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Disasters and Aging: Global Research Trends

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ABSTRACT

Türkiye is frequently affected by natural disasters such as earthquakes, floods, and wildfires due to its geographical and climatic conditions. Older adults represent a particularly vulnerable group, facing increased physical, psychological, and social risks in the context of such events. This study was conducted as a bibliometric analysis to examine the scientific literature on the intersection of disasters and aging. A total of 442 publications were identified in the Web of Science Core Collection using the keywords “disaster” and “aging.” All retrieved records were analyzed using VOSviewer software to map patterns related to publication year, contributing countries, author collaboration, and keyword co-occurrence. In addition, a PRISMA-based content screening was performed, and 38 original articles were included for in-depth qualitative assessment. The findings demonstrate a substantial increase in research addressing disaster vulnerability among older populations, particularly after 2018. The limited number of Türkiye-originated publications highlights a need for more interdisciplinary and context-specific studies. This work aims to illuminate the structural features of the academic output at the intersection of aging and disasters, contributing to both scientific inquiry and policy development. In conclusion, disaster gerontology is of increasing global importance, and integrating age-sensitive perspectives into disaster research is crucial.

Keywords: Aging, Bibliometric, Disaster, Earthquake

1. INTRODUCTION

Türkiye is recognized as one of the most seismically active countries worldwide, frequently exposed to natural disasters including earthquakes, wildfires, and floods (Ocal, 2019). The country’s complex tectonic structure and diverse climate zones contribute to these recurring hazards, which increasingly threaten both urban and rural populations (AFAD, 2011). Older adults—defined as individuals aged 65 years and above—have been consistently identified as a high-risk group during such events due to physiological decline, chronic illnesses, limited mobility, and social isolation (Puyane et al., 2025; Ocal, 2019; Ngo, 2012). Meta-analyses have demonstrated that older individuals are significantly more susceptible to post-disaster mental health consequences such as posttraumatic stress disorder (PTSD) and adjustment disorders (Parker et al., 2016).

In recent decades, the frequency and intensity of natural disasters such as earthquakes, floods, wildfires, hurricanes, and heatwaves have increased globally, posing severe threats to human health and safety (UNDRR, 2023). Older adults, defined as individuals aged 65 years and above, are particularly vulnerable during such events due to age-related physiological decline, chronic health conditions, reduced mobility, cognitive impairments, and social isolation (Parker et al., 2016; Siskind et al., 2016). Studies from various disaster-prone regions including the 2008 Sichuan earthquake in China, Hurricane Katrina in the United States, and the 2011 Tōhoku tsunami in Japan consistently demonstrate that older individuals are disproportionately affected, both in terms of mortality and long-term psychosocial outcomes (Jia et al., 2010; Gutterman, 2023; Poole et al., 2022). These populations frequently face barriers in evacuation, access to emergency healthcare, and post-disaster recovery processes. Furthermore, emerging literature highlights that beyond physical injury, older adults are at heightened risk of experiencing post-disaster depression, anxiety, grief, and disrupted social support networks often with prolonged recovery trajectories compared to younger cohorts (Holm and Severinsson, 2014; Parker et al., 2016). Despite this evident vulnerability, there

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remains a notable scarcity of targeted research and disaster preparedness policies focusing on geriatric needs within the broader context of global disaster risk reduction. Despite this observable vulnerability, Türkiye's academic literature remains limited in terms of addressing disasters through a gerontological lens. To investigate this research gap, a bibliometric analysis was conducted using the Web of Science Core Collection. A total of 442 publications (dated 2010–2025) were identified using the search terms "disaster" and "aging." VOSviewer software was employed to generate visualizations illustrating global trends in publication year, author and institutional collaboration, and keyword co-occurrence. High-frequency keywords such as "earthquake," "flood," "resilience," and "older adults" clustered in relation to studies on health system preparedness, psychosocial risk factors, and disaster recovery phases. Subsequently, a PRISMA-based screening of abstracts and full texts was performed, leading to the inclusion of 38 peer-reviewed articles for in-depth analysis. Results revealed a marked increase in publications after 2018, indicating growing international awareness of the need for age-inclusive disaster preparedness. However, studies originating from Türkiye remain relatively few, despite its status as a high-risk country with a rapidly aging population. The proportion of Turkish citizens aged 65 and older is projected to exceed 15% by 2030 (TURKSTAT, 2022), with notable concentrations of older populations in seismically active provinces such as Istanbul, İzmir, and Kahramanmaraş (Karasapan and Arslan, 2025). The presence of high elderly density in these disaster-prone regions underscores the critical importance and urgency of research focusing on the intersection of aging and disaster preparedness.

