Mapping Elderly Residential Research During the Onset of Baby Boomer Aging: A Bibliometric Analysis

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***Abstract*—As global population aging accelerates, housing for older adults has emerged as a critical interdisciplinary research topic. Understanding how academic attention has evolved in this field is essential for informing policy and guiding future research. This study conducted a bibliometric analysis of 2,141 English-language publications related to elderly residential indexed in the Web of Science Core Collection from 2002 to 2021. It systematically examined publication trends, leading countries and institutions, key subject areas, collaboration networks, and journal co-citation patterns. The results show that the United States, Australia, and China are the top contributors in terms of publication volume, while countries like Sweden and New Zealand demonstrate high research intensity on a per capita basis. Over time, the research focus has shifted from clinical geriatrics and nursing toward environmental sciences, urban planning, and public health, indicating an increasing interdisciplinary integration. Collaboration network analysis highlights the central roles of institutions in Australia and Hong Kong in facilitating international research partnerships. This study maps the global knowledge landscape of elderly residential research and provides a foundation for future policy development, interdisciplinary collaboration, and scholarly inquiry.**

***Keywords*—Aging; housing for the elderly; long-term care; environment design; bibliometrics**

I. Introduction

The global elderly population is increasing rapidly as the baby boomer generation ages and birth rates continue to decline [1]. Since 2001, the proportion of people aged 65 and over has increased from approximately 6.9% to 10.2% in 2024 [2]. According to statistics from the United Nations, they predict the proportion of elderly people across the world, demonstrating an expected increase in all regions [3]. Now, more countries are entering an aging society, and some, such as Japan, have even developed a super-aging society [4]. Due to persistently low birth rates and longer life expectancy, Japan has experienced a rapid demographic shift, with the proportion of people aged 65 and older rising significantly from 7.1% in 1970 to 26.6% by 2015 [5]. While increased longevity allows people to enjoy extended years of activity and fulfillment, it also brings substantial challenges, particularly in the healthcare system. Older adults, despite being a minority of the population, account for a disproportionate share of medical expenditures. For example, individuals aged 50 and above face significant financial barriers due to high premiums and out-of-pocket healthcare costs [6]. Additionally, populations aged 70 and over have been shown to contribute significantly to national healthcare burdens, especially in rapidly aging countries such as Japan [7].

Against this backdrop, research on elderly residential housing has emerged as a critical topic, reflecting not only the individual pursuit of quality of life but also broader pressures on urban governance and social welfare systems. Therefore, selecting the period from 2002 to 2021 for this study holds clear practical significance. On one hand, this timeframe encompasses a phase of rapid global real estate expansion, during which surging housing prices became a common challenge faced by many countries. Since the early 2000s, housing prices have continuously risen across numerous European countries, driven by a combination of demographic growth and financial dynamics [8]. In New Zealand, repeated housing bubbles, particularly in cities like Auckland and Wellington, have drawn considerable attention [9]. In the United States, as the proportion of the population aged 65 and over increased, the growing demand for age-specific housing added further pressure to the market, driving up prices in related segments [10]. Moreover, according to Lee et al. [11], the ratio of house prices to median household income has risen significantly since 1990 in developed economies such as Australia, Canada, Ireland, New Zealand, the United Kingdom, and the United States, most notably in globalized urban centers. This growing disparity has intensified housing market instability and made it increasingly difficult for low- and middle-income households to access affordable housing. As a result, the issue of housing affordability became a widespread concern during this period, and when combined with accelerating population aging, it brought the question of elderly housing to the forefront of global academic inquiry.

Although interest in elderly residential issues has grown steadily, existing studies often concentrate on specific aspects such as post-discharge care services or barrier-free housing design. For instance, a demographic study from Germany revealed that only a small proportion of older adults reside in barrier-reduced housing even when mobility limitations are present [12], while a mixed-methods survey of occupational therapists in Australia emphasized the importance of specific design features such as step-free entrances and showers in supporting aging in place and post-discharge transitions [13].

Comprehensive analyses that integrate cross-national or cross-disciplinary perspectives remain relatively limited. Most

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existing studies are confined to single-country contexts or emphasize narrow thematic areas, which restricts their generalizability. In addition, there is a lack of integrative reviews that systematically map how different disciplines approach elderly residential issues, leaving the broader research landscape insufficiently explored. Therefore, this paper seeks to broaden the scope by employing a bibliometric approach to examine the overall research landscape on "elderly residential" topics. Through the analysis of key elements such as countries, disciplines, journals, and institutional affiliations, this study aims to identify global research patterns and publishing outlets valuable to prospective authors. Bibliometric analysis has proven to be an effective tool for quantitatively assessing scientific trends and knowledge structures within a research field, especially in emerging or interdisciplinary domains [14]. In the field of architecture, for instance, bibliometric techniques have been used to map trends in elderly-related design studies, revealing increasing attention to housing, accessibility, and aging-in-place themes [15]. Similarly, recent analyses of social support systems for older adults also demonstrate the utility of bibliometric methods in identifying evolving research focuses and policy implications [16].

