

Research Status and Trends in Retirement Communities: A bibliometric Analysis

Bing Huang^{1,2,*} and Vanvipha Suneta¹

¹Faculty of Decorative Arts, Silpakorn University,
Bangkok 10200, Thailand

²College of Fine Arts, Hanshan Normal University, Chaozhou, China

*Corresponding author's e-mail: huangb2401@gmail.com

Received: June 5, 2023 Revised: June 29, 2023 Accepted: October 16, 2023

Abstract

In the context of global aging, the study of retirement communities has attracted the attention of scholars. However, there needs to be more systematic bibliometric studies. This study aims to sort out the current research status of the retirement community and explore research trends. This study adopts a bibliometric approach, using the Web of Science Core Collection (WoSCC) as a database, VOSviewer to analyze research collaboration networks, and CiteSpace to analyze keyword co-occurrences. The study's conclusion showed that the significant scholars are Ayalon, Resnick, Bennett, Royall, Courtin, and Knapp. The major journals are the *Journal of the American Geriatrics Society*, *Gerontologist*, and *Journal of Applied Gerontology*. The main research areas are Geriatrics Gerontology, Public Environmental Occupational Health, and Nursing. The primary research countries are the United States, Canada, and China, with the United States leading the way. The study found that the author's research collaboration network was more active, with Bolling as the bridge author. Institutional collaboration networks were also active, with the University of Washington's research collaboration network being the most prominent. The research collaboration networks between countries (regions) needed to be more expensive. There are three possible research trends in retirement community research: (1). naturally occurring retirement community (NORC); (2). aging in place; (3). continuing care retirement community (CCRC); (4). physical activity.

Keywords: Retirement communities, Research status, Research trends, Bibliometric, VOSviewer, CiteSpace

Introduction

The global population is rapidly aging. The world's population of 65 and above in 2020 accounted for 9.3%; by 2050, this proportion will reach 15.9%; by 2100, this proportion will be as high as 22.6%. The aging population is a global trend (United Nations, 2022).

With the deepening population aging, countries around the world have built a large number of retirement communities. The concept of retirement community originated in the United States. Early retirement communities were generally continuing care retirement communities (CCRCs) (Tang, et al., 2015). In 1986, Hunt and Gunter-Hunt first proposed the concept of NORC (naturally occurring retirement community) (Hunt & Gunter-Hunt, 1986). In 2006, Andrew Carle proposed the university-based retirement community (UBRC) (Andrew, 2006).

In order to cope with the aging of the population, more and more scholars are researching retirement communities. Campbell (2015) studied the social space of the retirement community, pointing out the characteristics of integrating the third place in the social space design of the retired community, thereby promoting the health of seniors. Courtin and Knapp (2017) examined the health effects of social isolation and loneliness in older adults through a scoping review. Boyle et al. (2010) examined the relationship between physical frailty and mild cognitive impairment in older adults through a case study of approximately 40 retirement communities in Chicago. Jiaxuan et al. (2022) selected 49 articles from Scopus and Web of Science databases to explore an overview of Naturally Occurring Retirement Communities (NORCs).

Previous research on retirement communities has made some progress. However, most studies were limited to one specific issue in one area, and there still needs to be a gap in sorting out the overall research status and trends. This study is an attempt to fill this gap.

In recent years, using bibliometric methods to study the development of a discipline has become an essential tool in scientific research. This paper used WoSCC (Web of Science core collection) as data sources and used CiteSpace and VOSviewer to generate scientific knowledge maps. Then, the systematic analysis explores the current state of research, research hotspots, and trends in the retirement community field. Research conclusions provide a transparent research environment for future retired community design research.

Objective of the study

The objectives of this study are two: (1) The research status of the retirement community and (2) Research trends in the retirement community. By presenting the research status, hotspots, and research trends of retirement community design, this study provides a reference for scholars in related fields. It supports the government in formulating relevant policies.

Materials and methods

1. Research framework

The framework of this research is shown in Figure 1.

