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Older adults in disaster and emergency management: What are the priority research areas in Australia?

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Older adults in disaster and emergency management: What are the priority research areas in Australia?

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Abstract

In Australia, the proportion of people aged over 65 years is increasing and the frequency and severity of natural hazard events are also increasing. Older adults are often identified as a vulnerable group in natural hazard events, but there has been relatively little research that focuses specifically on older adults and their capacities and needs. This paper describes stakeholder consultation undertaken to identify research priorities related to older adults and natural hazards in Australia, and compares this to current research literature on this topic identified in an initial scoping review. A two-phase modified Delphi study was undertaken with stakeholder organisations within Australia, including older adults' representative organisations, community services, and emergency services. Stakeholders ($n=112$) first identified priority research areas. 649 distinct topics were suggested; thematic analysis was used to refine these to 19 research topic areas that were then rated and ranked for importance by stakeholders during phase two. The top five topic areas identified were 'Communication and warnings,' 'Preparedness,' 'Awareness, behaviour and decision-making,' 'Culturally and Linguistically Diverse (CALD) communities,' and 'Community services and organisations'. While these topics are covered in some Australian literature, further research – particularly in relation to CALD communities, and community services/organisations – is needed. This study demonstrates the value of stakeholder engagement and the Delphi approach for identifying research priorities that can best address issues and concerns amongst diverse stakeholders. It also highlights that there is a need for further research with older adults, communities, and stakeholders to support preparedness, risk reduction, and resilience.

Keywords

Natural hazards, Emergency Management, Disaster management, Older adults, Delphi method, Stakeholder engagement

Introduction

Older adults are typically identified as a distinct vulnerable group to natural hazards (Kwan & Walsh, 2017; Leyva, Beaman, & Davidson, 2017). The increasing frequency and severity of natural hazards, and the global trend of ageing populations, highlight the importance of better understanding how to support the safety of older adults in disaster management (Beard et al., 2016; Duggan, Deeny, Spelman, & Vitale, 2010; Gearhart et al., 2018). In Australia, disaster management is typically framed as a “shared responsibility” among individuals, families, communities, and authorities (COAG, 2011; León & March, 2016; Singh-Peterson, Salmon, Baldwin, & Goode, 2015). Understanding the specific needs and strengths of older adults, and the extent to which these can be supported through this disaster management paradigm is an important issue. There is also a growing body of scholarship in the Australian context that documents the strengths, needs, and challenges faced by specific ‘vulnerable groups’ (for example, children and young people, people with disabilities, people with pets (Thompson et al., 2014; Towers, Haynes, Sewell, Bailie, & Cross, 2014)), but there has been less attention to older adults as a cohort.

The purpose of this research is to gain a better understanding of the research priorities pertaining to older adults in the context of natural hazards in Australia. This paper begins with a scoping review of the global and Australian literature on this topic. Next, we describe using a modified Delphi approach with stakeholders in Australia to identify research priorities, and we explore the extent to which these priorities align with current research. We conclude with a discussion of the strengths and limitations of the current research and recommendations for future research. We argue that close engagement with stakeholders in academic research is valuable to identify research priorities, and that the Delphi approach can be used to identify shared priorities amongst diverse stakeholders.

Literature Review

A scoping literature review was conducted in October 2018 using two databases: Scopus and Web of Science. The importance of conducting this review was to place the Australian perspective within the wider context of international research on natural hazard and older adults. Furthermore, the literature will supplement the respondents’ identified priorities, via comparison that will enable an identification of the gaps in disaster and emergency management, and avenues for further research. The following criteria were applied to database searches by searching article title, abstract and keywords. Each search was within 2000-2018, and included the keywords “older adults,” “elderly,” and “ageing.” Nine searches were conducted per database, using the following hazard terms: “bushfire,” “wildfire,” “forest fire,” “cyclone,” “hurricane,” “earthquake,” “flood,” “heatwave,” “tsunami,” “natural hazard,” and “natural disaster.” The inclusion criteria were older adult related articles, scholarly peer-reviewed literature, and people-related articles (i.e. non-people related articles were excluded, e.g., ‘ageing infrastructure,’ or ‘ageing structures’).

Previous literature suggest that referring to disaster and hazard events as ‘natural’ is problematic in that it conceals the socio-political processes involved in making some populations more or less vulnerable to the devastating effects of these events (Gaillard, Liamzon, & Villanueva, 2007; Kevin, Garcia, & Jacob, 2016; O’Keefe, Westgate, & Wisner,

1976). However, while there is much recent consensus that the terms ‘natural disaster’ should be obsolete, ‘natural hazards’ are terms still commonly used by many practitioners and academics who work in emergency management. There is also important older literature (and some more recent), that warrants inclusion, that uses the terms ‘natural disaster’. It was therefore important to use these terms in the literature review search and questionnaire, although the authors fully recognise that levels of exposure to, and the consequences of hazards are very much rooted in socio-political processes

The hazard specific keywords were selected based on Question 5 responses from the Phase 1 responses provided in the current study (see Appendix A). The Australian terms provided, were broadened to encompass equivalent international terminology. For example, “wildfire,” and “forest fire,” are equivalent to “bushfires, and “hurricane” to “cyclone”. Hence, “bushfire,” “wildfire,” and “forest fire” were combined into a category named “fire,” and “cyclone” and “hurricane,” as well as “natural disaster” and “natural hazard,” were combined into singular categories. “Volcano” was mentioned by one respondent, however, considering that domestic volcanic activity is not included within Australian emergency management arrangements it was excluded from the literature review keywords. Finally, although drought is a prevalent natural hazard in Australia, Phase 1 respondents did not note it as relevant to older adults in the context of disaster and emergency management, hence it was excluded.

References were imported to EndNote and duplicates across the two databases were removed. Smart Groups were created to allow for references to be manually crosschecked using the previously mentioned search terms. The Smart Groups were produced using the following search terms: “Title contains (keyword) OR abstract contains (keyword) AND title contains (hazard) OR abstract contains (hazard).” To ensure accuracy of our inclusion and exclusion criteria, Database and Smart Group outputs were refined manually to make up the final groups outlined in Table 1. The articles in each hazard group were separated by country or countries that were included in the research, and grouped into Developed Countries, Developing Countries, and Multiple Countries/Worldwide. Some articles discussed multiple hazards, or both developed and developing countries. The total number of articles after refining and removing duplicates was 719. The majority of peer reviewed articles published were about developed countries ($n= 736$), which was considerably higher than developing countries ($n= 138$). Most publications focused on earthquakes ($n= 270$) and cyclones and hurricanes ($n= 196$) and the least number of published articles was on fires ($n= 48$). Out of the 719 publications, 42 were focused on Australian hazards; these were imported to EndNote for further investigation.