This paper is structured as follows. Section II describes the data collection process, inclusion and exclusion criteria, and the analytical methods employed. Section III presents the main results, including country-level publication trends, disciplinary distribution, institutional contributions, and journal co-citation patterns. Section IV discusses the implications of these findings in the context of global aging, interdisciplinary integration, and policy relevance. Section V concludes the paper by summarizing the key insights and outlining directions for future research.

II. Materials and Methods

A. Data Collection and Filtration

We conducted a comprehensive literature search on the Web of Science Core Collection (WOSCC) from 2002-01-01 to 2021-12-31 [17]. The search was initiated on February 24, 2022. This database was chosen since it is one of the most well-known databases for conducting bibliometric analysis, currently covering 18,000 journals and classifying information into 256 subject categories [17], and has been widely employed in bibliometric studies across fields such as medical research, environmental science, information science, and engineering [16-18]. It provides structured citation networks and comprehensive reference tracing capabilities [19-21], which facilitate diverse bibliometric analyses using software tools. Therefore, the relevant bibliographic records on the topic of elderly residential were derived from WOSCC.

Inclusion and exclusion criteria: Only publications written in English were included to ensure consistency in text analysis. All document types indexed in WOSCC, including articles, reviews, conference proceedings, and book chapters, were initially retrieved. Duplicates were removed. Non-scholarly items such as editorials, corrections, and news items were excluded. Studies not directly related to elderly residential or housing for older adults were also excluded after a manual screening of titles and abstracts.

Search strategy: To maximize coverage, the search strategy was designed to capture a broad range of terms related to elderly residential research. First, synonyms for the target population were identified, including elderly and senior (with truncation "senior*" to capture both singular and plural forms). Second, synonyms for the core concept of residential housing were specified, including residential, housing for the elderly, and elderly housing. These terms were combined using Boolean operators to ensure sensitivity and precision. The final query string was: TS=[(elderly OR senior*) AND ("residential" OR "housing for the elderly" OR "elderly housing")] AND LA=(English) AND PY=(2002-2021). The language is restricted to English, and no restrictions in terms of document type, data category are used. Following the above criteria, "elderly residential" obtained 2,141 original records.

Analysis process: The retrieved bibliographic records were downloaded in plain text format with full records and cited references. Data preprocessing included removal of duplicates and standardization of author, institution, and journal names. Summary statistics, such as annual publication trends, country contributions, and research fields, were generated directly from WOSCC and Microsoft Excel. For network analyses, VOSviewer (version 1.6.17) was employed to map co-authorship, institutional collaboration, keyword co-occurrence, and journal co-citation networks. Nodes in the visualizations represent units such as authors, institutions, or journals, while links indicate the strength of their relationships. The built-in clustering algorithm grouped related items, and both network and density views were adopted to enhance interpretability.

B. Data Analysis

Fig. 1 illustrates the whole study process. The retrieved documents were downloaded from the Web of Science Core Collection and used as input data for the subsequent bibliometric analysis. Summary statistics, including annual publication trends, leading affiliations, and research areas, were extracted directly from the WOSCC platform. The analysis was performed using VOSviewer (version 1.6.17) for network visualization and Microsoft Excel for statistical summaries and charting. Microsoft Excel was used to generate multiple visualizations and summary tables, including country-level publication statistics, time-segmented distribution of top research fields, and bar charts illustrating the publication output of leading institutions. These visual elements provided a clear overview of the geographic and thematic distribution of research efforts in elderly residential. Basic data processing functions and built-in charting tools in Excel facilitated the organization and presentation of bibliometric indicators derived from the raw dataset [22].

VOSviewer specializes in creating maps based on bibliographic data, particularly useful for detecting co-authorship patterns, institutional collaboration networks, co-citation clusters, and keyword co-occurrence [23]. The software employs a distance-based mapping technique combined with a unified layout and clustering algorithm, allowing items with stronger relationships to be positioned closer together in the visual space. It is capable of processing large-scale bibliographic datasets while providing an intuitive interface for exploring

complex network structures. VOSviewer also offers several types of visualizations, including network, overlay, and density views, which support both qualitative interpretation and quantitative comparison of bibliometric connections.

This study utilized VOSviewer to perform three core bibliometric analyses: mapping international collaboration between countries, examining institutional co-authorship relationships, and identifying journal co-citation patterns. These analyses enabled a structured examination of collaborative patterns and the intellectual structure of the field. Nodes in these networks represent entities such as countries, institutions, or journals, while the links reflect the strength of their bibliometric relationships. The clustering algorithm embedded in VOSviewer further enables the grouping of closely related items, revealing underlying thematic structures within the dataset. Layout and density visualizations were adopted to enhance interpretability and support intuitive analysis of bibliometric connections.

III. Results

A. Countries

Table Ⅰ presents the scientific output of various countries and regions in the field of elderly residential research from 2002 to 2021. The United States ranked first with 379 publications (17.71% of the total), followed by Australia with 348 publications (16.26%) and China with 245 publications (11.45%). Together, these three countries contributed over 45% of the global research output, highlighting their central role in this field.

