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Systematic Review

Factors enhancing resilience among older adults experiencing disaster: A systematic review

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ABSTRACT

Background: Resilience is important to adapt and deal with difficult situations, particularly in a disaster, yet its related factors among older adults are unknown. This study aimed to synthesize the factors enhancing resilience among older adults experiencing disaster.
Methods: A systematic review was conducted using international databases, i.e., CINAHL, ProQuest, JAMA Network, SCOPUS, Ovid, PubMed, and Google Scholar since 2000. The studies were independently appraised by two authors using a quality appraisal tool and the parallel-results convergent synthesis design was adopted for the synthesis.
Results: Five articles related to technological disasters, hurricanes, floods, and typhoons were included for review. Consideration for methodological strengths was limited in some studies. The factors enhancing the resilience of older adults were categorized into (1) demographic, (2) physical, (3) psychological, (4) spiritual, and (5) socio-cultural factors. The studies revealed that previous experience, social support and spirituality were the common factors.
Conclusion: Five factors related to resilience should be considered by nurses and other health professionals when caring for older adults experiencing disasters. Due to limited robust evidence and the diverse contexts of the selected studies, future research remains important to enhance the older adults' resilience in long term care.
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Introduction

Disaster is a global public health problem that pushes people to vulnerability [1]. Globally, around 90, 000 people are killed every year due to natural disasters, which also influence the lives of around 160 million people. Natural disasters destroy both the physical and bio-social environment, which might have immediate or long-term damaging effects to people [2] as well as long-lasting psychosocial consequences [3]. Natural disasters also influence the lives of survivors [2] and affect people's health and well-being [4]. Similarly, manmade disasters also affect people, the society, ecosystems, health systems, and the economy [5].

According to the United Nations [UN], people aged 60 years and above are known as older adults or elderly people [6]. An increasing trend of older adults' population [7] urges the need for actions to facilitate positive aging with higher levels of subjective well-being and healthier lifestyles [8]. However, disasters of various types have directly and indirectly affected physical and mental health of older adults [9]. Physical decline with aging, lack of adequate services, age discrimination, disability, changing household dynamics and family system, poverty levels [10], low physical strength and weaker immune systems, dependency and living alone [11], and limited accessibility to transportation [12] heighten the negative effects disaster situations on the physical, mental, and social wellbeing of older adults [13]. In addition, they are the most neglected population group in the society during and after disaster events [11,14–16]. Due to this vulnerability, the effects of disasters among them are usually disruptive to and threaten both their life [17,18] and health in different ways and with diverse levels of intensity [17].

Although older adults suffer from mental health problems after a disaster [4,19–21], resilience can promote the mental health of people involved in disasters [22,23]. Therefore, great attention needs to be paid to disaster resilience which promotes people's capacity to organize themselves from disasters and their associated problems with the help of their experiences from previous disasters [24,25]. It helps to decrease the risk of and develop the strength to resist adverse events in the future [24,25]. A systematic review in South Africa indicated that the resilience to disasters is important as it helps to alleviate the negative effects of a disaster among survivors and help them convalesce more speedily and sustainably [26]. Also, emergency preparedness and disaster recovery focus-

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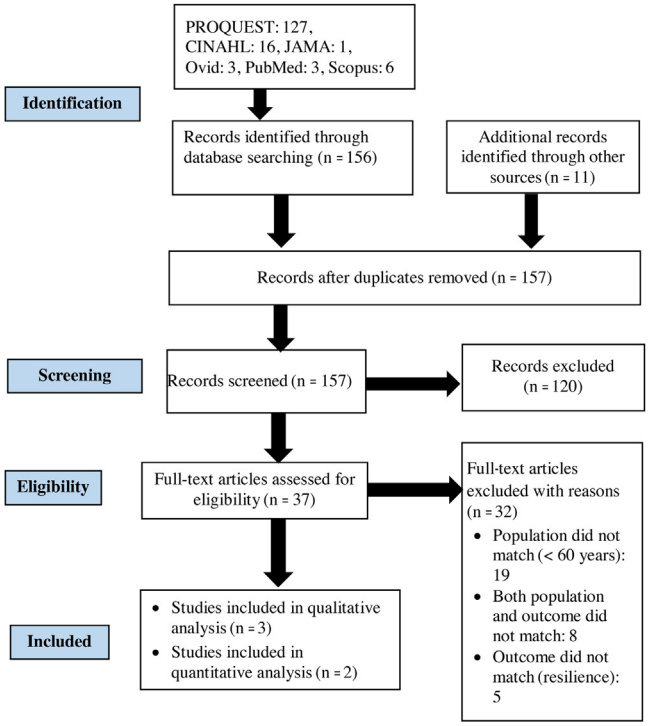

Fig. 1. PRISMA flow diagram of the selection of eligible papers.

ing on the older adults' resilience are very important [18]. To that end, nurses and health care providers are required to respond to the needs of disaster survivors as well as provide psychological support [27] including enhancing social connectedness [23].