In light of these findings, this study underscores the necessity of developing interdisciplinary, gerontology-informed disaster strategies in Türkiye. By combining bibliometric mapping with a structured literature review, the research aims to both chart global scholarly engagement with disaster and aging themes and highlight the critical gaps within the Turkish context. It is anticipated that the outcomes will inform future evidence-based policy formulation and public health planning tailored to older populations in disaster-prone regions.

2. MATERIAL METHODS

2.1. Search Strategy

This study employed a bibliometric methodology to examine scientific trends related to disasters and aging across all available years indexed in the Web of Science Core Collection (WoS-CC), without restricting the publication date range. A comprehensive literature search was conducted in July 2025 using the keywords "disaster" and "aging", with the search field set to "Topic" (TS), encompassing titles, abstracts, and author keywords. This broad search strategy was intended to capture the historical and thematic breadth of publications addressing the intersection between natural hazards—such as earthquakes, floods, and wildfires—and older adults. Only peer-reviewed articles published in English and indexed in core WoS databases were included; records from sources such as the Preprint Citation Index were excluded to maintain consistency and reliability.

2.2. Article Selection

The initial search yielded a total of 442 publications matching the query criteria. A structured multi-phase screening process was then applied to refine the selection. Duplicate entries were first removed. The remaining articles were reviewed by title and abstract to eliminate studies that were unrelated to aging or disasters—for example, those focusing exclusively on technological modeling or non-human subjects. A full-text evaluation was subsequently conducted based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. Articles that failed to directly address older adult populations or disaster contexts were excluded. This process resulted in 38 peer-reviewed articles being selected for in-depth qualitative analysis.

2.3. Data Extraction

For bibliometric analysis, metadata from all 442 eligible records were exported from WoS in plain text (.txt) format. Extracted information included titles, abstracts, keywords, author names, affiliations, publication years, and journal sources. These data were imported into VOSviewer (version 1.6.20) for the creation of

bibliometric maps. The software enabled visualization of co-authorship networks, international collaboration patterns, temporal publication trends, and keyword co-occurrence. Separately, the 38 full-text articles selected through PRISMA-based screening were reviewed manually. Relevant information was extracted regarding study scope, disaster type, methodological design, population focus, and key outcomes. Publications specific to Türkiye or authored by Turkish researchers were identified for additional thematic scrutiny.

2.4. Data Analysis

Data analysis was carried out in two complementary phases. The first involved a quantitative bibliometric evaluation using VOSviewer. Co-occurrence analyses were performed to identify thematic clusters based on keyword frequency, with a minimum threshold of five occurrences. Clustering algorithms generated visual maps highlighting prevalent topics such as “resilience,” “post-traumatic stress,” “climate disaster,” and “older adults.” Authorship and country-level collaborations were also visualized to assess geographic distribution and research connectivity. The second phase entailed a narrative synthesis of the 38 selected articles. These were categorized by disaster type (e.g., earthquake, wildfire, flood), research focus (e.g., physical and mental health, emergency preparedness, policy response), and population vulnerability factors. Special attention was given to Türkiye-originated publications to explore national trends and gaps. This dual-approach methodology aimed to provide a robust and multidimensional perspective on the scholarly landscape of disaster-related aging research.

3. RESULTS

In this section, the findings of the bibliometric and systematic review are presented. The results cover the scope and selection process of the literature, the distribution of disaster types addressed in aging-related studies, the thematic structure and co-occurrence of keywords in the field, and the international collaboration patterns among contributing countries.

Figure 1 presents the PRISMA flow diagram that outlines the systematic process of study selection applied in this research. An initial search conducted through the Web of Science Core Collection (WoS-CC) yielded 876 records based on the co-occurrence of the keywords “disaster” and “aging” within the topic field, which includes title, abstract, and author keywords. Only peer-reviewed, English-language publications with full-text access were considered eligible.