After normalizing by population size, Sweden showed the highest number of publications per million people (13.91), followed by Australia (13.55) and New Zealand (11.02), indicating that countries with relatively small populations but strong research intensity performed exceptionally well in terms of per capita output. Meanwhile, regions with high population density, such as Taiwan (6.51) and South Korea (5.17), also demonstrated active research performance, possibly reflecting heightened attention to elderly housing issues amid rapid urbanization and population aging.

In terms of collaboration networks, as illustrated in Fig. 1, North America, particularly the United States and Canada, maintained strong and frequent cooperation with Asian countries such as China, India, and South Korea. Australia, which ranks second in total publications, also showed close international collaboration, underscoring its key role in global elderly residential research. In contrast, countries like Germany, Italy, and Spain, despite having a moderate volume of publications, ranked relatively low in per capita output. This suggests that while aging is a global issue, national research investment and strategic focus vary considerably.

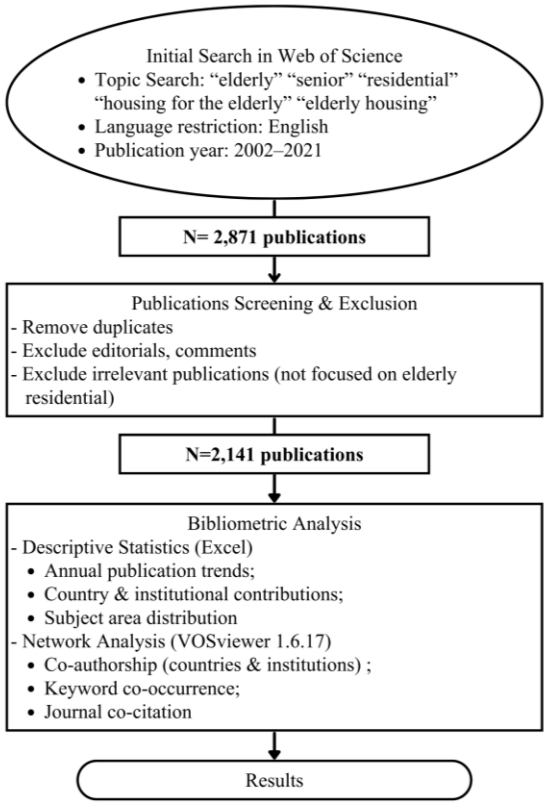


Fig. 1. Flowchart of the study process, including data collection, screening, and bibliometric analysis.

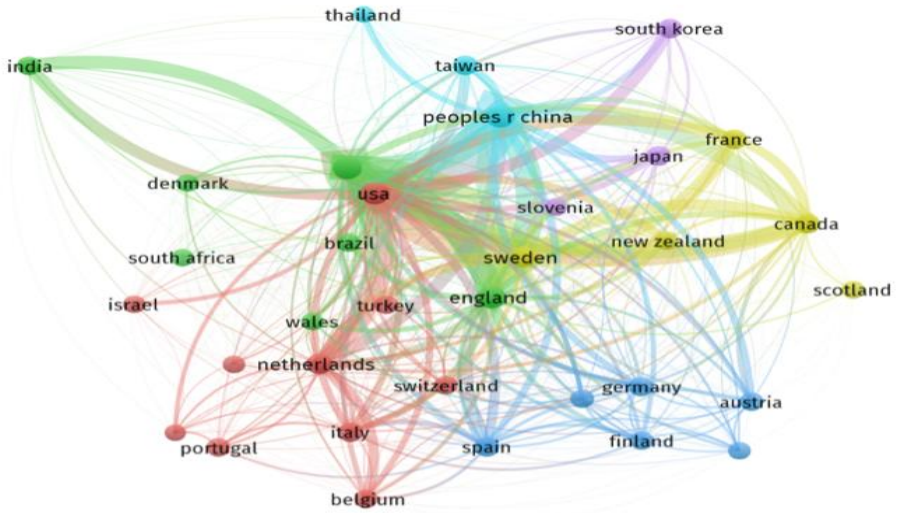
Fig. 2 visualizes the country-level collaboration network within the field of elderly residential research. Each node represents a country or region, with node size indicating the number of publications. The thickness of the connecting lines reflects the frequency of international research collaboration, while different colors represent clusters of countries that frequently co-author publications. The analysis reveals that the United States (USA) occupies the most central and prominent position in the network, indicating its leading role in both publication output and the breadth of global collaboration. China (People's Republic of China) and the United Kingdom (England) also demonstrate strong research productivity and maintain extensive links with a wide range of countries, highlighting their growing influence in this domain. A dense collaborative cluster is formed among several European countries, including Germany, Spain, Italy, the Netherlands, and Portugal, suggesting frequent intra-regional cooperation.

In parallel, the Asia-Pacific region, notably Japan, South Korea, Thailand, and Taiwan, is increasingly integrated into the global research landscape. Countries such as India, Canada, and Australia function as cross-regional connectors, facilitating scholarly exchange between Eastern and Western institutions.