Table 1 Number of Search Returns

Natural Hazard	Developed Countries	Developing Countries	Multiple Countries/ Worldwide	Total Articles	Australian Publications
Fire	26	10	12	48	10

Cyclone, Hurricane	174	7	15	196	3
Earthquake	201	54	15	270	-
Flood	68	19	13	100	8
Heatwave	67	7	9	83	16
Tsunami	73	17	17	107	-
Natural disaster/ hazard	127	24	26	177	8
<i>Total</i>	<i>736</i>	<i>138</i>	<i>107</i>	<i>981</i>	<i>45</i>
<i>Total- With Duplicates Categories Removed</i>				<i>719</i>	<i>41</i>

In Australia, heatwaves ($n= 16$) was the most prevalent topic identified. The vast majority of research on the elderly and heatwaves is focuses on health impacts. Older adults were identified as more vulnerable to extreme heat than other age groups in these articles, although some only note this vulnerability rather than purposively engaging with older adults as research participants or as a cohort (for example, Bennetts, Pullen, & Zillante, 2012). Several studies used hospital admissions and other health data to quantify the morbidity and mortality effects of heatwaves through a range of physiological and physical factors, particularly renal diseases (Nitschke et al., 2011; Toloo et al., 2014; Tong, Wang, Fitzgerald, et al., 2014; Tong, Wang, Yu, Chen, & Wang, 2014; Wang et al., 2012). Increased mortality risk was found for those with pre-existing heart disease and dementia, respiratory illness (P. Thomas, Swaminathan, & Lucas, 2012) for those from low socio-economic status groups (Nitschke et al., 2011; Zhang et al., 2016), and in older females – which could be explained by menopause-related thermoregulation and cardiovascular issues (Tong, Wang, Yu, et al., 2014).

Heatwave studies provide a number of recommendations. A review of heat-related health risk and discourse on the role of general practitioners (GPs) by Wilson, Black, and Veitch (2011) concluded that, GPs play a crucial role in heatwaves for older adults. GPs can identify at risk older adults and implement tailored strategies for minimising morbidity and mortality, during periods of extreme heat. Based on a case-control study of past admissions of older adults into the emergency department from heatwaves, Dalip, Phillips, Jelinek, and Weiland (2015), suggested developing heat-related response plans, such as providing extra resources, training and coordination among carers and health professionals working with older adults (McInnes & Ibrahim, 2010). Cheng et al. (2018) suggested increasing community-based communication, effective warning systems and interventions targeted at the elderly population, from data on temperature and mortality. Suggested preparedness strategies in the literature include media-run education campaigns about heat-related risks to health and how to prevent them – obtained from an argumentative policy analysis from anonymous semi-structured interviews with stakeholders (Bi, van Iersel, & Saniotis, 2011) – and strategies that promote adaptive behaviours and knowledge about heat-related health, such as having air conditioning in the bedroom or house (Hansen et al., 2015b; Zhang et al.,

2016), being prepared for power failures (Hansen et al., 2011), and using emergency buttons and refreshments for hydration (Zhang et al., 2016). Bennetts et al. (2012) suggested design prevention strategies that are protective for both health and expenses, such as creating a cool refuge, which can be implemented in both new and existing houses.

Our dataset revealed 10 publications on fires. Haikerwal et al. (2015) conducted time-stratified case-crossover study using health data from registries, from the 2006-2007 fires in Victoria, Australia. There were significant increases of out-of-hospital cardiac arrests and ischemic heart disease related hospital admissions particularly in older adults over 65. In regard to evacuation, Shahparvari, Chhetri, Abareshi, Abbasi, and Alahakoon (2015) found, through multi-objective analytics from three bushfire scenarios, that older adults pose challenges for emergency responders in the late evacuation stage, which involves timely evacuation, shelter assignment and routing. Boon (2014) attributed problems with emergency warnings to the social isolation of older adults, due to less access to the internet and mobile phone communications, as revealed through both surveys and focus group interviews. Warnings from community members and neighbours, as opposed to the media and organisations (Boon, 2014), and animal ownership among older adults (Thompson, Trigg, & Smith, 2017), were associated with mobilising preparedness and evacuation plans.

There were eight publications related to flooding. In one study, Miller and Brockie (2015) used poetic inquiry to allow for older adults to recount their experiences of floods, and analysis of poems to show how their experiences are narrated. Brockie and Miller (2017b) conducted semi-structured interviews, which revealed a strong narrative of resilience following a flood; social capital (bonding, bridging and linking) and previous exposure to floods was associated with resilience. Despite evidence of resilience, a longitudinal study, using surveys, by Bei et al. (2013) showed that a portion of older adults experienced significant difficulties recovering after the floods and found that increasing frailty and declines in health associated with ageing hindered preparedness, recovery and flood risk communication (Boon, 2014; Brockie & Miller, 2017a).

Cyclone-related publications were least prevalent in the Australian literature ($n=3$) and all come from recent PhD research by Astill on older adults' preparedness, experiences of events, and recovery. Non-probability snowballing techniques used in an exploratory, mixed-method and phenomenological approach by Astill (2017) demonstrated that government policies promoting ageing-in-place have failed to encompass resilience-building, which adversely contributes to older adults' over-reliance on authorities in emergency situations. Astill and Miller (2018b) noticed a discrepancy between government expectations, which emphasise self-reliance, and the experiences of elderly and their caregivers – indicated through a questionnaire and either face-to-face interviews or focus groups. Disaster managers expected equal awareness of the risks and how to avoid them in a cyclone – often placing unrealistic reliance on in-situ care organisations. Community health carers interpreted older adults' understandings of “self-reliance” as having the financial capacity for access to in-situ care. However, in a preparation and recovery context, older adults lacked understanding of the term “self-reliant,” since many were not aware of government expectations. Astill and Miller (2018a) found, through focus groups, interviews and questionnaires, that older adults

were concerned about their ability to prepare and recover in future cyclone scenarios, due to both age-associated concerns and previous experiences of a lack of social support, fears of evacuating from homes and trauma associated with recovery – contributing to older adults' feelings of isolation, frustration, the loss of community and rethinking of ageing in place of their choice.