In addition, disaster survivors may have various levels of disaster resilience. Despite different consequences, considerable research on resilience has been undertaken on the concept of resilience in disasters [28], resilience measurement in later life [29], and resilience among older adults [30]. However, little attention has been paid to factors facilitating disaster resilience among older adults. Most importantly, the need to search for solutions that can help enhance the resilience and wellbeing of older adults has also been highlighted [31]. The authors then investigated what has already known about factors enhancing resilience among older adults experiencing disaster through a systematic review. It could identify literature gaps, and suggest directions for further disaster nursing research in the geriatric population.

Methods

The researcher adopted the Preferred Reporting Items for Systematic Review and Meta-Analyses [PRISMA] criteria suggested by Liberty et al. [32] for developing the PRISMA flowchart (Fig. 1) to describe the literature screening procedures [33,34].

Searching strategies and databases

The keywords used to search for articles were "factors enhancing" OR predictors OR p̈redicting factorsÖR F̈actors associated with, spirituality, s̈piritual determinantsÖR s̈piritual factors, "psychological factorsÖR p̈sychological determinants", s̈ocial factorsÖR s̈ocial determinants, "physical factors, income OR s̈ocioeconomic factors, AND p̈sychological recoveryÖR resilience OR p̈sychological resilienceÖR "disaster resilience" AND ël̈derly people" OR ölder adultsÖR s̈enior citizensÖR g̈eriatric populationÄND disasters OR earthquakes OR n̈atural disastersÖR tsunami OR flood OR "technological disaster" OR "man-made disaster."

Eligibility criteria

The inclusion criteria for article selection in this systematic review consisted of articles which: included a sample of older adults, 60 years old and above, who had survived a disaster; analyzed resilience as an outcome variable; assessed at least one of these factors-physical, social, psychological, spiritual, and socioeconomic factors; employed a cross-sectional/comparative, cohort/longitudinal, qualitative, or quantitative research design; and were published in a peer-reviewed full-text journal excluding unpublished dissertations, grey literature and reports. According to PRISMA guidelines, there are no date or language limits when searching [34]. However, the search in this review was limited to English language papers only due to the authors' limitations with understanding articles published in other languages and set the date limits for January 2000 to April 2019 for identifying the updated references of the 21 st century.

Study selection

A number of databases—CINAHL, ProQuest, The JAMA Network, SCOPUS, Ovid, and PubMed—along with Google Scholar were used to search and retrieve the articles. The authors applied a three-phase process (i.e., screening, eligibility, and inclusion) following the PRISMA guideline for the selection of articles [33,34]. In the first phase, two authors RT and PS—discussed the above keywords to be used in searching by analyzing text words contained in the title and abstract of papers along with the index terms applied in databases. Then, the same authors independently searched for articles using keywords and index terms from each database following the PRISMA protocol. Finally, the reference list of selected articles was also independently reviewed to search for additional articles. Then all full-text articles were independently stored using the Mendeley reference management software. Next, the articles from both authors were compiled together (167 articles). Ten article duplicates were removed using the Mendeley reference management software; hence, 157 articles were screened.

In the second phase, 37 articles were found relevant for additional screening. However, 32 articles were excluded after comprehensive reading by both authors independently using the eligibility criteria (Fig. 1). In the third phase, five eligible articles were selected for review by the authors (RT and PS). Then the two authors independently performed a bias risk analysis by exploring the strengths, limitations, and suitability of study methods based on the research questions and objectives of the retrieved articles as well as the methods of reporting outcomes. There was no confusion or discrepancy between the two authors regarding the five selected articles.

Quality assessment and analysis

The data were critically analyzed for their quality and relevance based on the standard quality assessment criteria [35]. The scoring criteria were "yes" = 2, "partial" = 1, and "no" = 0. The items of quantitative studies that were not suitable for this study's design were noted as "not applicable [N/A]". The total score of each quantitative (Appendix Table 3) and qualitative paper (Appendix Table 4) was summed from each applicable item; the obtained score was divided by the total possible score and then multiplied by 100 (obtained score/total score × 100). The cutoff point of selecting an article for systematic review was a score of more than 55 percent from the two reviewers compared to the overall scores [35].

Data extraction

After finalizing the selection of articles, the authors extracted the data using structured tables consisting of detailed descriptions of the title, authors, country, research design, population, sample size, characteristics, sampling technique, mean age, data collection tools along with methods used, data analysis, results, recommendations, quality appraisal, and level of evidence and remarks following the PRISMA guideline [34] (Table 1).

Data synthesis

There are different types of data synthesis designs for a systematic review. The parallel-results convergent data synthesis design is the method used for the analysis of qualitative and quantitative findings of the five selected articles separately [43]. The authors then integrated the findings and interpreted the results in the discussion following the recommendation of Hong et al. [43].

Results

Following the PRISMA protocol [33,34], and applying the quality-assessment criteria [35], only five studies were eligible with acceptable quality scores ranged from 75 to 86.3 percent.