TABLE I. COUNTRY-LEVEL RESEARCH OUTPUT ON ELDERLY RESIDENTIAL (2002–2021)

Countries and areas	# of Publication	% of total	Population in 2021(millions)	# of publications (per million population)	Land Area (10,000/m²)	Density (pop. per Land Area)	Rank (Pub.)	Rank (Pub. per million pop)	Rank (Density)
USA	379*	17.71*	332.47	1.14	983.40	0.34	1	13	10
AUSTRALIA	348*	16.26*	25.69	13.55	769.20	0.03	2	2	15
PEOPLE'S R CHINA	245*	11.45*	1412.6	0.17	959.70	1.47	3	15	7
ENGLAND	243	11.36	67.08	3.62	13.03	5.10	4	7	3
SWEDEN	144	6.73	10.35	13.91	45.03	0.23	5	1	12
NETHERLANDS	138	6.45	17.44	7.91	4.15	4.20	6	4	4
CANADA	117	5.47	38.01	3.08	998.50	0.04	7	8	14
GERMANY	91	4.25	83.24	1.09	35.74	2.33	8	14	5
ITALY	80	3.74	59.55	1.34	30.13	1.98	9	11	6
SPAIN	76	3.55	47.35	1.61	50.60	0.94	10	10	9
JAPAN	73	3.41	12.58	5.80	37.80	0.33	11	6	11
SOUTH KOREA	67	3.13	51.78	1.29	10.02	5.17	12	12	2
NEW ZEALAND	56	2.62	5.08	11.02	26.80	0.19	13	3	13
TAIWAN	51	2.38	23.57	2.16	3.62	6.51	14	9	1
FRANCE	50	2.34	67.39	7.42	54.39	1.24	15	5	8

*Note: * USA, Australia, and the People's Republic of China have been marked with an asterisk to indicate their position as the top three countries by number of publications in the field of elderly residential. # of Publication = Number of publications; % of total = Percentage of total publications; Population in 2021 (millions) = Population based on WHO 2021 statistics (in millions); # of publications (per million population) = Publications per one million people; Land Area (10,000/m²) = Land area in units of 10,000 square kilometers; Density (pop. per Land Area) = Population per unit of land area; Rank (Pub.) = Rank based on total publications; Rank (Pub. per million pop) = Rank based on publications per million population; Rank (Density) = Rank based on population density.*



Note: USA = United States; peoples r china = People's Republic of China; South Korea = Republic of Korea; Uk = United Kingdom ; UAE = United Arab Emirates.

Fig. 2. Country-level collaboration network in the field of elderly residential research (2002-2021).

B. Fields

Table Ⅱ illustrates the top five research fields in the domain of elderly residential across four consecutive five-year periods from 2002 to 2021, based on the Web of Science subject classification. Throughout all time intervals, Geriatrics Gerontology consistently ranked as the most prominent field, reflecting its foundational role in elderly residential research. Notably, the field reached its peak publication volume during 2012-2016 (251 articles), before declining slightly in the 2017-2021 period (195 articles).

Public, Environmental, and Occupational Health maintained its position as the second most represented field across all periods, with a steady increase in publication output from 44 articles (2002-2006) to 139 articles (2017-2021), highlighting the growing integration of environmental and public health perspectives in elderly housing research. Psychiatry remained a stable third-ranked field during the earlier periods, although it was later surpassed by Environmental Sciences and Gerontology in the last five years, indicating a disciplinary shift towards more environment- and aging-specific research contexts.

The emergence of Nursing, Internal Medicine, and Health Care Sciences and Services in earlier periods underscores the initial focus on clinical and institutional aspects of elderly. However, fields such as Environmental Studies and Gerontology gained prominence in the most recent period, reflecting an expansion of research into broader socio-environmental dimensions of aging.

TABLE II. TOP 5 RESEARCH FIELDS IN ELDERLY RESIDENTIAL BY FIVE-YEAR INTERVALS (2002-2021)

Rank	Fields (2002-2006)	# of Publication	Fields (2007-2011)	# of Publication	Fields (2012-2016)	# of Publication	Fields (2017-2021)	# of Publication
1	Geriatrics Gerontology[a]	183*	Geriatrics Gerontology[a]	229*	Geriatrics Gerontology[a]	251*	Geriatrics Gerontology[a]	195*
2	Public Environmental Occupational Health	44*	Public Environmental Occupational Health	54*	Public Environmental Occupational Health	88*	Public Environmental Occupational Health	139*
3	Psychiatry	39*	Psychiatry	48*	Psychiatry	44*	Environmental Sciences	104*
4	Health Care Sciences Services	22	Nursing	44	Medicine General Internal	42	Gerontology	86
5	Medicine General Internal	22	Medicine General Internal	25	Nursing	36	Environmental Studies	63