The eight Australian articles that considered older adults and natural hazards in a general sense addressed health and wellbeing topics relevant to ageing communities. Allan, Ball, and Alston (2007) addressed issues associated with ageing populations and declining health through interviews and focus groups with policy makers, community service workers and community members in two rural communities. Disaster events were considered as one factor contributing to health vulnerabilities of older adults in rural populations. For instance, in one rural town a devastating flood in 2004 damaged and limited health services. Health service site limitations were still apparent when the research was conducted in mid-2007, although some services continued to operate. Limited access to health services was due to lack of transportation among older adults, which is further impeded by disaster events. Seib et al. (2014) provide a study protocol for examining stress and ageing among women and note exposure to disasters as one of the relevant stressors for this study.

Bambrick, Capon, Barnett, Beaty, and Burton (2011) and Strand, Tong, Aird, and McRae (2010) focused on health impacts associated with climate change. Strand et al. (2010) conducted focus groups with government stakeholders and relevant agencies to gauge perceptions of climate change threat and methods for developing and implementing a framework for assessing vulnerability of associated eco-environmental health. Declines in health associated with an ageing population was one of the factors socially, physically and economically influencing vulnerability. Bambrick et al. (2011) focused on health implications from natural hazards associated with climate change in Australian urban populations. Morbidity and mortality rates in Australia are expected to increase as a result of multiple hazards such as thermal stress (i.e. from heatwaves), flooding, bushfires and air pollution. Impacts will be felt disproportionately, having a greater impact on more vulnerable urban population such as the elderly, those with chronic illness and low socio-economic status (SES) groups; older people with multiple vulnerability factors will be at an even higher level of risk. Social isolation and low SES among older adults can also further increase vulnerability to hazard impacts. For example, those with less access to social ties, transport, and lower SES will have increased difficulty receiving messages, preparing and responding appropriately to reduce their risks.

O'Donnell and Forbes (2016) commented on the vulnerability of older adults by discussing how the mental health of older people can be promoted during the recovery phase following a disaster. They recommend targeted psychosocial interventions after natural hazards and call for further research to provide an evidence base and to ensure that such interventions are strategically targeted. On the other hand, qualitative research on disaster preparedness, by Howard, Blakemore, and Bevis (2017), highlighted resilience factors and the importance of harnessing the knowledge and experience of older adults. Specifically,

focus groups revealed older adults' ability to locally generate and mobilise social capital in disaster preparedness, response and recovery.

Summary

Disasters in Australia are increasing in frequency and impact, and Australia's population is ageing (Brockie & Miller, 2017a; Coates, Haynes, O'Brien, McAneney, & De Oliveira, 2014). Risks associated with increasing disasters and an ageing population are continuing to rise with urbanisation (McInnes & Ibrahim, 2010) and migration (Toloo et al., 2014) in coastal and urban areas, which make up the major part of the Australian population (Astill, 2017; Astill & Miller, 2018a), and in rural communities that are both ageing and shrinking due to out-migration of younger generations to urban areas (Astill & Miller, 2018a; Greene & Burley, 2006). With the exception of heatwaves, there has been less Australian peer-reviewed publications considering pre-disaster contexts and issues of prevention and mitigation (Kwan & Walsh, 2017). Furthermore there is potential for more research on synergies, and disconnects, between ageing-in-place and disaster preparedness efforts (Astill, 2017; Shih et al., 2018).

Research has highlighted the vulnerability of older adults as a cohort, particularly in relation to heatwaves, though there has been less attention to understanding diversity within older adults and how this may influence safety or risk during natural hazards. This includes gender, LGBTIQA, cultural and linguistically diverse communities, disabilities and chronic illnesses, and living and caring arrangements. Recent work has placed increased emphasis on the experiences and perspectives of older adults to better understand their vulnerability and resilience (Astill & Miller, 2018a; Miller & Brockie, 2015). This provides a potential intervention and points towards a more nuanced understanding of hazard experiences, and to the need for greater attention to the strengths, skills, and knowledge of older adults in this field.

The literature outlined, provides a basic theoretical overview of the key research areas surrounding emergency and disaster management for older adults. However, obtaining a comprehensive overview of priority research areas, requires the perspectives of stakeholders associated with older adults, who have been involved in disaster management. "Stakeholder" in the current study refers to those currently working in emergency services, aged care, community services, relevant government agencies, as well as older adults themselves. Due to Australia's rapidly ageing population and because there is limited academic research specifically focused on older residents and natural hazards (particularly those other than heatwaves), this project sought to identify the research priorities of the aforementioned stakeholders.

Methods

The safety of older adults in relation to natural hazards is a multi-organisational and societal issue. While individuals and organisations vary in their roles, responsibilities, and experiences, and effective co-ordination amongst stakeholders is important, particularly given the current focus on 'shared responsibility' for disaster resilience in Australia. Stakeholders refers to a diverse range of groups including older adults themselves, carers, government

agencies and departments, community services/organisations, and aged care facilities. Understanding the relevant priority areas for research according to people working in different organisations and across multiple levels of the community is an important approach to inform research. For these reasons, a modified Delphi approach was conducted in two rounds, to identify research priorities related to ageing and natural hazards, as informed by the previously mentioned stakeholder groups.

The Delphi method is a decision-making and prioritisation approach that allows participants to share knowledge and provide feedback in a non-confrontational way until a consensus is reached (Okoli & Pawlowski, 2004; Sawford, Dhand, Toribio, & Taylor, 2014). It typically involves two or more rounds of data collection and can continue until a consensus is reached. For the current research, two rounds of data collection were sufficient for identifying a set of priority areas, as we do not need to continue until consensus is reached (Sawford, Dhand, Toribio, & Taylor, 2014). The Delphi method has been used in a range of fields and is considered “well suited to new research areas and exploratory studies” (Okoli & Pawlowski, 2004, p. 27). Therefore, it is an appropriate method to identify research priorities for work related to ageing and natural hazards. Furthermore, since there has previously been little research on this topic and the area involves a wide range of stakeholders working in different fields this method is particularly suitable.