Study characteristics

Two articles were quantitative studies conducted among older adults that had survived a typhoon [36] and a technological disaster (i.e., the Gulf of Mexico Deepwater Horizon Oil Spill) [38]. Three qualitative studies were carried out among older adults, who had survived a typhoon [37], floods [39], or a hurricane [40]. Two studies were conducted in the Philippines [36,37], two in the USA [38,40], and one in Australia [39]. Four studies used non-probability sampling [36,37,39,40]. The sample size varied among the studies, ranging from 10 to 5713 participants. All qualitative studies had less than 30 participants; the smallest one had only 10 participants [39,40]. All studies included samples from community-dwelling older adults who had experienced a disaster. Three studies used an interview guideline with a tape recorder for the collection of data [37,39,40]. The Brief Resilient Coping Scale and the Perlin Mastery Scale were used to measure resilience in two different studies that reported high resilience scores (M = 17.48, SD = 1.1) [35] and (M = 19.26, SD = 2.78) [38] respectively.

Factors enhancing resilience among older adults experiencing disasters

The analysis showed five factors associated with resilience among older adults experiencing a disaster (Table 2).

1. Demographic Factors. Only one study considered the demographic factors of age, gender, race, and marital status [38]. This study's participants' age ranged from 65 to 96 years, and it highlighted huge differences in resilience scores (i.e., minimum scores 6 to maximum scores 25). The findings showed a negative association between age and resilience scores ($\beta = -0.048$, $p < 0.001$, $CI = 11.888, 16.491$), and that resilience scores decreased with advancing age. Regarding gender, females had higher resilience scores than male ($\beta = 0.222$, $p < 0.001$, $CI = -0.058, -0.038$). Concerning marital status, higher resilience scores were found among single older adults as compared to married/partnered ones ($\beta = 0.192$, $p < 0.01$). Older adults of non-white categories had higher resilience scores than their white counterparts ($\beta = 0.057$, $p < 0.01$, $CI = 0.082, 0.361$). This study concluded that age, gender, marital status, and race were predictors for resilience among older adults [38].

2. Physical Factors. A research study in the USA indicated that both general health [GH] ($\beta = 0.266$, $p < 0.01$, $CI = 0.053, 0.332$) and physical health [PH] ($\beta = 0.201$, $p < 0.001$, $CI = 0.154, 0.377$) predicted higher resilience scores among older adults after a disaster [38].

3. Psychological Factors. The factors included the self-rated mental health, freedom from mental health problems (i.e., absence of anxiety and depression) [38], along with the attitude towards sustainable development [ATSD] [36]. Moreover, the findings demonstrated that self-rated mental health [MH] ($\beta = 0.433$, $p < 0.001$, $CI = 0.097, 0.306$), anxiety ($\beta = -0.316$, $p < 0.001$, $CI = 0.523, 0.514$) and depression ($\beta = -0.186$, $p < 0.01$, $CI = 0.053, 0.332$) were significantly associated with resilience scores among older adults after a disaster [38].

Attitude towards sustainable development [ATSD]. It refers to the attitude of participants towards the sustainable developmental index related to the environment, economy, society, and education [36]. Only one study in the Philippines found that older adults experiencing a disaster had a more positive ATSD ($M = 3.73$, $SD = 0.97$), which was also a significant predictor of resilience ($R^2 = 0.420$, $p < 0.001$) [36].

Furthermore, the qualitative study on older adult's experiences in disaster resilience revealed that feeling of a high energy level as a strength, life interest, and previous experience with disasters were also psychological variables that helped older adults cope with situations effectively and bounce back to their pre-disaster life with confidence [40]. Regarding feeling of high energy level as a strength, this study revealed that older adults experiencing disasters handled the situation with confidence based on their physical strength and good health, optimism, intelligence, and problem-solving ability [40]. They further utilized their strength as a means to cope with the post-disaster situation and achieve resilience. Life interest was also found to influence the resilience of older adults [40]. They expressed gaining a new sense of interest and appreciation of life by focusing on what they had rather than thinking about what they had lost, which was illustrated by the reflection of one of the older adults who had survived Hurricane Katrina of the Mississippi Gulf Coast: *"Life is more interesting. It made me appreciate what I have, you know, each other. I very much could have lost my husband in the storm, and I realize that"* [40]. In addition, previous experience with disasters provided a chance to develop the required skills and insights among Filipino older adults to deal with the impending catastrophes [37]. The study in the USA also reported that older adults who had previous disaster experience would develop the ability to deal with insufficient resources and problematic living conditions resulting from the disaster [40]. Similarly, the study in Australia [39] also showed that previous disaster experiences guided older adults to overcome their post-disaster adversity, decide on the evacuation process in spite of limited formal guidance and the overwhelming decision-making process, and develop coping strategies to come back positively to their pre-disaster life.

4. Spiritual Factors. Spirituality played a vital role in disaster resilience among older adults [36]. Two studies in the Philippines found the relationship between spiritual factors and resilience of older adults [36,37]. The first study revealed that spirituality ($R^2 = 0.292$, $p < 0.01$) was a predictor of resilience among older adults after the disaster [36]. This study further highlighted that spirituality could decrease the vulnerability and trauma level associated with the disaster as well as enhance the older adults' health, the meaning of self-worth towards their life, and foster their disaster resilience. Similarly, the second study also outlined that religiosity was an active involvement of people in religious activities to adapt to adversities after the disaster, and it promoted the older adults' strength, helped redirect their life via a connection with the divine, and utilized alternative resources, e.g., searching for food and shelter, in order to adapt to their post-disaster life [37].