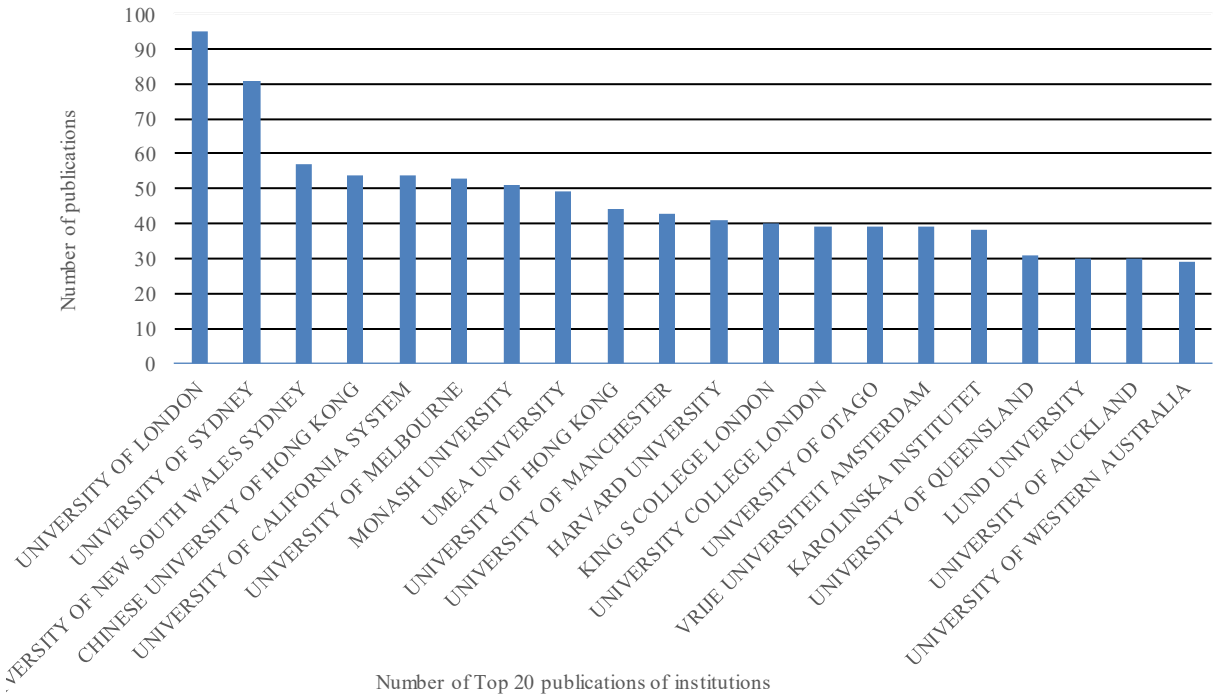
*Note: *indicates that the field ranked among the top three in the corresponding time. "Geriatrics Gerontologya" refers to the combined subject categories of "Geriatrics" and "Gerontology" in the Web of Science Core Collection (WOSCC).*

C. Institutions

Fig. 3 presents the publication output of the top 20 institutions contributing to the field of elderly residential research from 2002 to 2021. The University of London leads with the highest number of publications, reflecting its dominant academic position in this domain. It is followed by the University of Sydney and the University of New South Wales Sydney, both of which show high levels of scholarly productivity, underlining Australia's significant engagement in elderly residential topics.

The list also includes notable institutions from Hong Kong (e.g. Chinese University of Hong Kong), North America (e.g. University of California System, Harvard University), and Europe (e.g. University of Manchester, Karolinska Institutet). This wide distribution indicates that elderly residential research has attracted global attention and academic investment.

The recurring appearance of multiple institutions from countries like Australia and the UK suggests regional hubs of research excellence. The results highlight a trend where both English-speaking countries and regions with rapidly aging populations have contributed substantially to the knowledge base in this field.



Note: Each bar represents the number of publications produced by each institution related to elderly residential research during the period 2002-2021.

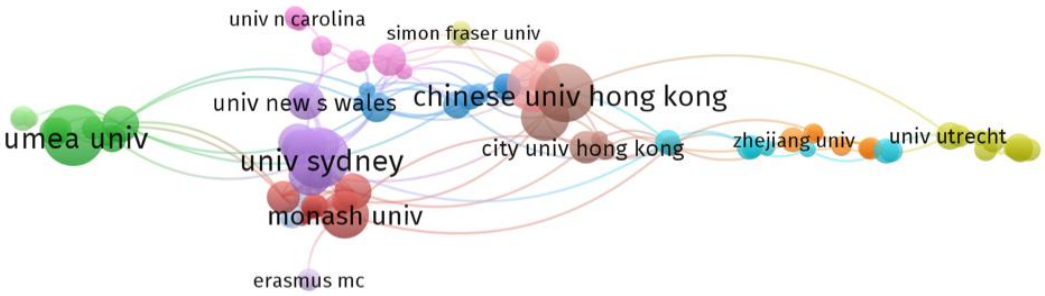
Fig. 3. Number of publications of the top 20 most productive institutions in elderly residential research (2002-2021).

Fig. 4 displays the institutional co-authorship network in the field of elderly residential research. Each node represents a university or research institution, with node size proportional to its total publication output. The thickness of the connecting lines indicates the frequency of co-authored publications, reflecting the intensity of academic collaboration.

The network reveals a high degree of international cooperation. Central institutions include Umeå University, University of Sydney, Monash University, and the Chinese University of Hong Kong, all of which demonstrate high publication output and strong collaborative ties. Regional clustering is evident, particularly among institutions in Australia and Hong Kong, where close intra-regional collaboration is observed. Several other Australian institutions also exhibit substantial academic activity in this domain. The University of New South Wales ranks third in total publications and shows a strong pattern of international collaboration, while the University of Melbourne ranks within the top 10 and maintains frequent co-authorships with leading global research centers.