Relevant stakeholders were identified selectively via online searches and/or telephone correspondence; stakeholders contacted were also invited to send the research invitation to other relevant stakeholders. The search aimed to identify email addresses of individuals working/ involved with older adults and natural hazards. Stakeholders included organisations and government agencies that work in the areas of aged care, community services, advocacy groups for older adults and emergency services in all states and territories in Australia.

Procedure

Two rounds of questionnaires were sent out, via an email collector created through Qualtrics, to the aforementioned relevant stakeholders. First, an online questionnaire (Questionnaire 1) was distributed, asking participants to identify up to ten research priorities related to ageing and natural hazards (see Appendix A). There was a total of 112 stakeholders who completed Phase 1, most of which operate under local and state jurisdictions (**Error! Reference source not found.**). Those who indicated “Other,” provided comments such as: “all levels of government,” “non-for profit,” “regional,” and “LGA.”

Table 2 Total number of respondents for both rounds by Jurisdiction level

Jurisdiction Level	Phase 1 Respondents	Phase 2 Respondents		
		Respondents who completed Phase 1	New Respondents in Phase 2	Total for Phase 2
Local	41	15	3	18
State	40	19	6	25
National	19	8	2	10

Other	7	1	1	2
Missing	5	1	2	3
TOTAL	112	44	14	58

Two researchers (Author 1 and Author 2) independently analysed the responses from round one using a general inductive approach (Figure 1). This analysis approach was chosen to “allow research findings to emerge from the frequent, dominant, or significant themes inherent in raw data, without the restraints imposed by structured methodologies” or current emergency management models (D. R. Thomas, 2006: 238). The two researchers coded data independently, and then met to discuss in detail the themes and sub-themes that emerged through their coding and how best to group the themes in research topic areas for the Phase 2 questionnaire. For example, recovery and relocation (after events) were initially coded as two separate topics, but these were combined into one research topic area. Further, respect for older adults and empowerment were initially coded as themes by both researchers; however, these were treated as overarching themes and issues as they are important to any research in this area. While there was no required or expected number of themes, following Sawford et al. (2014) the researchers agreed that, if possible, having fewer 20 themes would be preferable to ensure that the Phase 2 questionnaire was not excessively long. This analysis was undertaken in QSR NVivo.

The second online questionnaire (Questionnaire 2) was then distributed to stakeholders who completed Phase 1, and new participants suggested by Phase 1 respondents (see Appendix B). A total of 58 respondents completed this questionnaire, 14 of whom were new participants. The majority of Phase 2 respondents work under state jurisdiction (Table 2). In this questionnaire participants were asked to prioritise the key themes identified (e.g., to rate each theme on a scale of ‘not very important’ to ‘extremely important’), and to select the top five topic areas that they think should be prioritised. The online questionnaires were distributed between November 2017 and February 2018.

Figure 1 Flow chart summarising Phase 1-Phase 2 sampling and data collection

Results

There was a total of 11 stakeholder groups presented in Phase 1. Most respondents came from community services, followed by aged care facilities/services, emergency services and older adults. Similarly, in Phase 2 the majority of respondents were from emergency services, aged care facilities/services and community services. There were no respondents in Phase 2 in the federal government. Some responses mentioned for “Other” specified: “people living with or recovering from mental illness,” “Culturally & Linguistically Diverse, Migrants and Refugees,” “Aboriginal People,” and “lesbian, gay, bisexual, trans and gender diverse and intersex peoples.” Stakeholders ranged nationwide in both Phase 1 and Phase 2, with the majority selecting New South Wales, followed by Victoria. The third most prevalent State/Territory was Queensland in Phase 1, and South Australia in Phase 2. Those who indicated “Other,” commented that they operate under “all jurisdictions.”

Research Topics

In Phase 1, 649 topic areas were suggested, and these were refined to 19 Research Topic Areas; these were presented in Phase 2 for prioritisation by the stakeholders. The full list of the 19 Research Topic Areas presented in the Phase 2 questionnaire are provided in Appendix C. Table 3 shows the frequency of topics areas mentioned in both phases.

Table 3 Frequency of topic mentions in Phase 1 and Phase 2

Topic Areas	Phase 1: Frequency of Mentions	Phase 2: Frequency of Nomination for Top 5 Priority Areas
Communication & warnings	93	34
Awareness, behaviour & decision-making	79	21

Preparedness	48	27
Social isolation, poverty	44	18
Health needs	40	9
Evacuation	39	14
Recovery and relocation	38	14
Planning	33	15
Skills, knowledge of older adults	32	14
Community services and organisations	27	22
Resilience and shared responsibility	26	17
Response	22	10
Culturally and Linguistically Diverse (CALD) Communities	20	21
Register of vulnerable people	20	20
Volunteers	19	5
Ensuring services and facilities are safe and accessible for all	18	9
Electricity	17	12
Prevention and Mitigation	15	6
Training	12	2
Other and unclear responses	7	9

In Phase 2, respondents were asked to rank topic areas on a scale of importance, from ‘not very important’ to ‘extremely important.’ The top five priority topic areas are presented in Figure 2, which will be discussed in more detail. Other important topics that were highly rated included: Social isolation, Resilience, and Register of vulnerable people. For clarity and consistency with the survey tools, subheadings/topics are identified, but we recognise that these research topic areas are all inherently interrelated, and that some represent specific dimensions of the same issue (e.g., communication and warnings, CALD communities social isolation), and need to be addressed holistically.

Figure 2 Priority topic areas identified in Phase 2¹

Communication & Warnings

This topic was identified in Phase 1 most frequently by stakeholders from aged care facilities and services ($n=25$), community services ($n=18$) and emergency services ($n=12$). In Phase 2, 93% of respondents rated communications and warnings as ‘extremely important’ or ‘important.’ Issues identified include how and through what means communications and warnings are sent and received. Also noted was the increasing reliance on digital media, and in particular the issue of communicating if the electricity and National Broadband Network are not functional. Others suggested a need for tailored warnings for older adults, for example, use of plain language and of languages other than English (including Auslan). For instance, one respondent mentioned that, “The gaps between digitally included and excluded Australians are substantial and widening... More plain English resources and translations needed for all hazards.”