In the first step, duplicate records were automatically removed. The remaining articles underwent a thorough screening of titles and abstracts. A total of 734 records were excluded at this stage for failing to meet the inclusion criteria. Studies that did not directly pertain to natural disasters (e.g., technological modeling, animal experiments, or pediatric populations) or lacked a clear connection to aging were systematically filtered out. Subsequently, 142 full-text articles were assessed for eligibility. Among these, 71 were excluded for not addressing disaster-related content, and 33 were removed due to insufficient focus on aging or older adult populations. Additional exclusions were made for studies with methodological limitations, vague outcomes, or conceptual misalignment with the research objective. Ultimately, 38 articles were deemed eligible and included in the final synthesis, based on their direct relevance to the intersection of aging and disaster risk.

This rigorous selection process ensured that the final dataset was both methodologically sound and thematically focused. The use of the PRISMA framework added transparency and replicability to the study’s design, aligning it with international standards for systematic reviews and evidence synthesis.

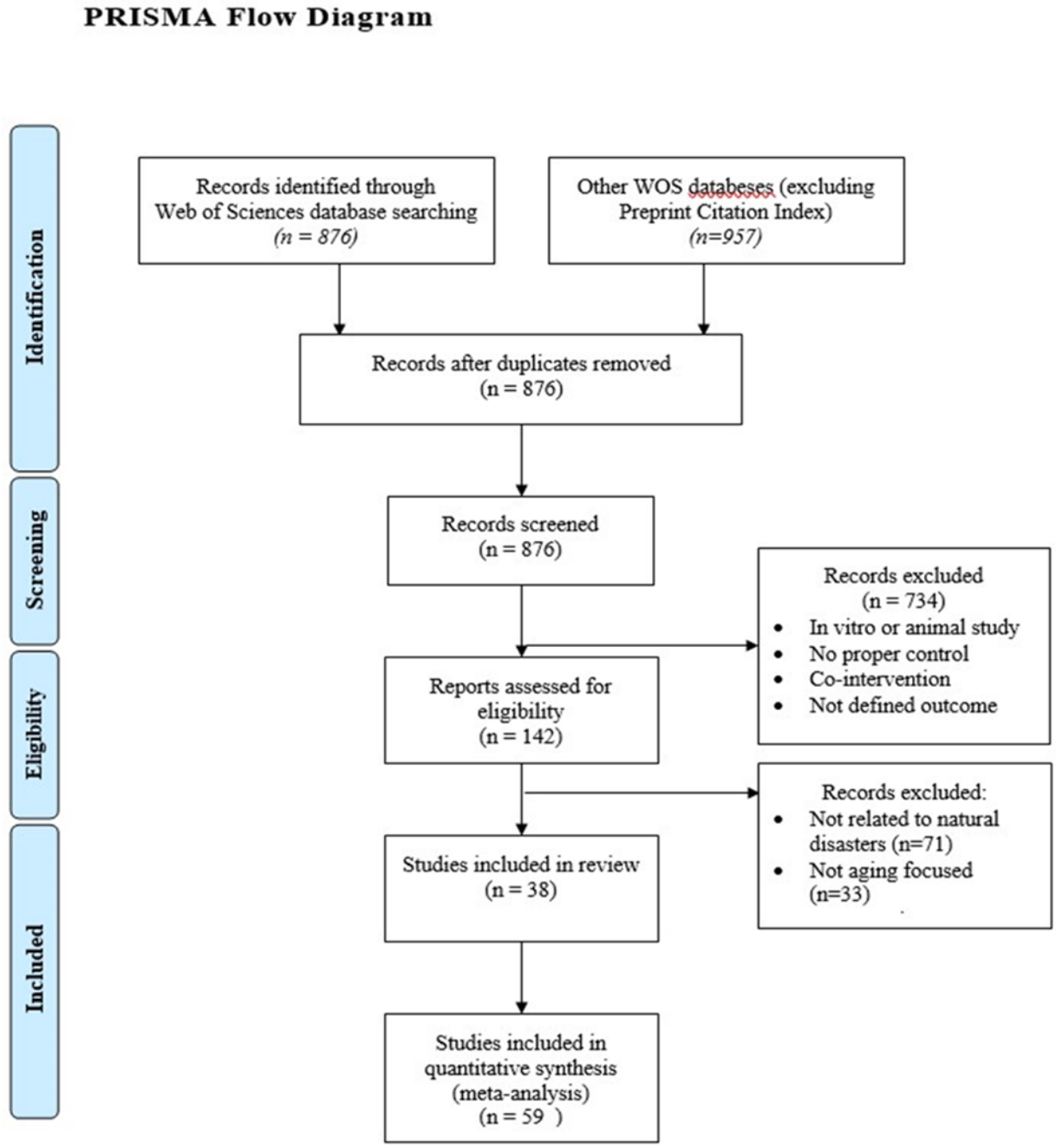

Figure 1. The study selection process is illustrated in the PRISMA flow diagram

Figure 2 illustrates the distribution of natural disaster types explored in publications related to aging (Figure 2). The visualization reveals a highly uneven research landscape. Earthquakes emerge as the most frequently studied disaster type, accounting for nearly 300 of the indexed publications. This is perhaps unsurprising, given their sudden onset, high lethality, and devastating impact on both urban infrastructure and vulnerable populations. Earthquakes pose serious risks for