In the United Kingdom, both the University of London and the University of Manchester are among the top 10 most productive institutions, highlighting the country's advanced position in this field. Nordic countries also contribute significantly, with Umeå University (Sweden) emerging as one of the most influential institutions in terms of both output and connectivity.

Furthermore, the presence of institutions such as Zhejiang University (China) and Utrecht University (Netherlands) reflects growing global engagement, particularly from Asia and continental Europe. The observed collaboration structure indicates a distributed, multi-centered international research network, supporting the expansion of scholarly efforts in elderly residential.



Note: umea univ = Umeå University; univ n carolina = University of North Carolina; univ new s wales = University of New South Wales; univ sydney = University of Sydney; monash univ = Monash University; chinese univ hong kong = The Chinese University of Hong Kong; city univ hong kong = City University of Hong Kong; simon fraser univ = Simon Fraser University; zhejiang univ = Zhejiang University; univ utrecht = Utrecht University; erasmus mc = Erasmus Medical Center.

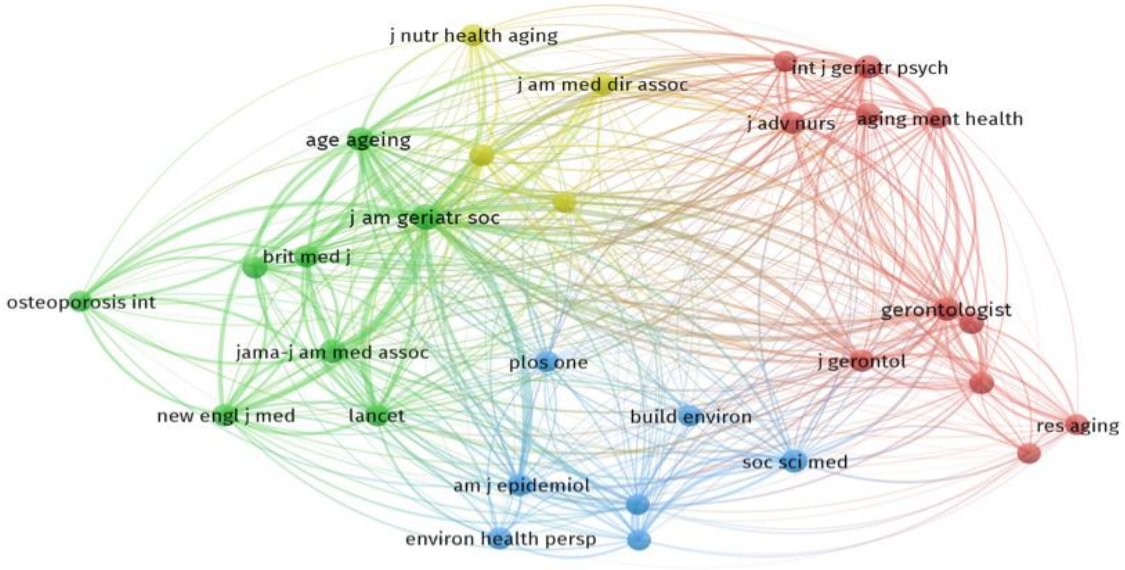
Fig. 4. Institutional co-authorship network in the field of elderly residential research.

D. Journals

Fig. 5 presents the journal co-citation network within the domain of elderly residential research. Each node represents an academic journal, with the node size corresponding to its co-citation frequency, and colors denoting different thematic clusters. Links between nodes indicate the strength of co-citation relationships, reflecting the underlying intellectual structure and disciplinary interconnections in the field.

The network reveals several prominent clusters. Core gerontology journals, Journal of the American Geriatrics Society, The Gerontologist, and Journals of Gerontology, occupy central positions, indicating their foundational role in shaping aging-related scholarship. Another cluster comprises interdisciplinary journals such as Social Science & Medicine, Environmental Health Perspectives, and Building and Environment, suggesting close linkages between aging, environmental health, and the social sciences. Additionally, high-impact clinical journals, including JAMA, The Lancet, and New England Journal of Medicine, are also represented, underscoring the relevance of aging issues in broader public health and medical research.

In terms of publication volume, Age and Ageing was the most productive journal with 61 articles, followed by International Journal of Environmental Research and Public Health with 44, and Journal of the American Geriatrics Society with 32. These publication patterns align with the journals' disciplinary classifications: Age and Ageing and Journal of the American Geriatrics Society fall under Geriatrics & Gerontology, while International Journal of Environmental Research and Public Health is categorized under both Environmental Sciences and Public, Environmental & Occupational Health.



Note: j nutr health aging = The Journal of Nutrition, Health and Aging; j am med dir assoc = Journal of the American Medical Directors Association; age ageing = Age and Ageing; j am geriatr soc = Journal of the American Geriatrics Society; brit med j = The British Medical Journal (BMJ); jama-j am med assoc = Journal of the American Medical Association (JAMA); new engl j med = The New England Journal of Medicine; lancet = The Lancet; osteoporosis int = Osteoporosis International; plos one = PLOS ONE; am j epidemiol = American Journal of Epidemiology; environ health persp = Environmental Health Perspectives; build environ = Building and Environment; soc sci med = Social Science & Medicine; int j geriatr psych = International Journal of Geriatric Psychiatry; j adv nurs = Journal of Advanced Nursing; aging ment health = Aging & Mental Health; gerontologist = The Gerontologist; j gerontol = Journals of Gerontology; res aging = Research on Aging.