Table 1
Extraction of data on factors enhancing resilience among older adults experiencing disasters n = 5.

Title, author & country	Design, population, sample size and characteristics, and sampling technique	Operational definition, tools used and data collection methods	Data analysis and results	Recommendation	Quality appraisal,[a] level of evidence,[b, c] and remarks
1. Predicting patterns of disaster-related resilience among older adult survivors of Typhoon Haiyan • Almazan et al. [36] • Tacloban City, the Philippines	**1.** Descriptive correlational design **2.** Older adults (mean age in years: Male = 68.23 years; Female = 71.45 years) **3.** 2,020 older adults 1 year and 9 months after the disaster experience that consented to participate **4.** Purposive sampling	**1. Resilience:** Refers to older adults' sense of control and coping ability focusing on optimism, creativity, tenacity, and problem solving after a super-typhoon **2.** Attitude towards Sustainable Development Scale; Multidimensional inventory for religious/spiritual well-being; Brief resilient coping scale; & other instruments **3.** Interviews at participant's temporary shelter	Multiple linear regression analysis meeting assumptions of normality and no multicollinearity 1. **High resilience** (M = 17.48, SD = 1.1, range = 17-20) 2. **Predictors of resilience** • Spirituality: (R^2 = 0.292, p < *0.01)* • Attitude towards sustainable development: (R^2 = 0.420, p < 0.001)	• Need for further empirical evidence • Focus on qualitative research • Inclusion of multiple religions in future studies	86.50% C • Design limitation (cross-sectional descriptive survey) • Less representative of population because of purposive sampling • Need to describe other assumptions and applicability of linear regression test • Need to justify sample size • Explored religious (Roman Catholic) bias
2. Coping strategies of older adult survivors following a disaster: Disaster-related resilience to climate change adaptation • Almazan et al. [37] • Philippines	**1.** Qualitative: case study **2.** Older adults (60 years and above) **3.** 26 older adults (12 male & 14 female) having experienced a strong typhoon; no experience of a strong typhoon; with family members, and without family during the typhoon **4.** Purposive sampling	**1. Resilience:** Refers to older adults' ability to cope and deal with a disaster, i.e., Typhoon Haiyan **2.** Pilot-Tested Interview Guide with probing based on the participant's response **3.** In-depth interviews and focus group discussions	**1.** Cross-case analysis of data: exploratory analysis **2. Factors associated with resilience** • Previous experience of a disaster, Social support, Religiosity, Culture, • Not having family and prior experience of a disaster: adaptation to traumatic experience was possible when access to basic services was available.	• Mixed-method design (i.e., qualitative and quantitative design) in wider settings	75% C • Mentioned data trustworthiness • Better to mention the theoretical framework • Did not mention reflexivity • Needs a clear description of the context

3. Predictors of individual resilience characteristics among individuals aged 65 and older in post-disaster settings • Liddell and Ferreira [38] • United States of America [USA]	**1.** Cross-sectional telephone survey **2.** Older adults aged 65 and older **3.** 5713 older adults, who were: residents of Florida, Alabama, Mississippi, and Louisiana; directly affected by the Gulf of Mexico Deep Water Horizon Oil Spill; and able to respond **4.** A random sample of households	1. **Resilience:** Refers to a buffer mechanism applied to prevent or sustain the disturbances caused by the oil spill. 2. The Perlin Mastery Scale for measuring Individual's Psychological Resilience, demographics-related questions, self-rated physical and psychological health questions, questions related to social factors 3. Telephone interviews	**1.** Linear regression analysis **A. Resilience scores** (M = 19.26, SD = 2.78) **B. Factors associated with resilience** **a. Demographic factors** • **Age:** Negatively associated (β = - 0.048, p < 0.001) [i.e., advancing age decreased the individual resilience scores because of vulnerability] • **Gender:** Positively associated (β = 0.222, p < 0.001) (i.e., female gender: higher resilience scores) • **Race:** Non-white race: higher resilience scores (β = 0.057, p < 0.01) • **Marital status**: Resilience scores higher among single older adults than married/partnered ones **(**β = 0.192, p < 0.01) **b. Health factors: increased resilience** • Self-rated general health (β = 0.266, p < 0.01), physical health (β = 0.201, p < 0.001), and mental health (β = 0.433, p < 0.001) condition • Anxiety (β = -0.316, p < 0.001) and depression: (β = -0.186, p < 0.01) **c. Social factors:** Increased resilience • **Emotional support** (β = 0.280, p < 0.001), and n**o physical or emotional abuse:** (β = 1.505, p < 0.001)	• Further study to identify age-group differences in individual resilience at age 65 or older • A future study focusing on protective factors of psychological wellbeing following a disaster	81.80% C • Need to justify the sample size • Need to describe the assumptions and applicability of the linear regression test • Not able to determine pre-disaster resilience • Difficult to show the temporal direction of causality • Despite random sampling, limited representation of minority groups, i.e., mainly white participants (84%), only 2% Hispanics or Latinos
4. Understanding older adults' resilience during the Brisbane floods: social capital, life experience, and optimism • Brockie and Miller [39] • Brisbane, Australia	1. Combined qualitative approach (i.e., Constructivist Grounded Theory [CGT] & Narrative Inquiry) 2. Older Ipswich residents (age 67 to 83 years) impacted by floods in 2011 and 2013 3. 10 older adults (age range 67-83 years); among them, 2 older adults had also experienced the 1955 floods, and 6 had experienced the 1974 floods	**1. Resilience:** Refers to older adults' ability to cope and adapt after experiencing the Brisbane floods **2.** Open-ended questions **3.** Interviews using verbal prompts & memorabilia; accessory devices: audio-taped interviews	**1.** The comparative method of CGT **2.** Factors associated with resilience **Social factors**	• Needs to promote social cohesion, trust and social capital within communities as a resource	80% C • Justified sample size