Preparedness

This topic was identified in Phase 1 most frequently by respondents from community services ($n=14$) and emergency services ($n=9$). It was the third most frequently mentioned topic in Phase 1 and ranked second in Phase 2. Responses highlighted that older adults use knowledge and experience to improve their preparedness. They also noted such issues as the need for support, as preparing can be physically and financially demanding, and the need for inclusiveness in planning and preparing. Older adult sub-groups were identified as needing special consideration, as mentioned by one participant: “low socio economic groups.” Another participant stated that “people with disabilities should be a part of the preparedness

¹ “Not very Important” was presented as an option on this scale however, none of the Phase 2 respondents selected it.

process.” The preparedness needs of individuals, aged care facilities, and of communities in a broader sense were considered. The importance of preparedness at a community level was also highlighted, for example:

“Developing a greater understanding of community preparedness and what motivates preparedness for older community members, would be incredibly beneficial given the strong link between preparedness and response activities as well as timeliness or recovery.”

Awareness, Behaviour and Decision-Making

This topic was identified in Phase 1 most frequently by those from community services ($n=22$), aged care facilities and services ($n=17$) and emergency services ($n=15$). It was the second most frequently mentioned topic in Phase 1 and ranked third in Phase 2. Many noted the skills and knowledge of older adults here and the importance of recognising, supporting and harnessing these. Participants noted some areas where further research or information is needed, for example, one participant said that:

“Education and information is difficult as many can’t come along to events/presentations. Also many resources are online and everything is digitised-change in media habits.”

In regard to people with disabilities one respondent noted that “Some people with disabilities require support to make decisions but with support they are quite capable of making their own decisions.” Pets were often mentioned in terms of influencing decision-making, evacuation, and recovery, as one participant mentioned:

“Pets is a particularly important area - there is evidence to show that having pets increases well-being in older adults and also is a deciding factor in whether they will evacuate on request or not.”

Culturally and Linguistically Diverse (CALD) Communities

This topic was not frequently identified in Phase 1, but it was rated as important by the majority of participants in Phase 2 when it was presented back to them as an emerging theme. Fifty percent of participants in Phase 2 rated CALD communities as ‘extremely important’, around 39% rated it as ‘important’. ‘Moderately important’ and ‘somewhat important’ were each selected by only 5% of respondents. This indicates that all respondents regarded CALD communities on some level of importance in Phase 2. Participants noted the importance of ensuring information, education and warnings are available in relevant languages, particularly as vulnerable CALD communities are often located in peri-urban areas (e.g., suburbs at the bushland-urban interface), and in regional towns. Participants also noted that there are potentially different risk exposures, knowledge, perceptions, cultural contexts, and expectations and knowledge of services in Australia. In regard to older adults in CALD communities, one respondent explained:

“Particularly those that migrated later in life and it not necessarily being their choice – i.e. joining their adult children to assist with child care and household duties frequently lack flexibility in language and, like the others in their families may not be

familiar with hazards and risks being warned for. Nevertheless, in many cultures their advice and instruction is considered to be primary - they may be the household decision makers but they are rarely the ones targeted in any awareness or preparedness strategies”

The importance of addressing CALD older adults extends to multiple topics discussed in this paper. For example, areas with a dense population of certain CALD groups require tailored warnings, especially for those who migrated later in life; skills, experience and knowledge surrounding preparedness should be better understood to increase resilience among CALD groups.

Community Services/Organisations

This topic was not frequently identified in Phase 1, but was rated as important or extremely important by 75% of participants in Phase 2. The importance of community services, organisations and NGO’s in disaster risk reduction is highlighted. Additionally, many participants noted that it is important to address barriers between organisations, and to build on existing networks. One respondent mentioned that:

“This already happens in areas who have experienced multiple emergencies. Networks such as Aged Care networks already exist - they just need more information about how to support people with emergency planning as some paid carers don't see it as their role to help with emergency planning.”

Understanding the various roles and responsibilities, and how these can be co-ordinated, to ensure the effectiveness of ‘shared responsibility’ in Australian disaster management is an important issue.

Further Considerations Emerging from Questionnaire Responses

In addition to the research topics identified, some overarching themes and concerns were identified from the questionnaire responses and additional comments. First, some respondents noted that there has been significant learning within organisations and communities, particularly during and after events, and it is important that these learnings are recognised and shared. As a Phase 2 Respondent explained:

“Our organisation and shire was put to the test with severe flooding in 2015, which resulted in the deaths of three of our clients. Due to losing power, water and phone service we had to think outside the square to ensure our clients’ safety... As a result of what we as an organisation and as individuals dealt with, we have developed a workable emergency plan for future reference, and have worked with all local services and organisations so that we can work hand in hand without wasting time checking on things that have already been done.”

Second, because older adults are often characterised as vulnerable, respondents noted the need to respect older adults, in terms of their knowledge, experience, and skills, as well as their privacy and independence. Example comments include “ask them what their priorities are prior to an event - don't just presume” (Phase 1 Respondent), and a recommendation of “Adopting a strengths-based approach to working with older people” (Phase 2 Respondent).

Third, older adults often have diverse roles, abilities, skills and identities – including whether they identify themselves as being an ‘older adult’. As a Phase 1 respondent noted, I am 76 and do not consider myself to be ‘elderly’.” and another explained that “Many elders are also carers of grandchildren and other older adults”. Therefore, “It is important to recognise the capacity of elders to help. This gives the elders the prestige they need to live in the community with honour” (Phase 1 Respondent). Respondents also highlighted that different identities can overlap or intersect in ways that are important for understanding responsibilities, vulnerabilities, and strengths. For instance, “disempowering characteristics [such as] (gender, race, income, disability etc.)” can contribute “to exposure to natural hazards, preparedness, impact and recovery” (Phase 2 Respondent). An important recommendation that emerged from another Phase 2 Respondent, in regard to this was that:

“Many of these issues overlap and should be addressed in this way. For example, a person who has a CALD background, may also have a disability, be isolated and be gay. Important that research doesn’t box them into a single topic when people are far more complex.”