Fig. 5. Journal co-citation network in the field of elderly residential research.

IV. Discussion

A. Comparison with Related Research

Recent evidence synthesizes how the built environment supports ageing in place through urban planning, physical accessibility, and adaptable housing design, while also noting inconsistencies in reported effects on cognitive outcomes and well-being [24]. One systematic review in this area calls for integrated approaches that link housing, health, and planning and for clearer operationalization of environmental exposures and outcomes [25]. Qualitative work from Sweden adds demand-side insight into how active older adults actually use neighborhoods [26]. Interviews grounded in time-use diaries show that proximity to everyday amenities, walkable public spaces, and opportunities for spontaneous social interaction structure daily practices and support autonomy, with some gender differences and variation between central and peripheral locations [26]. These findings underscore the importance of neighborhood-scale design for health and participation. A complementary strand links senior-friendly housing to the silver economy [27]. A recent scoping review emphasizes universal design and supportive environments as means to sustain autonomy and reduce dependency while creating economic opportunities, illustrating how housing policy can align with broader development agendas in rapidly ageing settings [27].

Although this study systematically mapped the development of global elderly housing research between 2002 and 2021 through bibliometric methods and provided a macro-level perspective on cross-national comparisons, disciplinary evolution, and collaboration networks, several limitations remain. In contrast to the systematic review [25], our analysis did not examine in detail how specific built environment factors influence health outcomes, and therefore offers limited insights into underlying mechanisms. Compared with the qualitative work of Vilhelmson [26], our study relies primarily on English-language publications indexed in the Web of Science, which constrains the ability to capture older adults' lived experiences and local contextual differences. Relative to the scoping review [27], which links senior-friendly housing to the silver economy and policy frameworks, our work has not fully addressed the intersections between housing, economic development, and industrial policy. Thus, the main contribution of this study lies in delineating the knowledge structure and interdisciplinary trends of the field, while further research is required to advance understanding at the levels of health impacts, individual experiences, and economic–policy integration [28].

B. Responding to Global Aging Through Residential Research

The ongoing demographic transformation marked by global aging has substantially reshaped housing-related academic discourse. As populations' age and urban centers experience real estate intensification, the housing needs of older adults become increasingly complex. Recent studies have linked rising housing prices with growing inequality in housing access, particularly among low-income elderly residents [29]. As affordability declines, aging populations, especially those living alone or on fixed incomes, are disproportionately vulnerable to housing instability [30]. This socio-economic backdrop is reflected in scholarly publication trends. Between 2002 and 2021, the field of elderly residential research expanded significantly, with countries such as the United States, Australia, and China contributing over 45% of global publications. When normalized

by population, smaller nations like Sweden, New Zealand, and the Netherlands demonstrated exceptionally high research intensity. This pattern suggests that both demographic pressure and housing market volatility have acted as research catalysts, especially in high-density or rapidly urbanizing regions.

The geographic concentration of output, especially in nations facing acute housing affordability issues, indicates a clear response to national policy priorities and market realities. For example, regions such as Taiwan and South Korea demonstrated increasing academic interest in elderly housing, likely shaped by urban crowding, transport inequality, and land scarcity. A recent study in South Korea confirmed that accessibility to health and aged care infrastructure is significantly lower in urban peripheries, disproportionately affecting older populations [31]. This intersection of spatial inequality and demographic stress has helped prioritize elderly housing as a key research and policy agenda across disciplines.

C. Changing Research Fields and Emerging Interdisciplinary Trends

Geriatrics and gerontology continue to form the empirical backbone of elderly residential studies, particularly in addressing healthcare accessibility and long-term care provision. Yet, a notable disciplinary shift has occurred over the past decade toward the inclusion of environmental sciences and urban studies. These fields now contribute substantially to the discourse on aging-in-place strategies and the role of built environments in promoting active aging [32]. Recent studies in urban planning have emphasized the role of neighborhood walkability, greenery, and social infrastructure in supporting older adults' autonomy [33]. Environmental determinants, such as air quality, spatial safety, and public transport accessibility, are increasingly framed as health enablers for aging populations [34]. This expansion signals a growing consensus that elderly housing research must be interdisciplinary to address the full spectrum of residential quality and well-being.

D. Deepening Focus on Environmental Sciences and Urban Studies

The role of environmental factors and urban design in shaping older adults' well-being has gained substantial scholarly attention. Concepts such as green space aesthetics, walkability, and neighborhood connectivity are now central to research on aging in place [35]. Empirical tools have been developed to assess age-friendliness in residential environments, such as multi-dimensional frameworks measuring accessibility, public service proximity, and environmental quality.