older adults, who often face limited mobility, dependency on structural safety (e.g., elevators, stair access), and pre-existing chronic conditions that impair emergency response capacity (Bentli and Demirel, 2025). Following earthquakes, hurricanes and floods are the next most represented disaster types, each exceeding 120 publications (Ocal, 2019). These hydrometeorological hazards are particularly relevant in the context of climate change, which has intensified the frequency and unpredictability of extreme weather events globally. The older population is acutely affected by such events due to factors like inadequate evacuation infrastructure, power outages affecting medical equipment, and heat sensitivity. Fires, storms, tsunamis, and non-specific “natural disasters” were moderately represented, suggesting a growing but still limited research focus.

Conversely, some disaster types—despite increasing prevalence in recent years—remain severely underrepresented in the aging literature. For instance, droughts, heatwaves, landslides, and wildfires had relatively low publication counts. This is concerning, particularly given the projected increase in these events as global temperatures rise (Lyu et al., 2024). Heatwaves, for example, disproportionately affect older adults due to thermoregulation deficits, social isolation, and comorbidities, yet they remain understudied in this context.

The observed distribution highlights significant thematic gaps. While high-casualty and infrastructure-intensive events like earthquakes dominate the literature, slower-onset or climate-linked hazards that pose equally critical threats to older adults remain on the margins of academic inquiry. These findings suggest an urgent need for more diversified and inclusive disaster-aging research agendas, especially in regions where such overlooked hazards are becoming increasingly common.