Table 1 (*Continued*)

Title, author & country	Design, population, sample size and characteristics, and sampling technique	Operational definition, tools used and data collection methods	Data analysis and results	Recommendation	Quality appraisal,[a] level of evidence,[b, c] and remarks
	4. Non-probability snowball sampling		a. **Social capital**, •**Personal networks:** individual phone calls •**Bonding networks:** a) sense of support, b) coping on one's own efforts along with support from the community or officials •**Bridging and linking networks**: a) sharing of information; b) provision of supplies and resources by strangers; c) a good memory of people's kindness and generosity b. **New sense of community and mutual support**: gather information, make plans, survive and recover, provide support together with friends, neighbors, and strangers c. **Experience**: use of knowledge and skills obtained in life to recover		• Qualitative evidence of the trustworthiness of data through prolonged engagement and member checking • Potentiality for response bias • Did not mention the procedures for maintaining reflexivity
5. Five years later: resiliency among older adult survivors of Hurricane Katrina • Hrostowski and Rehner [40] • Gulf Coast, USA	1. Qualitative phenomenological study 2. People aged 65 years and above 3. 10 older adults who survived Hurricane Katrina; among them, 7 white and 3 African American older adults with the absence of depression, a high quality of life, life satisfaction, had experienced the loss of life of someone they knew, and had lived in shelters for months 4. Purposive sampling	1. **Resilience:** Refers to an extremely personal set of coping skills developed out of, and in response to adversity i.e., Hurricane Katrina and multiple losses 2. Semi-structured interviews focusing on the description of experiences of Katrina, their first reactions about the effects of Katrina, coping skills, and disaster experiences related to their whole life 3. Accessory materials: audio tapes and notes	**1. Giorgi's steps for data analysis** **2. Factors associated with resilience** **a. A new sense of community and mutual support:** friends, neighbors, and strangers came together to deal with stress **b. High energy level as a strength:** individual strength, a new sense of confidence towards their capabilities **c. Life interest:** allow for the appreciation of what I have rather than thinking about what I lost	• The need for more research on resilience and trauma among survivors	**75% C** • Did not mention reflexivity and only mentioned peer debriefing as a means to enhance trustworthiness

Note [a]: Kmet, Lee, and Cook [35]; [b, c]: Armola, Bourgault, Halm, et al. [41]; Polit & Beck, 2012 as cited in Peterson, Barnason, Donnelly, et al. [42].

Table 2
Extracted factors from five studies (Three Qualitative and Two Quantitative Studies).

S.N. & Author	Demographic factors	Physical factors		Psychological factors					Spiritual factors	Socio-cultural factors					
		Self-rated GH	Self-rated PH	Self- rated MH, free from anxiety and depression	ATSD	Feeling of high energy level as a strength	Life interest	Previous experience		Free from physical and emotional abuse	Emotional support	Social support	Social capital	A new sense of community and mutual support	Culture
Almazan et al. [36]					✓				✓						
Almazan et al. [37]								✓	✓			✓			✓
Liddell and Ferreira [38]	✓	✓	✓	✓						✓	✓				
Brockie and Miller [39]								✓					✓	✓	
Hrostowski and Rehner [40]						✓	✓	✓				✓		✓	

Note. S. N. = Serial Number. GH = general health; MH = mental health; PH = physical health; ATSD = attitude towards sustainable development.

5. Socio-cultural Factors. Emotional [38] and social support [37,38], a sense of community and mutual support [38,39], social capital [38] and culture were identified under the socio-cultural factors.

Emotional support, free from physical or emotional abuse. One study in the USA [38] highlighted that emotional support ($\beta = 0.280$, $p < 0.001$, $CI = 0.599, 0.835$), and being free from physical and emotional abuse ($\beta = 1.505$, $p < 0.001$, $CI = 0.216, 0.345$) significantly enhanced resilience scores among older adults after the disaster.

Social support. Social support was defined as helping the community, gaining a new sense of community and providing mutual support for each other, and seeking help from family, friends, and neighbors [40]. This study demonstrated that older adults with social support tried to adapt to the post-disaster situation and facilitate a faster recovery by helping community members make good decisions to rebuild the community. In addition, older adults developed a new sense of commitment and belonging towards their society, and their capacities to make a valuable contribution after the disaster [40]. In addition, social support during hardship was one of the positive coping strategies of Filipino older adults [37]. This helped them bounce back to their pre-disaster life. It was also found that older adults with access to basic services returned to their regular activities and restored their day-to-day routine successfully [37].