Design-based and participatory research approaches have also emerged. In Prague, for example, user-centered design and digital innovation are applied to tailor home environments for older users [36]. Studies in Italy emphasize the integration of shared green infrastructure, public seating, and intergenerational community planning as ways to promote psychological and physical well-being among seniors [37]. Walkability, including the presence of pedestrian infrastructure and nearby amenities, plays a crucial role in encouraging walking and mobility among older adults [38].

E. Regional Leadership and Policy-Driven Research Growth

Australia and Hong Kong stand out as leading contributors to elderly residential research, driven by targeted policy reforms and high research intensity. Australia's aged care strategies, such as the implementation of Home Care Packages (HCP) and Residential Aged Care (RAC), have stimulated academic studies on service design and housing adequacy [39]. In Hong Kong, the government has integrated welfare instruments such as housing subsidies and community living allowances to enhance older adults' residential stability. These efforts have also generated substantial institutional collaborations between local universities and public agencies [40]. Additionally, elderly housing policy in Hong Kong has been shaped by demographic projections and the urgent need to prevent future institutional care deficits. While direct strategies to reduce institutionalization have been limited, policy responses, such as public housing redevelopment supporting aging in place, reflect a growing recognition of this challenge. As noted by Mesthrige and Cheung (2020), such initiatives not only aim to promote residential autonomy among older adults but also encourage academic engagement in evaluating housing adequacy and long-term care alternatives [41]. This evolving policy-academic feedback loop positions Hong Kong as a key case for understanding how institutional design and aging policy can co-produce robust research ecosystems.

F. Strengths and Limitations

This study employs bibliometric methods to synthesize global research trends in elderly housing over 20 years. The strength of this approach lies in its capacity to capture interdisciplinary growth, highlight collaboration networks, and quantify shifts in publication output. Furthermore, combining subject category analysis with institutional and regional metrics provides a more holistic understanding of where and how knowledge on elderly residential is produced [42].

Nonetheless, limitations must be acknowledged. The analysis relies exclusively on the Web of Science Core Collection, potentially excluding valuable research indexed in Scopus, PubMed, or regional databases. Furthermore, restricting the review to English-language publications likely underrepresents elderly housing research in Latin America, East Asia, and non-Anglophone Europe [14]. Third, citation-based metrics used in bibliometric studies often favor older, well-established research while undervaluing recent or practice-oriented studies that may not yet have accumulated citations [43]. This limitation is particularly salient in emerging interdisciplinary fields, like elderly housing, where impactful policy papers and architectural studies may not circulate in highly cited scientific journals.

G. Future Research Directions

The increasing complexity of elderly housing issues calls for expanded and more nuanced research agendas. While recent years have seen growing interdisciplinary attention to aging in place, urban livability, and health equity, several promising entry points remain underexplored and merit future investigation.

First, researchers should prioritize comparative policy studies to examine how different welfare regimes, urban development models, and long-term care systems influence

elderly housing access and design. National policies can profoundly shape housing affordability and support structures, particularly in rapidly aging but economically diverse regions [44]. Second, future research should expand on technology-enabled living environments for older adults, particularly examining the integration of smart home systems, telehealth, and ambient sensors. However, more work is needed to assess ethical concerns, user acceptance, and long-term cost-effectiveness [45]. Third, methodological innovation is essential. Researchers should adopt mixed-method designs, longitudinal datasets, and community-based participatory approaches to capture the lived experiences of aging populations in different contexts. This would enrich quantitative bibliometric insights with qualitative depth and social meaning [46].

Lastly, considering escalating environmental challenges, climate-resilient senior housing should become a core research agenda. Studies should evaluate how extreme weather events, urban heat islands, and infrastructure breakdowns uniquely impact vulnerable older populations, and how housing design can mitigate such risks [47].

V. Conclusion

This bibliometric analysis reveals a rapidly expanding and increasingly interdisciplinary field of research centered on elderly residential from 2002 to 2021. With contributions led by countries such as the United States, Australia, and China, and strong per capita output from Sweden and New Zealand, the study highlights a globally shared academic response to the dual challenges of population aging and housing affordability. The analysis further demonstrates a clear disciplinary shift from traditional geriatrics and nursing toward environmental sciences, urban planning, and public health, underscoring the structural interdisciplinarity of the field. Furthermore, international and institutional collaboration networks demonstrate growing global engagement and policy relevance. By mapping publication trends, research clusters, and collaborative patterns, this study not only synthesizes two decades of scholarly development but also lays a foundational framework to guide future inquiries into inclusive, sustainable, and health-promoting housing for aging populations. Journal co-citation patterns also reveal that core gerontology journals are closely linked with outlets in environmental health and the social sciences, indicating the cross-field integration of knowledge.

Overall, these findings contribute in three ways. First, they delineate the global knowledge structure of elderly housing and identify leading countries, institutions, and journals. Second, they highlight policy-relevant fronts such as accessibility, aging in place, and community-level design where evidence has accumulated. Third, they provide a reproducible baseline for future longitudinal updates of the field. Practical implications suggest that inclusive housing strategies should be co-designed across health and planning systems, with greater attention to accessibility retrofits and community services that delay institutionalization. Future research should expand comparative policy studies, apply mixed-method designs, and address climate resilience in senior housing to meet the challenges of aging populations.

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