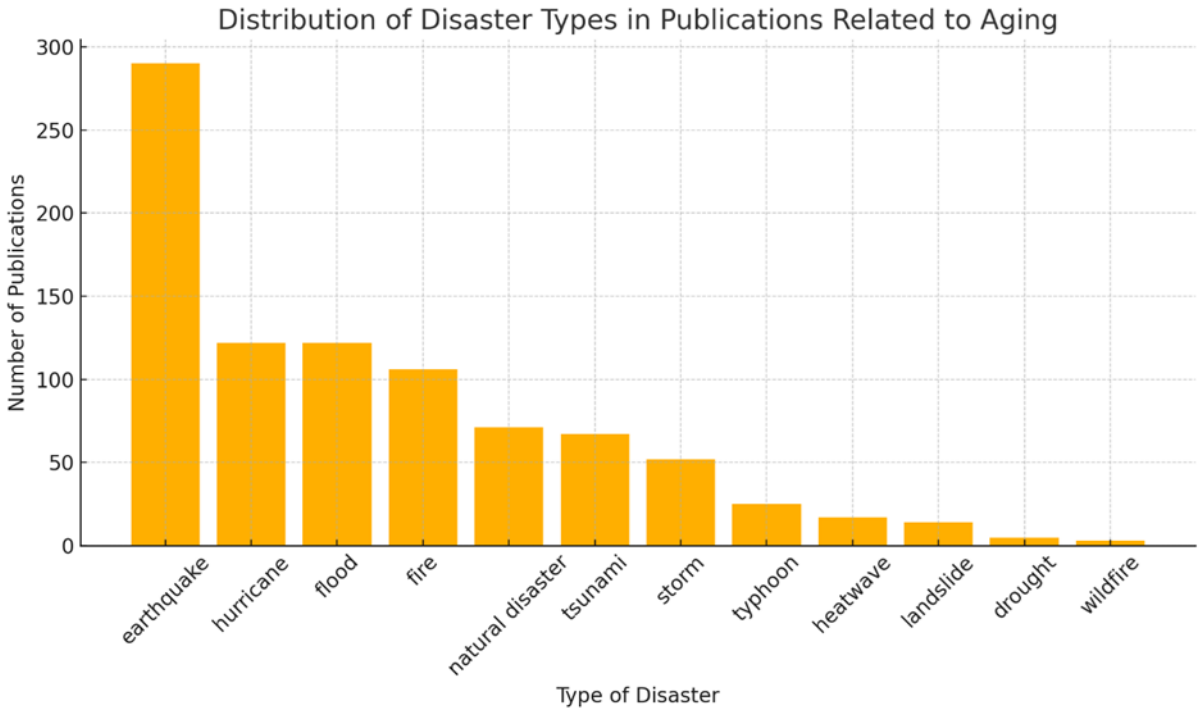

Figure 2. Distribution of Disaster Types in Aging-Related Publications

The figure presents a detailed co-occurrence map of author keywords derived from the full corpus of publications (Figure 3). The visualization highlights “aging,” “disaster,” and “older adults” as the most central and interconnected terms, forming the conceptual backbone of the field. Clusters of closely associated terms reveal several thematic foci, including “resilience,” “disaster preparedness,” “vulnerability,” “public health,” and “long-term care.” These domains reflect a growing global concern over how aging populations are prepared for and affected by various types of natural disasters.

Notably, disaster-specific keywords such as “earthquake,” “tsunami,” “flood,” and “wildfire” also appear with relatively high frequency and strong linkages to health-related and preparedness terms. This trend aligns with the observable rise in the frequency and severity of natural disasters globally due to climate change and urbanization, which has increased the exposure of older adults to life-threatening hazards. For instance, “earthquake” is densely connected to terms like “dementia,” “disaster recovery,” and “long-term care,” reflecting the unique challenges faced by frail elderly populations during seismic events. Similarly, “flood” and “wildfire” appear in clusters that emphasize the role of community-based resilience, social capital, and healthcare systems in disaster response.

The map indicates that the field is not only expanding but also becoming more interdisciplinary, integrating insights from gerontology, public health, climate science, and social policy. The prominence of psychological and systemic resilience as recurring concepts underscores the necessity of adaptive and inclusive disaster preparedness models that account for the specific vulnerabilities of older adults in a rapidly changing risk landscape.