A new sense of community and mutual support. This experience was identified in two studies. Displaced older adults tried to find their homes, missing family members, friends, and neighborhoods, and lived with strangers to cope with the devastating situation after a disaster [40]. Gathering information; making plans together with their families, friends, and neighbors after the disaster; surviving and recovering after a disaster; and providing physical, emotional and financial support to others promoted the older adult's resilience [39]. In addition, experiencing a new sense of belonging and a feeling of being valued were also key strategies for promoting resilience [39]. Furthermore, this experience facilitated the older adults' resilience after a disaster even though there was a lack of support from governments, and non-governmental or insurance agencies [39].

Social capital. A study conducted among older adults surviving floods in Australia found that social capital was a resilience factor which refers to personal, bonding, bridging, and linking networks [39]. The same study highlighted that personal networks were one of the critical aspects of the older adults' resilience after the disaster. Individual phone calls by older adults to ask for assistance from others were important means of network communication, which facilitated them to return to their pre-disaster life [39]. In addition, bonding networks helped them be free from isolation and experience support from others. They also experienced that the bridging and linking networks helped them share information, and receive supplies and resources. They also recalled the kindness and generosity of people from the local community. The positive community spirit and support then helped them to recover [39].

Culture. One study among Filipino older adults showed that cultural wisdom and strong cultural beliefs prepared them to cope with a disaster [37]. This study also addressed that culture was a survival factor by helping them learn from the experience of their culture, which was transferred from generation to generation, in order to deal with disasters and bounce back to the pre-disaster life [37].

Discussion

Resilience among older adults plays a crucial role in responding to a disaster and promoting community resilience [44]. Therefore, the current review focused on disaster resilience rather than personal resilience to other events in life. Disaster resilience refers to the ability of individuals or communities to learn from the disaster and enhance social networks, structures, and abilities to deal with future events [45]. It is influenced by the availability of necessary resources, and their arrangement before and after a disaster [25]. Additionally, summarizing the concepts of resilience from the five selected studies for this review, resilience to disasters among older adults refers to a buffer mechanism applied by older adults to prevent or overcome disturbances; and the ability to have a sense of control, cope with and solve problems in response to adversity caused by a disaster [36–40]. Disasters are inevitable, and have detrimental effects to human life [46,47]. Therefore, resilience to a disaster might be different from that to other events, which depends on the context (i.e., social group, socio-economic or political situations, environmental conditions); nature of disturbance (i.e., sudden events and/or long-term effects); ability to respond to situations (i.e., ability to deal with events, sensitivity, and adaptive capacity); and reaction after an event [48].

Similarly, personal resilience depends on the nature of events and the capacity of an individual to cope with events [49]. Based on these definitions, personal resilience to disasters is one of the components of disaster resilience. Literature indicates that the consideration of the nature of the threat and the capacity of an individual to cope with it are essential for disaster planning [48]. Referring to this evidence, the factors enhancing personal resilience to a disaster (i.e., disaster resilience) among older adults, who have experienced a disaster, might be different from personal resilience to other events in life which were focused in this review.

Although the available studies [36–40] on resilience specifically among older adults experiencing a disaster are few, the number of studies from countries at a high risk for natural disasters focusing on disaster-related mental health has not increased in recent years [50]. This lack of knowledge along with the increasing frequency of disasters [44,50], the likelihood of the recurrence of disaster experiences in the future [50], and the increasing proportion of older adults [44] could lead to detrimental effects to human life in our aging societies [44,50]. Therefore, the knowledge gained from the synthesizing of five relevant articles addressing the resilience of older adults experiencing a disaster could be worth publishing considering Shokraneh's suggestions [51].

Factors enhancing resilience among older adults

Based on the commonality of the theme of the selected articles [36–40], the potential factors that can enhance resilience among older adults experiencing disasters were identified. Concerning demographic information, a recent study discovered that the resilience scores of people experiencing disasters decline with age [38], which is contradictory to the maturation theory and inoculation theory mentioned by Rafiey et al. in their paper [52]. However, the finding of that study might be associated with the resource theory and exposure theory [52]. Furthermore, the resource theory explains that older adults with a low socioeconomic status and diminished functional ability experience difficulty in bouncing back to pre-disaster life [52]. Similarly, the exposure theory stated that older adults face difficulty in adapting to post-disaster life because of a lack of awareness regarding warning signs of disaster, and a greater sense of deprivation caused by losses after a disaster [52]. However, Liddell and Ferreira [38] did not explore the negative relationship between age and resilience scores any further in their paper. Moreover, female older adults had higher resilience scores [38], which is contradictory to the findings of a previous systematic review among females aged 18 years and above [28]. Additionally, literature demonstrates that resilience among females after a disaster strengthens over time because of the expansion of their leadership and management roles in the society [53]. Therefore,

resilience seems to be higher among female older adults [43]. Similarly, single older adults tend to have better resilience [38], which might be due to lower family financial burdens among them [54].