This last point aligns well with the issues raised by Kuhlicke, Scolobig, Tapsell, Steinführer, and De Marchi (2011), who note the importance of contextualised and nuanced understandings of vulnerability because vulnerability is embedded in the daily life and does not only emerge under emergency conditions. These responses, therefore, highlight three additional considerations that are relevant to natural hazard research with all communities including older adults.

Discussion

Our scoping review of research into natural hazards and older adults found a paucity of research on this topic, yet highlighted the urgency and importance of this topic in the context of climate change and an ageing population. Much of the Australian research is hazard specific, and more research that identifies and examines common issues and strategies across multiple hazards would be useful. Recent work that focuses on the experiences of older adults or of community services reveals the consequential and complex intersection of policies from different fields. For instance, recent disaster management policy emphasises self-reliance among members of the public, which may be inappropriate for some older adults. Moreover, ageing policies that encourage ageing-in-place with support from community services may leave older adults isolated when services cannot operate (Astill & Miller, 2018b; Brockie & Miller, 2017b). Similarly, arrangements for health services and residential care facilities provide limited clarity and co-ordination amongst services (Cusack, Siegloff, Arbon, & Chamberlain, 2012; McInnes & Ibrahim, 2010). This policy context further underscores the importance of research about older adults and natural hazards. Within current research, there is a significant focus on heatwaves and older adults, and in particular on quantifying the morbidity and mortality effects of excess heat. Notably, the majority of available research on other hazards, such as cyclones, bushfires and flooding emerge from single projects. Further, only eight studies purposively recruited older adults as participants, and only one study had participants from community-based health/ carer services (McInnes & Ibrahim, 2010). The literature typically identifies or acknowledges the vulnerability of older

adults, and some studies explore protective factors or resilience among older adults. In this section we identify areas of alignment between our findings and existing research about older adults and natural hazards and areas where future research effort could be usefully be directed. We also note that in this exploratory study there are similarities and overlaps in the resulting research topic areas, and that some topics can be understood as specific dimensions of the same issue.

Communication and warnings. Respondents highlighted concerns about the ‘digitally excluded,’ and the need to communicate about natural hazards in ways that are accessible and appropriate for older adults. Communications and warnings were discussed in several studies, though these were not the focus of the research. Recent work exploring the experiences and behaviours of older adults during floods and heatwaves has demonstrated a preference for communication via TV and radio, and through ‘word-of-mouth’ from family, friends and neighbours, and to a lesser extent emergency personnel and phone communications (Boon, 2014; Brockie & Miller, 2017a; Hansen et al., 2015a). Thus, this research demonstrates a preference for ‘traditional’ modes of disaster risk communication, and Brockie and Miller (2017a) noted that older adults are sometimes not competent or frequent users of social media and mobile phones. In line with our findings, Boon (2014) recommended that different communities require diverse and targeted communications depending on specific populations and sub-groups of older adults that need targeting, for example, elderly that are socially isolated have less access to the internet and mobile phones, and they rely more on mass media, neighbours and family. Engaging with older adults’ preferred means of receiving communications and warnings, Bi et al. (2011) suggested running media based education campaigns about heat-related health. Future research could usefully design and evaluate communication and education approaches with older adults, with particular attention to identifying trusted information sources and communication networks (Boon, 2014). Research that identifies messaging content and strategies that are appropriate for particularly vulnerable groups, for instance, people with dementia and CALD older adults would be particularly helpful.

Preparedness. Our findings highlighted the need for planning and preparations to be inclusive of older adults, and particular concern for the physical and financial strain of preparing for natural hazard events. Qualitative studies focused on older adults’ experiences of hazards further highlight this issue. For example, Astill and Miller (2018a) found that older adults’ perceptions of future cyclone preparedness revealed concern for their ability to prepare and cope, especially in terms of their personal limitations, physical strength and stamina and reliance on others for help. This is particularly significant in the context of disaster management policies that expect community members to be self-reliant (Astill & Miller, 2018b). Brockie and Miller’s work on older adults’ experiences of floods also highlights that reliance on family members and other members of the wider community is not always possible, and social isolation often contributes to an inability to prepare effectively (Brockie & Miller, 2017a). These small-scale qualitative studies both ($n < 15$) make an important contribution, and larger scale research could usefully explore how older adults in communities can be supported to prepare for hazards. In addition, developing and evaluating

strategies for inclusive preparedness is an important research priority to support older adults' preparedness, including people with disabilities, low SES groups and CALD communities.

Awareness, Behaviour and Decision-Making. Awareness of hazards, own skills and abilities, and of the services available (and acceptability of such services) were identified as key issues in our research, and these are reflected in the findings of small-scale qualitative studies that focus on the experiences of older adults. Behaviour and decision-making, particularly in relation to evacuations, were also key findings. Research with older adults has primarily been conducted post-event and focused on experiences of events (or morbidity and mortality impacts), rather than pre-event awareness. Our findings indicate that future research should go beyond simply identifying older adults as 'vulnerable,' and instead develop a more nuanced understanding of older adults as a cohort and consider the varying roles, abilities, skills and identities of older adults. Further research that explores awareness of hazards among older adults, how older adults perceive their own capabilities, and that identifies appropriate services and interventions to support older adults would be valuable.

Cultural and Linguistically Diverse Communities. This topic was identified as a clear priority for further research, and the challenges, experiences, and strengths of CALD communities have not yet been specifically addressed in the academic literature. Only one study addressed CALD communities in the Australian natural hazard literature: Hansen et al. (2011) noted that over one third of older people aged between 65-84 years were born overseas, and that where first language reversion was occurring among older immigrants, linguistic barriers affected understandings of heat-health related communications. Research with CALD communities is, therefore, a clear priority emerging from this study, and could include understanding the different knowledge, perceptions and risk exposures for different cultural contexts, how this affect preparedness, and how can we improve education and tailor warnings in relevant languages for different communities. It is worth noting that many of the issue raised in relation to CALD communities in this study are also related to the issue of 'communication and warnings.'