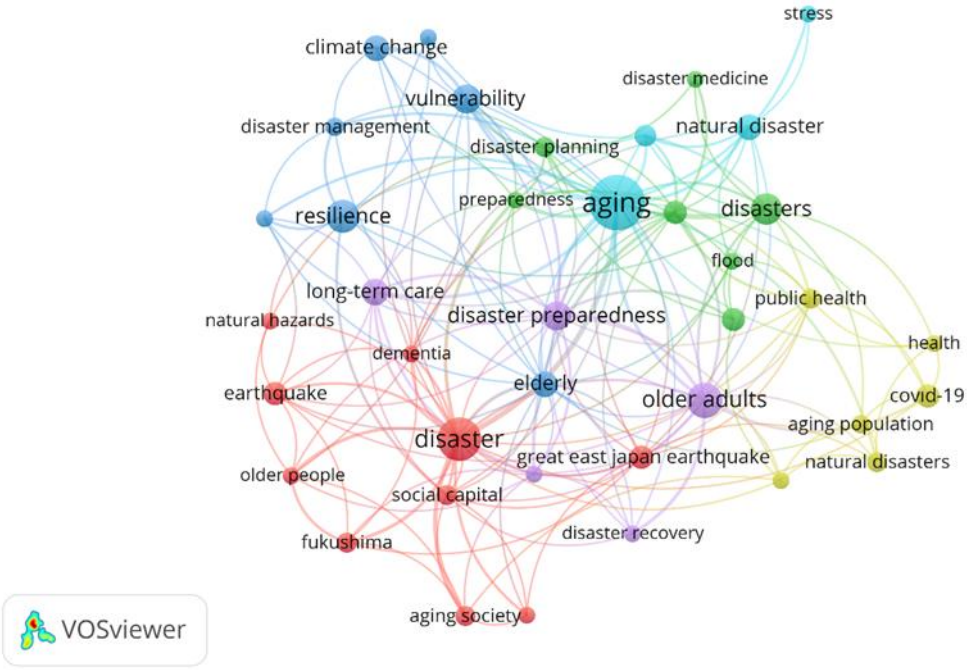

Figure 3. Keyword Co-occurrence and Thematic Clustering

The figure presents the country-level collaboration network based on co-authorship data derived from publications on disaster and aging (Figure 4). This map, generated using VOSviewer, visualizes the relative productivity and interconnectedness of countries engaged in this field. At the center of the network lies the United States, which stands out as the most prolific and internationally connected contributor. The U.S. demonstrates strong bilateral research linkages with Canada, China, Japan, Australia, and the United Kingdom, forming dense clusters of scholarly exchange and joint authorship. Several European countries, including Germany, France, and Italy, are also prominent in the network, often collaborating on research themes related to the integration of aging populations into health systems during crises. Other emerging contributors such as Brazil, South Korea, and India are visible as well, indicating their gradual incorporation into global disaster and aging scholarship through regional partnerships and increasing publication output.

Türkiye appears on the periphery of the collaboration network, represented by a smaller node, which reflects a relatively limited number of publications and international co-authorships in this domain. Despite being a disaster-prone country with a rapidly aging demographic profile, Türkiye's research visibility and integration into global academic dialogues on aging and disaster remain underdeveloped. This underrepresentation highlights a missed opportunity, as Türkiye possesses significant localized expertise in high-risk disaster types such as earthquakes and floods. Enhancing international collaboration and increasing national output could elevate Türkiye's impact within this field.

Overall, the collaboration map illustrates that research on disaster and aging is increasingly globalized but still shaped by geographic and economic disparities. Expanding inclusive international partnerships—particularly with underrepresented yet high-risk countries—will be essential for advancing equitable knowledge sharing and strengthening global preparedness strategies for aging populations.