In terms of physical health, the present review found only one study that highlighted the need for taking care of the physical health of older adults in a disaster situation in order to promote their resilience scores [38]. This finding concurs with those of previous work [30]. Considering the issues of the global aging population, physical health should be given more importance in health care [55]. Therefore, nurses as well as other health care professionals, who are directly involved in taking care of older adults after a disaster situation, should assess for comorbidities and specific needs with the aim of promoting the resilience of the geriatric population. Moreover, the Liddell and Ferreira reported that self-rated mental health was related to resilience among older adults experiencing a disaster [38], which is comparable with the finding of previous reviews [30,56]. Likewise, three studies showed that previous experience was related to the resilience of older adults [37,39,40], which is congruent with the inoculation theory mentioned by Rafiey et al. in their paper [52]. This theory maintains that previous experience with a similar kind of disaster boosts up the resistance to repeated hardships in life, decreases the negative effects of disaster exposure in later life, and keeps people away from harm [52,57]. The different psychological factors identified by this study may be modified through the education of older adults on disaster preparedness and readiness in a pre-disaster situation to prepare them coping with disasters and the provision of post-disaster psychological care. Moreover, older adults with prior experience to disasters can be utilized as an asset by having them share their experience with other survivors [44].

Regarding spiritual factors, two studies in the current review revealed that spirituality [36] and religiosity [37] were important protective factors that enhanced resilience among older adults after a disaster, which is identical to previous findings reported in literature [58]. This is because spirituality acts as a vehicle to find out the meaning of life and one's values, connect with others, seek hope and harmony, and promote mental health [55]. In addition, spirituality influences people's perception of natural hazards positively by developing social networks, a sense of structure and identity [57]; and promoting calmness, dealing with problems and maintaining comfort [59].

With regards to social support, the present review found that social support was associated with resilience among older adults after a disaster [37,40], this is a similar finding to that of a previous systematic review among adults aged 18 years and above [28,30,59]. One of these reviews further emphasized that connection with peers, friends, and other significant persons were the most important measure of resilience [59]. In addition, social capital played a crucial role in terms of promoting resilience and general wellbeing among older adults experiencing disasters in one of the selected studies [39], which is consistent with previous findings reported in literature [44]. Therefore, the need to generate and mobilize social capital after a disaster among older adults is necessary to prevent social isolation and mental health problems [44]. Furthermore, resilient older adults might be a valuable human resource [44] for transferring knowledge and skills to younger generations for the purpose of health promotion during a disaster [10].

Regarding culture, one study in the current review found that older adults utilized their cultural sense and beliefs to adapt to a disaster [37]. This is congruent with a previous study [60], which reported that culture plays a vital role in utilizing coping strategies for both the physical and emotional recovery of disaster survivors. Moreover, differences in culture influence the life of disaster survivors [60], their perception regarding hazards [60], expression of feelings and exhibition of reactions [50], and utilization of social, spiritual, and psychological resources [60]. However, little attention has been paid in the reviewed researches to cultural factors influencing the resilience of disaster survivors. Therefore, the consideration of cultural factors should be further explored as part or parcel of the development of effective disaster risk reduction strategies focusing on older adults' resilience.

Additionally, disaster might affect people's health [61] and daily life in the long term [62]. Since such impacts depend upon individual characteristics, exposure to disaster, and availability of appropriate policies and management during a disaster [61], people should be empowered to develop self-confidence, facilitate the improvement of their living standards, and formulate a plan for future challenges [62]. Furthermore, the recognition of strengths and weaknesses of older adults themselves should be considered when creating and implementing sustainable and need-based resilience promotion interventions [10]. Therefore, nurses and health care professionals should assess the above factors related to resilience while, at the same time, empowering older adults experiencing a disaster.

Strengths

Various strengths can be pointed out regarding this review. Firstly, this study followed the PRISMA guidelines, and appraised articles for quality to generate new knowledge on factors enhancing the resilience of the rapidly growing population of older adults after a disaster. Secondly, the current review synthesized the evidence related to positive psychological concepts concerning resilience along with relevant protective factors (social capital, cultural wisdom and beliefs; psychological factors like ATSD, and perception of a high level of physical strength; and spiritual factors like religiosity and spirituality) among older adults rather than disaster psychopathology. These factors are different from those previous systematic reviews [28,30,59]. Thirdly, this review highlighted the scarcity of evidence on protective factors of resilience among older adults experiencing disasters which identifies the necessity of rigorous future studies on the factors related to disaster resilience among older adults.

