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HEALTHCARE CENTERS AND OLDER PEOPLE IN THE CONTEXT OF DISASTERS IN CHILE: INTEGRATING PERSPECTIVES FOR RESILIENCE TO EARTHQUAKES

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Abstract

The older population is increasing rapidly worldwide and in the context of disasters produced by earthquakes, elders are considered a vulnerable population. This occurs especially when they have lower mobility and chronic diseases. Given this situation, healthcare centers are recognized as critical institutions to support the healthcare needs of vulnerable populations such as the older people (according to the United Nations, aged 60 and over). However, recent literature is increasingly paying attention to the idea that older people are not just vulnerable populations in need of support but contributors to resilience on disasters, mainly because of their past experiences on disasters.

To know how older people contribute to earthquake resilience, this study explored the perspective of both the staff of the healthcare center and some speakers from the elders' community who frequently receive assistance there. This study was carried out in a hospital of the central zone of Chile, in the county of Peñalolen (overall, 20% of its population is aged 60 and more), regularly exposed to earthquakes. The research team explored the perspectives of the healthcare center Cordillera and the older people with previous experiences on earthquakes in the central zone of Chile. This group of elders was affected by different earthquakes in the last century, such as the 1960 Mw 9.5 in Valdivia, the 1985 Mw 8.0 in Algarrobo and the 2010 Mw 8.8 in Concepción.

Relevant data was gathered from one interview conducted with the head of the hospital and one focus group with the hospital emergency team. Furthermore, two focus groups were conducted with older people aged 60 years and over. They were part of a consultative group of the hospital and representatives of their neighborhoods. Both were asked about their perspective on the support requested and received from the healthcare centers after an earthquake.

We analyzed the interviews and focus group under the model of resilience considering the disaster lifecycle, involving mitigation, preparedness, response, and recovery. While the healthcare center was concerned about the physical impairment of older people in the context of an evacuation needed if the facility does not maintain its functionality after an extreme earthquake, older people identify themselves as supporters of others, and the healthcare center as a safe place to meet and socialize, but not to request any support after earthquakes.

The divergence on views from older people in comparison to the staff of healthcare centers suggests that for the stage of response, healthcare centers consider the frailty of elders, while the older people feel crucial for the recovery phase, especially because of their past experiences on disasters and the learned lessons from those disruptive events. These findings suggest that the vulnerability associated with older people should be revised, to understand how they contribute to the resilience later in life, being supporters of others and not just vulnerable population in need of support from healthcare services.

Keywords: resilience, older people, healthcare center, lessons learned

1. Introduction

Worldwide, older people are increasing fast, and it is expected that by 2050 they will reach a quarter of the total population, consequently, they will be more exposed to disasters in the future. Unfortunately, they have been the primary population affected by several documented disasters in recent years. During the great disaster of Indonesia in 2004, most of the fatalities were aged females who were on the coast [1]. The eastern Japan earthquake in 2011 caused more than half of the fatalities who were people over 65 years old [2]. In the case of Chile, the 2010 Maule earthquake also affected the elders in the coastal areas [3] primarily.

This situation represents a problem; as usually older adults are seen as vulnerable to disasters. Their vulnerability is explained because of their demand on external resources to cope with the disaster aftermaths [4], including the healthcare services because of their chronic diseases, as well as their lower mobility, especially among older adults aged 75 and more [4], [5]. However, beyond this perspective of vulnerability, this research attempts to pay attention to the potential contribution of older adults in preparedness to communities under seismic risk, especially in the context of disasters triggered by earthquakes. In this research, we assumed that past experiences in disasters are essential to respond effectively to their needs.

Regarding the needs of communities, healthcare services are supposed to be critical in responding to the healthcare needs of older adults. This fact has driven the focus of earthquake resilience engineering to understand how to maintain the functionality of healthcare centers after extreme earthquakes [6]. Hence, the performance of healthcare infrastructure is one of the primary basis of a resilient community to allow the delivery of medical assistance and the supply of basics needs for people dealing with health issues [7]. The Sendai framework (SFDRR) [8] identifies the inclusion of experiences and knowledge of those who are more vulnerable to disasters as one of the pillars for building more resilient communities. However, there is scarce evidence on the transference of knowledge from the older adults to others in formal and informal instances, such as the tools employed by healthcare centers to manage risk from natural hazards [9].