Community Services/Organisations. The current findings prioritised community services/organisations for addressing disaster risk reduction, in particular, by looking at existing structures and networks. Only one study by McInnes and Ibrahim (2010) looked at this specifically, for heatwaves in Victoria. They found that existing community-based health and carer organisations provide services for minimising heatwave related harm to the elderly; such organisations have the capacity to further contribute to emergency heat-related health responses through existing staff and structures. However, they found that these organisations and services need to develop specific heatwave response strategies, which are coordinated with other agencies (McInnes & Ibrahim, 2010). Another study by Cusack, Sieglhoff, Arbon, and Chamberlain (2012) looked at perceived preparedness, for floods and bushfires in residential and aged care facility (RACF) managers. RACF managers expressed concern for their ability to make informed assessments in preparing for disasters and explained that preparation efforts to understand risks to advance capacities are required for facilities, staff and the residents, however, this can be resource intensive. Further research should be

conducted to look at the barriers and effectiveness of existing services and organisations for disaster risk reduction in Australia and how such organisations can be better integrated.

A strength of using the Delphi method was that it allowed for prioritisation of areas for future research by engaging with relevant stakeholders. Including older adults themselves gave us further insight into priority research areas and how to approach them. The two-stage process was helpful for identifying a wide range of issues from a broad group of stakeholders with differing perspective and functions. Initial responses were synthesised into a small set of topics/themes, that were then presented back to stakeholders, which enabled them to consider the full set of topics and prioritise those. This process could have also been useful for the stakeholders— in round one free recall was required to come up with priority areas in their own workplace or experiences. The second round allowed stakeholders to prioritise a broader set of topics, using cues, i.e. order topics on a ranking scale, which may have facilitated recollection of important areas that were not previously considered. For example, CALD communities were ranked on a high level of importance in the second round, but not considered as important in the first round.

There were some limitations noted in this study in regard to the scoping literature review and using the Delphi method. The search criterion used for the literature review was somewhat limited, for example McInnes and Ibrahim (2013), used the term “aged care” in their abstract, which was not included in our criterion. Additionally, as only two databases were accessed not all academic publications related to older adults and natural hazards are included in our dataset. The literature review has also not included grey literature; this would be useful area for future reviews to consider. The Delphi model provided a novel way to identify and prioritise research topics; however, attrition between Phase 1 and 2 meant that some participants who noted research priorities in Phase 1 were not able to rank the research topic areas on a scale of importance.

Conclusion

Research to improve the safety and resilience of older adults during extreme weather events and disasters needs to consider the priorities of stakeholders who are affected by these events and who are positioned to affect change within their professional or community settings. Research priorities, therefore, should be developed in consultation with older adults and advocacy groups, emergency services and other stakeholders whose work and responsibilities presents opportunities to support older adults to reduce their risks from disasters. This study illustrates that using a modified Delphi approach allows multiple viewpoints from diverse stakeholders to be included, considered, synthesised and prioritised. Recent small scale, in-depth qualitative studies with older adults have addressed many of the research priorities identified by stakeholders in this study, larger studies that explore such topics as communication and warnings, preparedness and awareness among older adults are needed. Noted in the Phase 1 research priorities and also in one qualitative study by Bennetts et al. (2012) was the importance of addressing other vulnerable subgroups, such as low SES and homeless older adults.

Stakeholders identified a particular need for research with CALD communities and with community services/organisations, and it is notable that there is very limited published research available on these topics in the Australian context. Further research that purposively focuses on older adults' experiences, perspectives, and needs would be particularly worthwhile, and as noted in this study, future research should avoid focusing solely on vulnerability and recognise the capabilities and diversity of older adults. The suggested research areas from stakeholders focused on practical issues faced, while published research more often identified policy issues that influence the roles, responsibilities, and expectations of various stakeholders. This suggests a key role for research to evaluate the effectiveness of potential solutions to practical issues (for instance, of targeted or translated communication materials), and to work with stakeholders to evaluate policies and their practical impacts. Future work could also usefully consider the grey literature, which reflects organisational and community knowledge about older adults' experiences, needs and challenges during and after major natural hazard events. In sum, this study has demonstrated the utility of the Delphi approach for identifying research priorities and identified key areas for research on older adults and natural hazards.

Appendices

Appendix A: Phase 1 Questionnaire

Q1 Which organisation do you represent?

Q2 Which stakeholder group do you primarily represent?

☐ Aged care facilities and services

☐ Emergency services

☐ Community services

☐ Researcher

☐ Older adults

☐ Healthcare

☐ State government

☐ Local government

☐ Federal government

☐ Community group

☐ Other (please specify)

Q3 At what jurisdictional level does your organisation operate?

☐ Local

☐ State

☐ National

☐ Other (please specify)

Q4 In which state(s) or territory(ies) of Australia does your organisation operate?

☐ NSW

☐ ACT

☐ VIC

☐ SA

☐ TAS

☐ QLD

☐ NT

☐ WA

☐ Other (please specify)

Q5 In your current professional role, which types of natural hazard event have you responded to?

☐ Bushfire

☐ Cyclone

☐ Flood

☐ Heatwave

☐ Storm

☐ Other (please specify)

Q6 Based on your experience and knowledge, what should be priority areas for future research about older adults and natural hazards in Australia?

Please list up to 10 topic areas below, in no particular order. These could include issues related to preparing for a hazard, what happens during an event and during the recovery phase, or work to reduce future risks. For example, "tailored warnings are needed" or "older adults who volunteer".

Topic 1 _____

Topic 2 _____

Topic 3 _____

Topic 4 _____

Topic 5 _____

Topic 6 _____

Topic 7 _____

Topic 8 _____

Topic 9 _____

Topic 10 _____

Q7 If you require additional space to list more topic areas or make any comments, please use the text box below.

Q8 Please select the hazards each of your topics relates to. Please select all that apply.

	<u>Bushfires</u>	<u>Cyclones</u>	<u>Floods</u>	<u>Heatwaves</u>	<u>Storms</u>	<u>None</u>
<u>Topic 1</u>	☐	☐	☐	☐	☐	☐
<u>Topic 2</u>	☐	☐	☐	☐	☐	☐
<u>Topic 3</u>	☐	☐	☐	☐	☐	☐
<u>Topic 4</u>	☐	☐	☐	☐	☐	☐
<u>Topic 5</u>	☐	☐	☐	☐	☐	☐
<u>Topic 6</u>	☐	☐	☐	☐	☐	☐
<u>Topic 7</u>	☐	☐	☐	☐	☐	☐
<u>Topic 8</u>	☐	☐	☐	☐	☐	☐
<u>Topic 9</u>	☐	☐	☐	☐	☐	☐
<u>Topic 10</u>	☐	☐	☐	☐	☐	☐

Thank you for participating in Phase 1 of this study.