Limitations

Nevertheless, this review has some limitations. Only five articles focusing on older adults' resilience after a disaster were identified. Some factors related to resilience were studied in only one study. Therefore, it is difficult to integrate the ideas presented in these papers and generate definite evidence regarding factors enhancing resilience among older adults experiencing a disaster. Because of the limited number of quantitative studies, it is impossible to highlight the definite predictive factors enhancing resilience among older adults after a disaster. Other limitations of this review were the inclusion of articles that were published only in the English language and the exclusion of grey literature and dissertations. In addition, some limitations affecting generalization were identified such as a cross-sectional research design; lack of justification for the sample size in some studies; selection of a sample using non-probability sampling techniques without justification (although there was a large sample size in the quantitative studies); and also a lack of reflexivity in the qualitative studies. Therefore, further study is necessary to add evidence regarding the resilience of older adults experiencing disasters by conducting quantitative or mixed-method studies. However, this review can provide baseline evidence for proposing ideas to planners, policymakers, nurses, and other health care professionals by pointing out the need for social support and spirituality-focused resilience programs for older adults experiencing disaster.

Conclusion and recommendation

Different types of factors (i.e., demographic, physical, psychological, spiritual, and socio-cultural factors) are associated with resilience among older adults experiencing disasters. Under the umbrella of these factors, previous experience in three studies, and social support and spirituality in two studies were resulted as the most common factors. Social capital and culture are also related to resilience among older adults. Age, gender, marital status, and race (i.e., non-modifiable factors) are also associated with the resilience of older adults after a disaster. Therefore, nurses and health care professionals should critically evaluate resilience among older adults experiencing a disaster considering both their non-modifiable and modifiable factors (i.e., social support, spirituality, social capital, etc.) in order to help decrease their vulnerabilities during a disaster and enhance resilience. In addition to the scarcity of robust evidence, the gap in knowledge on resilience among older adults experiencing a disaster has shown, and it highlights the necessity of future research with a stronger methodology for identifying the strength and direction of the relationship of the identified factors with older resilience in post-disaster. The ensuing improved knowledge would help inform policymakers regarding the development of a sustainable resilience promotion program for older adults experiencing disasters.

Start and completion dates

January to April 2019.

Authors' contributions

RT and PS generated the original research idea. RT developed the first draft of this review. PS contributed to the revision of the first draft and subsequent revisions of the systematic review protocol along with editing the manuscript. PS supervised the entire manuscript writing along with the input of intellectual ideas. Both authors read and approved the final manuscript.

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Ethics approval and consent to participate

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Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

What is already known?

Previous study focused on resilience and factors associated with resilience among general population. Very few studies focused on resilience among specific aged population i.e., older adults experiencing disaster.

What is not known?

However, little attention has been paid to reveal the factors enhancing resilience among older adults experiencing disaster. Therefore, this study aimed to synthesize the evidences which helps nurses and other health professionals to plan for older adults focused care strategies to enhance their resilience after disaster

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Appendix A

Table 3
Checklist for assessing the quality of two quantitative studies using quality appraisal tools [35].

S.N.	Criteria	Authors	
		Almazan et al. [36].	Liddell and Ferreira [38]
	Are questions/objectives sufficiently described in the introductory section?	2	2
	Is the study design evident and appropriate to answer the study question?	2	2
	Are the methods of subject/comparison group selection *or* source of information/input variables described and appropriate?	2	1
	Are subject (and comparison group, if applicable) characteristics sufficiently described?	2	2
	If interventional and random allocation was possible, was it described?	NA	NA
	If interventional and blinding of investigators was possible, was it reported?	NA	NA
	If interventional and blinding of subjects was possible, was it reported?	NA	NA
	Are outcomes and (if applicable) exposure measure(s) well defined and robust against measurement/misclassification bias? Are means of assessment reported?	2	2
	Is sample size appropriate?	1	1
	Are analytic methods described/justified and appropriate?	1	1
	Are estimates of variance (i.e., confidence intervals, standard errors) reported for the main results/outcomes (i.e., those directly addressing the study question/objective upon which the conclusions were based)?	2	2
	Is confounding controlled via a randomized study design, with comparable baseline characteristics, or appropriate controls at the design or analysis stage?	1	1
	Are results reported in sufficient detail?	2	2
	Do the results support the conclusions?	2	2
	Total	= 19/22 × 100= 86.3%	= 18/22 × 100 = 81.8%

Note. S. N. = serial number; NA = not applicable; Yes = 2; Partial = 1; and No = 0.

Table 4
Checklist for assessing the quality of three qualitative studies using quality appraisal tools [35].

S.N.	Criteria	Authors		
		Almazan et al. [37]	Brockie and Miller [39]	Hrostowski and Rehner [40]
	Are study questions/objectives sufficiently described in the introductory section?	2	2	2
	Is study design easily evident and appropriate to answer study questions?	2	2	1
	Is context for the study clearly described?	1	2	2
	Is there a connection to a theoretical framework/wider body of knowledge?	0	2	2
	Is sampling strategy clearly described, relevant and justified?	2	2	2
	Are data collection methods clearly described and systematic?	2	2	1
	Is data analysis clearly described, complete, and systematic?	2	1	2
	Is there a use of verification procedure(s) to establish the credibility of the study?	2	2	1
	Are conclusions supported by the results?	2	1	2
	Does the researcher show evidence of reflexivity in the study report?	0	0	0
Total		= 15/20 × 100= 75%	= 16/20 × 100 = 80%	= 15/20 × 100 = 75%

Note. S. N. = serial number; NA = not applicable; Yes = 2; Partial = 1; and No = 0.

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