Chile is one of the most aged countries in the Latin American Region. Currently, almost 20% of its population is aged 60 and more, and it is expected that by 2025, they will represent a fifth of the total population [10]. Most of the older adults are located in the central zone of Chile that also collects the more complex hospitals within the extent of the country [11]. Due to the seismic gap affecting the central zone of Chile, this research focused on the county of Peñalolen, a county that concentrates older adults living in earthquake-prone areas. The main purpose of this research is to integrate the perspectives of older adults and healthcare centers about preparedness to disasters.

The healthcare system in Chile comprises a private system and a public one. The public system provides medical attention to almost 80% of the total population in Chile. The Chilean Ministry of Health manages the public system, and this one operates in a network. Thus, there is a network of primary healthcare centers, which correspond to the low complexity healthcare centers that offer ambulatory services, and a network of hospitals, more complex centers in which people can access to specialists and hospitalization. In the case study of Peñalolen, there is one hospital and five primary healthcare centers. This study was conducted in the main hospital of Peñalolen, particularly in the building of specialists consultation.

1.1. Vulnerability and resilience in the context of healthcare centers and older adults

The discussion around earthquake engineering has recently changed from risk to resilience. In the context of disaster, this modern concept introduces the time as an additional variable defining how any community can recover from the impact of natural hazards using its resources [12]. Besides, resilience analysis not only focuses on the loss of capacity in a system as a function of vulnerability (i.e., robustness) but also integrates more dimensions such as rapidity, resourcefulness, and redundancy, as proposed by [13]. These four dimensions define the capability of any system to absorb the effects of a disruptive event, such as an earthquake, and reach the desired performance level with self resources [14].

Literature addresses older people facing earthquakes, mostly in terms of vulnerability, but it has paid scarce attention to their contribution to resilience. Older adults are more vulnerable to the effects of earthquakes than other adults since they have low mobility and chronic diseases that make them dependent on continuous medication and medical attention [4], [5], [15]. However, they may be more resilient to the disruptive consequences of this type of hazard due to their broad experience to cope with disasters and the connection they build with their communities as social support [16]. Table 1 shows a comparative description of perspectives about elders in the context of disasters, in terms of their contribution to vulnerability and resilience.

Vulnerability on the elders after a disaster (frail elders)	**Contribution of the elders to resilience|**
Low mobility (i.e. Increase the times and feasibility of evacuation) (McGuire et al, 2007)	Healthy elders (i.e. Help in the community recovery after the disaster) (Cohen et al, 2016)
Higher prevalence of chronic diseases and the subsequent access to medication and medical attention (Aldrich, 2008)	Lessons learned from previous experiences on disasters (Howard et al 2017; Brockie and Miller, 2017)
Socioeconomic status (i.e. Quantity of older people living in poor conditions, Fernández et al, 2002)	Transmission of the lessons learned to their communities (Howard et al 2017)
Isolation, social support (Fernández et al, 2002)	They are part of a social support for disaster's recovery (Howard et al 2017, Kiyoto et al, 2015)

Table 1: Comparative description of the contribution of older people [17].

1.2. Enhancing earthquake resilience

This proposal proposes a resilience framework to understand the relationship between the older people's experiences and the community resilience around healthcare centers in the understanding that healthcare centers are critical infrastructure that provides support to the most vulnerable population [8], in which older adults are included.

Two different alternatives can be highlighted to enhance resilience in healthcare systems: (1) to attend the immediate aftermath due to earthquakes in order to facilitate older people evacuation; (2) to attend the recovery process through the contribution of experienced people and their learned lessons from past disasters. This research presents its hypothesis based on the recognition of older people as a part of the community that contributes to enhancing the earthquake resilience of healthcare centers from two perspectives: the preparedness and the immediate response.