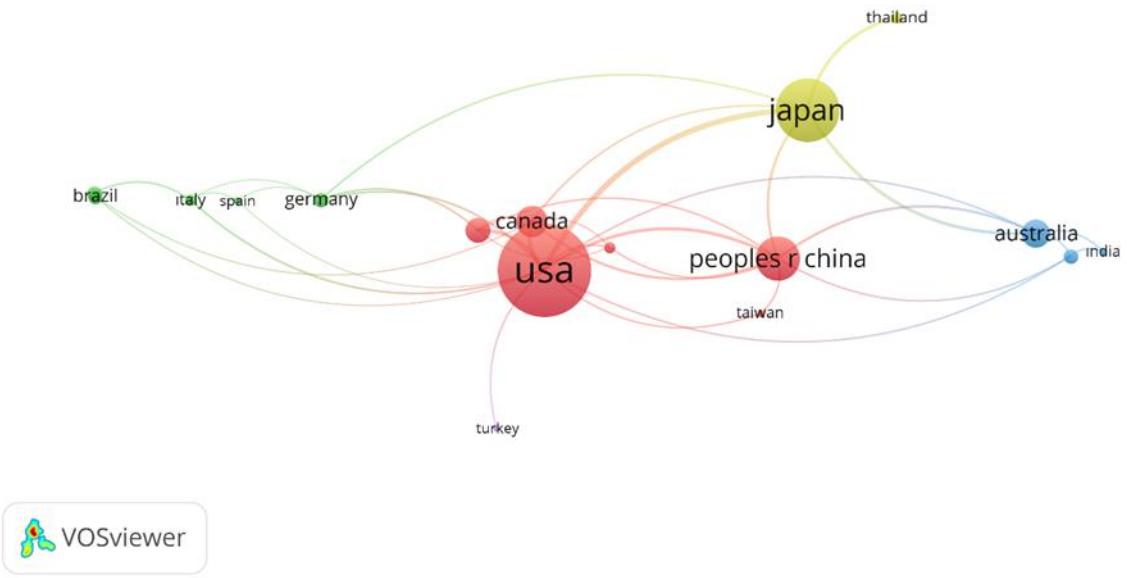

Figure 4. International Collaboration Network

4. DISCUSSION

The present study aimed to elucidate global and Turkish research trends on the intersection of disasters and aging through a dual methodological approach involving bibliometric mapping (VOSviewer) and systematic selection (PRISMA) of relevant literature. Broad bibliometric mapping identified 442 publications, with only 38 subject to detailed qualitative review. The results highlight major themes, thematic gaps, and the limited scope of Türkiye-originated research in this domain.

Findings show that older adults are significantly more vulnerable to the physical and psychosocial impacts of natural disasters (Jia et al., 2010). Meta-analyses indicate that older individuals exposed to disasters are 2.11 times more likely to develop PTSD and 1.73 times more likely to experience adjustment disorders compared to younger cohorts (Keya et al., 2023). Qualitative studies also consistently report heightened distress, helplessness, and long-term psychological consequences among elderly survivors (Holm and Severinsson, 2014; Poole et al., 2022). Physical vulnerabilities—such as chronic diseases, sensory impairment, and frailty—compound risks during emergencies (Holm and Severinsson, 2014; Gutterman, 2023; TURKSTAT 2022). Social isolation further exacerbates adverse outcomes, with longitudinal data linking increased loneliness to cognitive decline, disability, and prematurely elevated mortality (Poole et al., 2022, Lyu et al., 2024). While earthquakes dominate the literature, as shown in the bibliometric analysis, slower-onset climate events like heatwaves, famine, or droughts remain underrepresented despite their increasing frequency (Chen and Shin, 2021). This imbalance contrasts with real-world observations showing that climate change has intensified both the frequency and severity of hydrometeorological and heat-related hazards (Sillmann et al., 2024; Bentli and Demirel, 2025). In Türkiye, older adults are increasingly exposed to disaster-related risks due to both demographic shifts and geographic vulnerabilities. The 2023 Kahramanmaraş earthquakes revealed serious gaps in emergency planning for the elderly, including unmet health needs, emotional distress, and insufficient social support (Çınaroğlu et al., 2025). Although the Turkish Disaster and Emergency Management Presidency (AFAD) has initiated broader disaster frameworks (AFAD, 2011), policies specifically addressing the geriatric population remain underdeveloped (Tufan et al., 2022). Considering Türkiye's rapidly aging population and high disaster frequency, integrating gerontological principles into national preparedness strategies is essential.

Disaster preparedness behaviors among elderly populations are generally suboptimal. A recent cross-sectional study found that fewer than 27% of older adults performed even basic preparedness actions, such as securing furniture or vehicles, while less than 12% developed emergency kits, evacuation plans, or participated in drills (Jia et al., 2010). Preparedness was positively associated with higher education, better

physical fitness, past disaster experience, and stronger social capital (Nukpezah, 2020). These findings underscore the heterogeneity of older populations and the need for tailored interventions.

The international collaboration analysis revealed an asymmetry: high-output countries such as the U.S., Canada, Germany, and Japan form dense co-authorship clusters, while Türkiye, despite being disaster-prone, shows weak integration and lower publication volume. This suggests that Türkiye has not fully translated its lived vulnerability into academic visibility in disaster gerontology. The keyword co-occurrence map further underscores thematic clustering around terms such as “earthquake,” “resilience,” “long-term care,” “public health,” and “climate change.” However, critical clusters related to heatwaves, drought, and wildfires are less prominent. Given the demographic projections suggesting that individuals aged 65+ will constitute over 15% of Türkiye’s population by 2030 (TURKSTAT 2025) and considering the country’s frequent seismic and hydroclimatic events, this omission represents a research gap with tangible policy implications.