Please indicate if you are interested in receiving further information or are willing to participate in Phase 2:

☐ I am willing to participate in Phase 2 of this study. A link to the Phase 2 questionnaire will be sent by January 22, 2018. In Phase 2 you will be asked to rank the research topic areas. Participation should take 5-10 minutes.

☐ I would like to receive a summary of the results of this study. These will be provided in April, 2018.

☐ I would like to receive more information about the workshop being held in Sydney as part of this project.

☐ No, thank you.

If you are interested in Phase 2, the results of this study, or the workshop, please provide your email address. Your email address will not be associated with your responses to this questionnaire and will only be used to send you the information you have requested.

Thank you for your time and participation.

Appendix B: Phase 2 Questionnaire

Appendix C: Topic areas and subtopics identified from Phase One responses and presented in Phase Two

Topic Areas	Subtopics
1. Culturally and Linguistically Diverse (CALD) Communities	Differential risks for older adults in CALD communities – implications for emergency planning and preparedness
	Cultural factors influencing household decision-making
	Translated warnings, education and information, and use of visual symbols
2. Social isolation, poverty and older adults	Supporting older people living alone or who don't have support from family, friends or neighbours
	Targeted methods for reaching older adults who are socially or geographically isolated (i.e. impoverished, homeless)
	Financial costs of preparedness
3. Resilience and shared responsibility	What does 'shared responsibility' during natural hazard events mean for older adults with disabilities?
	Empowering/ building resilience of older adults in their communities
	Families, friends, and neighbours as support structures
4. Skills, abilities, knowledge and roles of older adults	Better recognising, respecting, and harnessing skills and knowledge of older adults – how do their roles contribute to resilience?
	Sharing hazard knowledge and experiences of older adults to younger generations and the broader community
	Older adults as carers for other family members (e.g., grandchildren, partner, children)
	Understanding the challenges/limits older age adds to preparing for and responding to natural hazards
5. Volunteers	Identifying volunteer opportunities and appropriate training for older adults
	Reducing discrimination against older adult volunteers
	Processes to recognise and appropriately deal with volunteers with emerging dementia or other illnesses that may affect their ability to respond

6. Awareness, behaviour, and decision-making	How do older adults interact with emergency services?
	Risk perception, preparedness, and risk-taking among older adults
	Factors influencing decision-making – i.e. evacuation or shelter-in-place; how to handle pets/livestock in evacuation planning
7. Prevention and Mitigation	Land use planning - location of retirement villages, access routes to aged care facilities
	Programs to improve homes to reduce exposure to heat or cold (e.g., insulation, shading)
8. Electricity	Planning for power outages of extended duration (e.g. for those using oxygen at home)
	Communication during power outages and NBN failure
	Impact of energy costs – reducing the cost burden for air-conditioning and heating
9. Training	Training for emergency responders and volunteers for targeted safe evacuation procedures – i.e. how to communicate effectively with older adults, including people with dementia and seniors in distress
	Training for older adults in the use of IT and use of apps or social media
	Cultural training for non-Aboriginal staff/volunteers working in remote areas
10. Planning	Barriers to emergency planning among older adults – i.e. those in rural areas
	Individualised plans for older adults that include family, carers, neighbours, friends and/or animals
	Inclusive emergency management planning in communities and aged care facilities
11. Preparedness	Preparedness among older adults living independently – Actions and equipment are protective against negative consequences of an event. Services that physically prepare and maintain homes for hazards (e.g., bushfires, floods) and extended periods without electricity or water
	Level of preparedness of aged care facilities/ carers of people with dementia

12. Communication and warnings	Identifying the preferred communication mediums and messages of older adults
	Provide tailored warnings and information – e.g. tailored to those with dementia, hearing or visual impairments, CALD families
	Use of social media and technology
	Accessing information and communicating without internet or if NBN fails
13. Register of vulnerable people	How to improve the registration in, and the use of, registers for vulnerable older people in communities (i.e. isolated, have mobility issues and would have difficulty evacuating independently) –so that services can reach those most in need.
	Identifying and alerting emergency services to vulnerable people
	Who should have access to such a register? Who should maintain it?
14. Response	Understanding how older people cope and react during events
	How to meet the needs of older adults during an event - including people with dementia, disabilities
	Maintaining security and hygiene in aged care facilities during events
	Ensuring staff support and access to work during major events
	Strategies for managing at home if people cannot or do not evacuate
	Caring for pets during emergencies
15. Evacuation	Older adults' perceptions of evacuation and decision-making (i.e. caring for pets)
	Accessible and appropriate evacuation centres with staff that can meet the needs of older adults – including people in high care environments and safe evacuation of people with dementia
	Transport needs and older adults who no longer drive
16. Ensuring services and facilities are safe and accessible for all	Respect for older adults and their privacy
	Ensuring safety and no discrimination against LGBTIQ community members, in accessing services and evacuation centres (especially if they are not 'out' in their community)
	Ensuring services and facilities are safe for people with dementia, hearing or vision disabilities, mental health and mobility issues

17. Health needs and safety during and after events	Access to healthcare and equipment during and after events, i.e. continuity of medication during events – particularly during power cuts
	Health adaptive behaviours, i.e. keeping hydrated during events
	Mobility issues and trip hazards
	Information provided to those experiencing mental health issues, i.e. services available
18. Community services/organisations	Potential role of community services/ organisations in preparedness, planning, and during and after events
	Raising awareness of services available to older adults
	Improved co-ordination among community services and emergency services - including identifying vulnerable people who may need assistance or provisions
	Building cohesive networks around older adults
19. Recovery and relocation	Understanding the impacts of events on older adults- physical and mental health, emotional, financial, and social and emotional wellbeing (strategies to support social connections, managing mental health issues after emergencies)
	Supporting older adults and carers after the event - sequencing of support, tailoring to meet the needs of older adults
	Strategies and supporting older adults who are unable to return home for an extended period
	Relocation - appropriate places, social and health consequences of relocation

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