Some authors have suggested that prior experiences inoculate people to face future events of disasters; thus, past experiences on disasters impact on how people will respond in the future [18]. As elders have learned from past earthquakes, especially those who have lived in the at-risk areas, they can add resilience through the strengthening of preparedness translated in the additional capacity of the healthcare centers community to recover in time. The heads of the healthcare facilities can use this information to improve the immediate response that the facility offers to its target community [17], integrating such criteria to the emergency plans in case of earthquakes. Figure 1 depicts the proposed framework to enhanced earthquake resilience of healthcare facilities from the contribution of older people to disaster management.

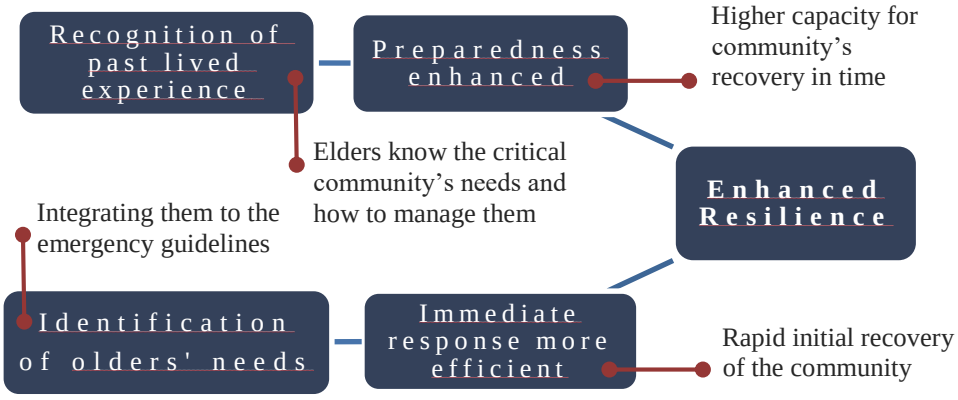

Fig 1. Representation of proposed framework [17].

1.3. Case study

This research was conducted in the central zone of Chile, one of the most seismic countries around the world. Chile has experienced 3 of the largest earthquakes worldwide, such as the Valdivia earthquake in 1960 (9,5 Mw), Algarrobo earthquake in 1985 (8,0 Mw), and Maule earthquake in 2010 (8,8 Mw).

The central zone of Chilean continental margin located in the southwest of the Pacific basin (~33°S; 71°W) constitutes an active subduction zone with high seismogenic potential, observing a megathrust earthquake recurrence of 200 to 600 [19]. Historically, the segment has been affected by major earthquakes such as Mw 8.8, 1571 [20], Mw 9.0, 1730 [21] y Mw 8.8, 2010 [22]. The historical seismic sequence of major earthquakes (Mw>8), initiated after to 1730 event, has been continued by 1822, 1906, and 1985 earthquakes show a relatively constant recurrence interval of ~85 years. However, the effects and extensions of seismic sources suggest physical processes associated with the rupture complexity of megathrust earthquakes [21], [23].

The central zone of Chile corresponds to the Metropolitan Region of the country, composed of 52 counties (see fig. 3). The Region concentrates 40% of the total older adults of Chile (aged 60 and more). This study worked with a community located in Peñalolen, in the east zone of the Region, indicated as a zone in which there is a critical seismic gap, as indicated by Fig 2.

