, don't know what to do) among some of the participants.

Future studies should investigate whether older adults' preparedness behaviours change in relation to older adults' perceptions about disaster risks for their family and friends as well as perceived benefits of being prepared for disaster outcomes of family and important others.

Considerations for the intervention

Several modifications were made to the programme based on the findings of this study in relation to the EPPM concepts. A section was added to further increase self-efficacy by providing specific questions that older adults can ask their health-care providers and pharmacists (*e.g.* 'How do I safely reduce the amount I take to make it last longer?', 'How do I safely reuse or sterilise medical supplies?'). Similarly, a new section that includes information on assisting individuals with dementia was added because many participants expressed the need to address this challenge. To encourage support seeking and mutual social exchanges, messages such as 'everyone is affected' was added to increase awareness about reciprocal social exchanges that occur within the community in emergency situations that are not unique to older adults. While older adults may view unsolicited assistance from others as unwanted or unpleasant (Smith and Goodnow 1999), a reciprocal exchange of resources may enhance motivation to engage with others. Finally, a concluding section states 'Seniors play an important role in the community', to empower older adults and to encourage the enhancement of family and community resilience. This section emphasises the important role older adults can play as valuable family and community resources by being prepared themselves.

Participants particularly liked the group format as they were able to exchange ideas, suggestions and encouragement during the programme. Especially in the groups that were conducted at a senior apartment building, participants discussed ways in which they could work together to store extra supplies in the basement and help the neighbours with mobility limitations. A number of older adults also wanted their support network members (family and friends) to be involved in the programme so that their emergency plans can be developed together and the entire social group would be better prepared. Such an approach to develop disaster plans jointly will further strengthen the resilience of their social groups, and will be consistent with the recommendation to capitalise upon strong familial and community ties to enhance wellbeing outcomes of older adults after a disaster (Acierno *et al.* 2006).

Conclusions

The findings of this study suggest that the perceptions of susceptibility to disasters, severity of the consequences, ability to engage in preparedness behaviours and benefits of engaging in such preparedness behaviours partly explained whether older adults were motivated to take preparedness actions. A strong theme that embraces the roles of social relationships emerged from the data, suggesting that the social relationships older adults have with others can act as facilitator, barriers and motivators of the preparedness behaviours. Findings suggest the need for support for not only responding to but also preparing for disasters, and clarifying the social roles of the community (*e.g.* responders) and individuals (*e.g.* older adults) in disaster situations. Furthermore, older adults expressed desire to help others that may act as a motivator to engage in preparedness behaviours. Thus, interventions aiming to facilitate preparedness behaviours among older adults should carefully consider the roles of

social relationships in addition to perceptions about personal risks and wellbeing. Such efforts to strengthen the social systems surrounding older adults are especially beneficial for rural communities that have lower availability of or longer geographic distances to disaster-related resources.

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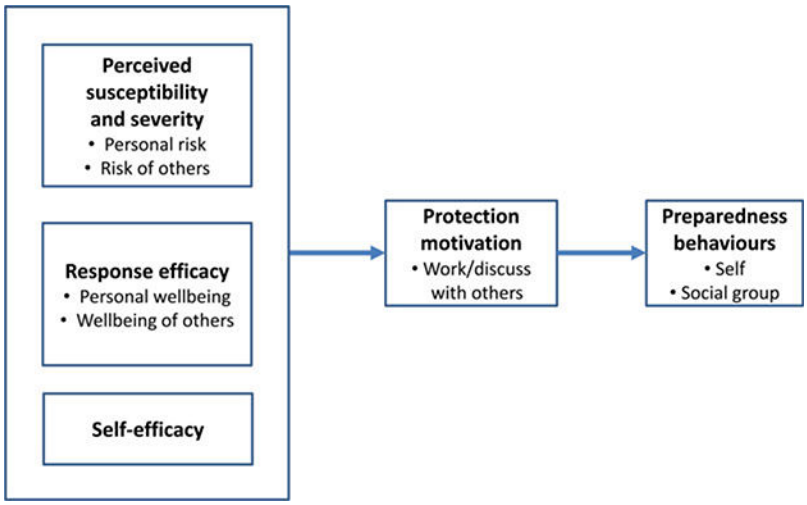

Figure 1.
Underlying factors of older adults' motivation to engage in preparedness behaviours.

Table 1.

Characteristics of the participants

	Interviews		
	Service providers	**Community residents**	**Focus groups**
N	5	5	30
Mean age (SD)	63.4 (6.47)	67.2 (7.50)	75.72 (8.94)
		Frequencies (%)	
Female	4 (80)	4 (80)	23(79.3)
Married[1]	2 (40)	1 (20)	7(23.3)
Live alone	3 (60)	4 (80)	24 (80)
	Race:		
White	5 (100)	4 (80)	28 (93.3)
African American/other	0 (0)	1 (20)	2 (6.7)
	Education:		
High school degree	0 (0)	2 (40)	9 (30)
Some college	2 (40)	3 (60)	5 (16.7)
College degree or more	3 (60)	0 (0)	16 (53.3)
	Employment:		
Currently employed	3 (60)	1 (20)	6 (20)
Currently volunteer	2 (40)	1 (20)	5 (16.7)
	Income (US $):[2]		
Under 20,000	1 (20)	1 (25)	15 (65.2)
20,000—39,999	1 (20)	2 (50)	4 (17.4)
40,0000 or more	3 (60)	1 (25)	4 (17.4)

1. *Notes*: 'Not married' includes never married, divorced, separated, widowed and no spouse.