This study’s strengths include the integration of bibliometric visualizations and a systematic content-screening process conforming to PRISMA standards. This contrasts with many prior reviews that rely solely on narrative or thematic analyses. By incorporating Türkiye-specific findings, the study also contributes a localized perspective absent in most global syntheses. Limitations must be acknowledged. First, the PRISMA screening was limited to English-language Web of Science records, which may exclude relevant articles published in Turkish or regional journals. Second, the bibliometric mapping depends on keyword indexing, which could miss nuanced or interdisciplinary research not tagged with expected keywords. Third, the 38 full-text articles are small relative to the broader pool, thus qualitative generalizations should be cautious.
This research has clear implications. There is a need for age-sensitive disaster preparedness frameworks in Türkiye, including accessible emergency communication, community-based resilience programs, and mental health support tailored to the elderly. Local policymaking must prioritize interdisciplinary collaboration that leverages gerontology, public health, urban planning, and disaster management.

Future research should focus on underexplored hazard types—such as extreme heat, droughts, and slow-onset disasters—and prioritize longitudinal designs to better understand resilience trajectories among older adults. Interventions need to be empirically evaluated, especially among socially isolated or mobility-limited populations. Finally, Türkiye would benefit from increased international research partnerships to align local experience with global evidence and policy practice.

In conclusion, despite the growing demand for disaster-inclusive aging research, significant thematic and geographic disparities exist. This study provides a structured foundation for addressing these gaps. The findings underscore the urgent need for integrated, evidence-based and context-specific strategies to strengthen resilience among aging populations in disaster-prone regions.

5. CONCLUSION AND RECOMMENDATIONS

This study sheds light on the global and national (Türkiye-specific) research landscape at the intersection of disasters and aging, employing bibliometric mapping and a systematic synthesis of relevant literature. The findings clearly demonstrate that older adults constitute a disproportionately vulnerable group in the face of natural disasters, not only due to physiological limitations and chronic health conditions but also because of social isolation, limited mobility, and insufficient preparedness. While earthquakes and acute events have dominated the literature, climate-related and slow-onset disasters—such as heatwaves, droughts, and wildfires—remain underrepresented despite their growing global relevance.

Despite Türkiye’s status as a high-risk country for earthquakes, floods, and wildfires, its academic contributions to the field of disaster gerontology remain limited, both in volume and international visibility (Tufan et al., 2022). This discrepancy highlights the urgent need for national academic and policy agendas to recognize the intersectionality of aging and disaster resilience as a public health priority.

Given the demographic trajectory of Türkiyewith older adults projected to constitute over 15% of the population by 2030 integrating aging-sensitive approaches into disaster management frameworks is both timely and essential. Local governments and public institutions must develop early warning systems, community-based training modules, and psychosocial support services tailored to older adults. Interdisciplinary collaboration between gerontology, disaster management, and public health experts should be institutionalized to enhance knowledge translation and practical implementation. Although this study emphasizes global disaster-aging intersections, it is critical to reflect on the specific challenges and policy gaps within Türkiye. Despite being one of the most disaster-prone countries in the world, empirical research focusing on older adults in disaster contexts remains sparse. Following the 2023 Kahramanmaraş earthquakes, qualitative evidence pointed to significant unmet needs among older survivors, including emotional distress, social isolation, and disruptions in basic healthcare (Çınaroğlu et al., 2025). While national disaster agencies such as AFAD have developed broad emergency response frameworks, these plans often lack explicit strategies tailored to the elderly population (AFAD, 2011). In light of demographic projections indicating a rapidly aging population, scholars have begun to advocate for the integration of gerontological principles into disaster risk reduction efforts. For example, Tufan et al. (2022) propose the formalization of "disaster gerontology" as a policy framework, emphasizing needs-based evacuation protocols, continuity of care, and localized support systems. However, such models require further operationalization through research-driven policymaking, cross-sector collaboration, and age-inclusive disaster planning.

Moreover, future research should focus on under-investigated disaster types and socially marginalized subgroups within the elderly population, including those with disabilities, low income, or living alone. Expanding international research partnerships—especially for countries like Türkiye—will also be critical for bridging the gap between local risks and global evidence. Overall, this study emphasizes that protecting older adults in disasters is not merely a logistical concern but a matter of equity, dignity, and human rights.

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