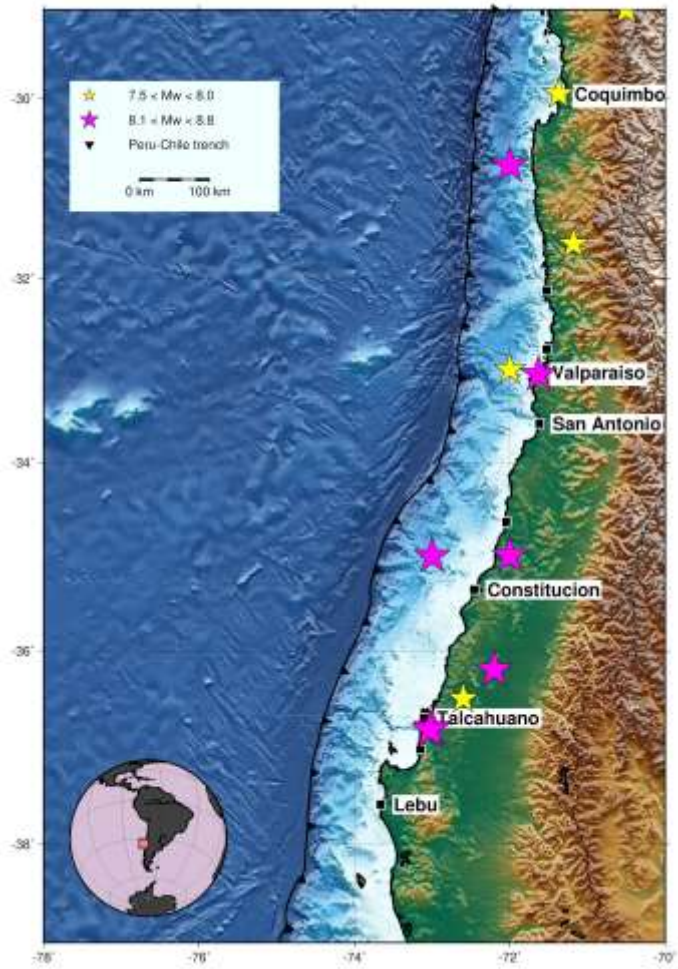

Fig 2. The historical sequence of megathrust earthquakes in the central subduction zone of Chile located between 30°S to 38°S. The red lines indicate seismic events with severe damages in the Metropolitan region.

2. Methodology

Data collection consisted of two phases. The first one took up three months and corresponded to the engagement with the community. The activities of the first stage included: (i) the contact with the director of the healthcare center (by phone and meeting); (ii) the contact with their elders (through the director and then directly with the elders); as well as (iii) the presentation of the project to the healthcare center emergency team and staff. Figure 4 depicts a general diagram of the methodological process.

Phase I. Engagement with the community

In a first meeting with the head of the healthcare center, the director suggested contacting the elders that worked directly with the center in a structure called the Consultative group. The consultative group is a structure established by the Chilean legislation to ensure the participation of patients in the management of healthcare centers like hospitals. This law establishes that the users and patients of the healthcare centers in Chile should be part of the participatory management of these institutions. Their role consists of transferring the concerns of the territorial units represented by them (such as neighborhoods) to the healthcare centers.