2. Information on income available for four interview and 23 focus group participants. SD: standard deviation.

Table 2.

Perceptions about disasters and preparedness steps

			Paired sample	
	Baseline	**Follow-up**	***t***	***p***
	Mean values (SD)			
Susceptibility (average):[1]	2.98 (0.53)	3.41(0.69)	3.003**	0.006
Flood	2.19 (0.92)	2.30 (1.41)	0.414	0.683
Tornado	3.15 (0.95)	3.52 (1.01)	1.845	0.076
Severe storm	3.46 (0.73)	4.05 (0.72)	3.006**	0.006
Fire	2.15 (0.91)	2.52 (1.01)	2.294*	0.030
Severity (average):[2]	2.97 (0.66)	35 (0.90)	4.082**	0.000
Flood	2.12 (o.91)	3.04 (1.34)	3.554**	0.002
Tornado	3.37 (1.01)	3.93 (1.07)	2.66*	o.013
Severe storm	2.85 (0.9i)	3.40 (i.08)	3.395	0.002
Fire	3.69 (1.38)	3.92 (1.32)	0.756	0.457
Self-efficacy to prepare (average):[3]	2.97 (0.84)	3.28 (0.94)	1.891	0.070
Flood	2.93 (1.17)	3.11(1.31)	0.723	0.476
Tornado	2.78 (0.93)	3.07 (1.33)	1.354	0.187
Severe storm	3.i2 (0.92)	3.56 (0.98)	2.249	0.033
Fire	2.74 (i.i6)	2.85 (1.20)	0.391	0.699
Response efficacy (average):[4]	3.78 (0.88)	3.70 (0.77)	0.343	0.735
Flood	3.81 (1.04)	3.67 (1.08)	−0.478	0.637
Tornado	3.78 (0.89)	3.63 (0.92)	−0.518	0.609
Severe storm	3.82 (0.84)	3.74 (0.78)	−0.404	0.690
Fire	3.59 (1.19)	3.67 (1.00)	0.290	0.774

Notes: N = 27. 'Severe storm' is a combination of three items: severe thunder/wind/hail storms, winter/snow/ice storms and severe heat wave.

1. Not at all likely (1),a little likely (2), somewhat likely (3), very likely (4), extremely likely (5).

2. Not at all severe (1), a little severe (2), somewhat severe (3), very severe (4), extremely severe (5).

3. Not at all confident (1), a little confident (2), somewhat confident (3), very confident (4), extremely confident (5).

4. Strongly disagree (1), disagree (2), neither agree nor disagree (3), agree (4), strongly agree (5). SD: standard deviation.

Significance levels.

* $p < 0.05$,

** $p < 0.01$.

Table 3.

Preparedness behaviours

	Baseline	Follow-up	'No' at baseline but 'yes' at follow-up
	Frequencies (%)		
Currently have:			
Smoke detector	27 (100)	27 (100)	0 (0)
Flashlights	24 (88.9)	25 (92.6)	1 (3.7)
Three-day medication	24 (88.9)	25 (92.6)	1 (3.7)
Fire extinguisher	20 (76.9)	23 (85.2)	3 (11.1)
Three-day food and water	18 (69.2)	22 (81.5)	4 (14.8)
Extra batteries	18 (66.7)	22 (81.5)	5 (18.5)
An emergency plan	17 (65.4)	21 (77.8)	3 (11-1)
First aid kit	16 (59–3)	17 (63.0)	3 (11.1)
Carbon monoxide detector	12 (44.4)	9 (33.3)	2 (7.4)
Radio	11 (40.7)	17 (63.0)	6 (22.2)
Special medical equipment[1]	11 (40.7)	12 (44.4)	4 (14.8)
Emergency kit	7 (25.9)	11 (40.7)	10 (37.0)
In the past year (in the past month):			
Discussed preparedness within household[2]	5 (83.3)	6 (100)	1 (16.7)
Discussed preparedness with neighbours	6 (22.2)	12 (44.4)	8 (29.6)
Discussed special procedures with family/Friends	10 (40.0)	15 (55.6)	9 (33.3)
Identified alternate sheltering Reasons for not taking some steps	13 (48.1)	22 (81.5)	10 (37.0)
Reasons for not taking some steps:			'Yes' at baseline but 'no' at follow-up
Others will help me	14 (51.9)	4 (14.8)	10 (37.0)
Don't know what to do	10 (37.0)	3 (11.1)	9 (33.3)
Don't want to think about it	8 (29.6)	3 (11.1)	6 (22.2)
Don't have time	5 (18.5)	9 (33.3)	3 (11.1)
Don't think I can	3 (11.0	1 (3.7)	3 (11.1)
Won't make a difference	3 (11.1)	1 (3.7)	2 (7.4)
Costs too much	2 (7.4)	2 (7.4)	1 (3.7)

Notes: N = 27.

1. This item was relevant to 25 participants (11/25 = 44%).

2. Six participants were living with somebody else.