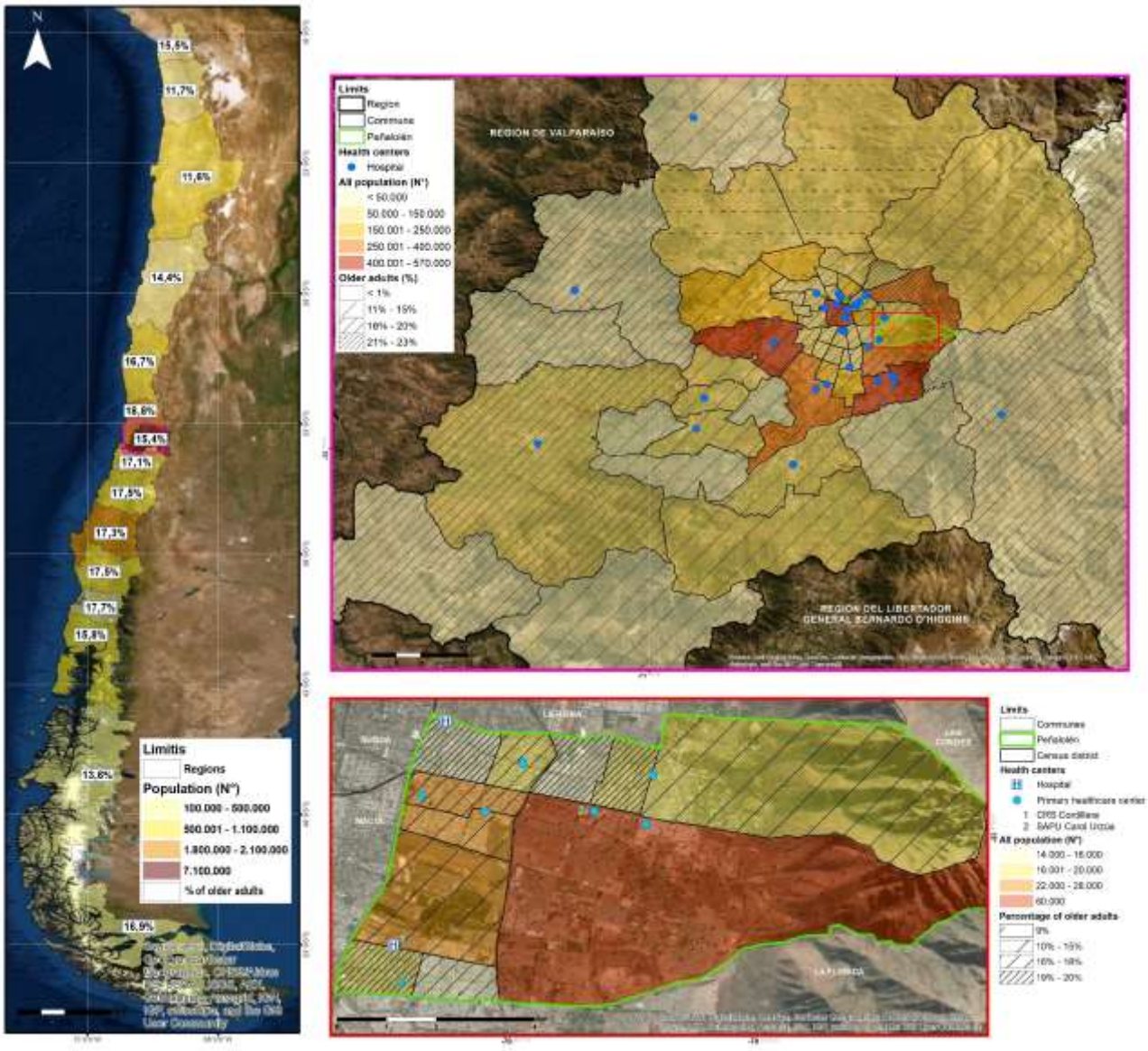

Fig 3. The ratio of older people in Chile and the location of healthcare centers in Peñalolen

The research team contacted the consultative group of older people from CRS Cordillera, previously agreed with the director of the healthcare center. The group comprised 13 members: 10 women, and 3 men. The participants of the session in which the research team conducted the activity (focus group) were 7 people: 2 men, and 5 women.

This research also worked with another consultative group of a primary healthcare center located in Peñalolén (one of the five available there, see Section 1. Introduction). The work with this new group emerged from the request of the older adults who participated in the first focus group at CRS *Cordillera*.

Fig 4. Methodological stages of this research.

Phase 2. Interviews and focus group

In this research we defined a set of topics to apply semi-structured interviews and focus group, with the following topics: (i) the past experiences on earthquakes among the older adults and healthcare center, and (ii) the supporting role of the healthcare centers in the context of earthquakes, especially in case of older adults.

Initially, we interviewed the director of the healthcare center in order to know her perspectives and concerns regarding the evacuation process, and the older adults facing earthquakes as well. Additionally, a focus group was applied to know the perspectives of older adults regarding their preparedness plans for future disasters and discuss the role of the healthcare center in the context of disaster response.

At the end of the focus group, participants were encouraged to summarize in one minute their lessons learned from past experiences. These summaries were recorded by using spherical cameras. The use of this type of technology encouraged them to record their experiences in video files, to transfer this knowledge to other audiences in further stages of the project (e.g., to the personnel of the healthcare center). In general, each interview and focus group lasted 60 minutes.

3. Results

3.1. Emergency plan at the healthcare center and previous experiences on earthquakes

The emergency plan states that in case of an earthquake, people can go to the safe areas located outside the building. The protocol and evacuation routes are designed by the staff from the Operative Emergency Office and guide the evacuation process of people. In the case of an earthquake, all people should evacuate. However, patients in the pavilion and those who are recovering after medical procedures are not included in this command.

The evacuation route implies to walk down the stairs connecting the second floor with the ground level. According to the emergency team, this does not imply a problem because people help others with low mobility. However, the head of the center expressed her concern about the low mobility and the use of wheelchairs as significant limitations in the performance of older people facing the consequences of earthquakes on the physical infrastructure of the healthcare center. Thus, regarding the evacuation process, this concern suggests that it is crucial to think about more inclusive evacuation plans, considering the people who will have to move with any restriction. Hence, the participation of elders showed an urgent need to include the mobility conditions of frail elders in the design of the evacuation plans.

3.2. Older adults and their role in the preparedness for future events of disasters

Considering both focus groups, one at CRS Cordillera and the other at a primary healthcare center of the county, some topics emerged in the discussion around learning from earthquakes. The older adults who participated in the focus group (n=13) talked about prior experiences on earthquakes being children, and how these memories impacted their later experiences on earthquakes as older adults.

The most impacting experiences as children were related to facing the disaster of the 1960 Valdivia earthquake (greatest worldwide earthquake) as children. Their experiences are mostly associated with preparedness strategies to respond to the earthquake immediately. These included some actions like to panic and to recognize safe zones in their houses (e.g., the common practice of staying under the frame of the doors).

In two specific cases, they had memories of earthquakes previous to the 1960 Valdivia earthquake, as experiences that they did not live but were transmitted by their parents and grandparents, like the case of the 1939 Chillan earthquake. They associated this memory with the effect of the earthquakes on weather changes, called the rain after the earthquake by themselves. This particular memory allowed them to link these experiences to the challenges emerging in the post-earthquake conditions, and how to be prepared for that. In the second case, a woman talked about the 1906 Valparaíso earthquake; her grandparents lived in a hand-made bricks house, and a loved one died because he could not evacuate outside the home.

Despite these perspectives on disasters, participants from both focus groups did not feel that their knowledge of past earthquakes was significant and useful to transmit to others such as grandsons, as they trust in the education they received at schools (i.e., the schools' emergency plans).

3.3. Older adults and their contribution to the response and recovery after the earthquake: their role as supporter of others

Regarding the healthcare center, they all agreed that the center did not provide support in case of an earthquake. However, they agreed that it was a meeting point in their everyday life, primarily through the consultative groups, as they could participate in the healthcare center and know other older adults. Moreover, based on the last experience on earthquakes, the 2010 Maule earthquake, they identified some capacities developed after that event that allowed them better coping with disasters in the future. Some of them, all women, stated that they could contribute by offering shelter and basic supplies (such as water and food) to younger people, especially other women with children.

In some cases they organized at a community level (e.g., in their buildings) to supply water back up or keep radio and light services in case of any emergency. These kits were tested by themselves in case of shakes and interruption of water supplies. In cases of adults with chronic diseases such as diabetes, one participant talked about the need she had to carry a kit with pills to cope with the aftermath of the earthquake. Although these pills must be enough for up to one week, she said she did not need anything else. “If I take my pills I have no concerns, even though I have diabetes and I have experienced two heart attacks” (Woman, 70 years old).

Considering all the participants, they worked either for their communities or in the industry as employees. One of the women was the carer of another person older than her; she talked about the idea of being support for others as a useful concern not only in case of an extreme event but even in everyday life.

4. Conclusions

Initially, this project was proposed under the idea of understanding how the healthcare facilities could support the older adults in the context of an earthquake, and how their both perspectives could contribute to an improved preparedness through the inclusive organization. However, we found out that the healthcare center had a perspective of the older adults based on their vulnerability, as traditionally has been explored in the literature, and that they do not find support from the healthcare center. The older adults in this research did not face the dimensions of vulnerability as a reason to depend on others, neither to ask for support (e.g., to have a chronic disease). On the contrary, they considered themselves as supporters for others. As well, even though they identified their past experiences as key to their preparedness for future events, they did not found valuable their perspectives to get more prepared communities for future events.

Healthcare centers were identified as meeting points in which older adults shared with others and a place in which they also built community. Even though they did not feel their knowledge as valuable to be transferred to other generations (something that has been discussed earlier in New Zealand and Australia), they could be valuable in the stages of response and recovery after an earthquake. This value can be found when the participation of older adults as supporters of their communities are considered by institutions, especially at the stages of response and recovery. This inclusion could impact the way the healthcare institutions respond in case of disaster, as they are part of the community as a meeting point for the older adult groups.

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