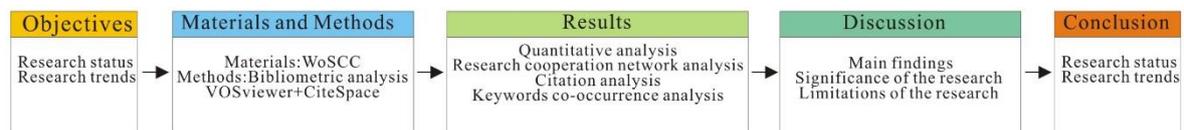


Figure 1 Research framework

Source: By the author

2. Materials

The research materials in this paper were used in the WoSCC. The search type was “Topic”. The keywords were “retirement community*” or “pension community*” or “old-age community*” or “aging community*” or “senior living community*”; the document type was limited to “article, “proceedings paper,” and “review”; the language of the documents was limited to “English”; the search period was from January 1, 1992, to December 31, 2022. After the search, 912 valid documents were obtained (Table 1).

Table 1 Search methods for retirement community

Database	Advanced Search Code	Number of documents
WoSCC *	Topic=“retirement communit*” or “pension communit*” or “old-age communit*” or “aging communit*” or “senior living communit*”	1,268
	And Document Type = article and proceedings paper and review	988
	And Language = English	981
	Index Date =1992-01-01 to 2022-12-31	913
	Data deduplication	912

*Search date: February 19, 2023

3. Research methods

A bibliometric research method was used in this research. In December 1969, “bibliometrics” was first introduced by Pritchard, in the Journal of Documentation (Pritchard, 1969). Bibliometrics uses statistical and mathematical methods to analyze the literature quantitatively. Typical analysis software used in bibliometrics is VOSviewer, CiteSpace, and HisCite. This research analyzed the literature related to retirement community research using CiteSpace (6.1.R6 Advanced) and VOSviewer(1.6.18).

CiteSpace is a bibliometric and visual analysis tool developed in Java by Chen. (Chen, 2006). The VOSviewer bibliometric tool developed by Vaneck and Waltman (2010) from the science and Technology Research Center of Leiden University in the Netherlands

First, a quantitative analysis was conducted using data from the WoSCC to sort out the research profile in this area. Secondly, VOSviewer was used to analyze the Co-authorship to present the research collaboration network of the literature. Finally, CiteSpace was used to analyze the keywords' co-occurrence of the literature to derive research hotspots and trends (Table 2).

Table 2 Analysis methods for retirement community

Objectives	Tools	Technique	Contents
Research status	WoS	Number of articles published	Author, Institution, Publication, Country (Region)
	WoS	Number of article citations	Overall citations, Highly cited literature
	VOSviewer	Co-authorship analysis	Author, Institution, Country (Region)
Research trends	CiteSpace	Keywords co-occurrence analysis	Keywords: Timeline

Results

The results of this research contain four aspects. (1) Quantitative analysis, (2) Citation analysis, (3) Research cooperation network analysis, (4) Keywords co-occurrence analysis.

1. Quantitative analysis

Figure 2 shows the annual distribution characteristics of articles related to the retirement community in the WoSCC. From 1992 to 2022, 912 papers on the “retirement community” were published in the WoSCC database. From 15 in 1992 to 61 in 2022, an increase of 46; the number of publications in 2022 was about four times that in 1992.

However, these 912 papers were cited 27663 times, averaging 30.33 citations per paper. The H-index is 82, indicating that 82 articles in this field have been cited 82 times.

The number of articles published in the WoSCC for research related to the retirement community varies significantly from country to country worldwide. The United States ranked first with 691 publications, accounting for 75.77% of the 912 publications. Canada ranked second with 50 publications. China published 41 articles. Israel published 34 articles. Many countries published fewer than five relevant articles.

Two thousand eight hundred fifty-five authors published papers on the “retirement community” from 1992-2022. Fifteen authors published ten papers related to the “retirement community.” Among them, Ayalon published 22 articles, accounting for 2.41% of the 912 articles, ranking first. Resnick published 20 articles, accounting for 2.19%, ranking second. Bennett published 15 articles, accounting for 1.65%, ranking third.

From 1992 to 2022, 462 publications published papers on the “retirement community.” The *Journal of the American Geriatrics Society* published 46 articles, accounting for 5.04% of the 912 articles, ranking first. *Gerontologists* published 42 articles, or 4.61%, ranking second. The *Journal of Applied Gerontology* published 24 articles, accounting for 2.63% and ranking third.

In the WoSCC, the research areas of articles with the theme of retirement community design (Table 3). Geriatrics Gerontology was the largest area of research for Retirement Communities, with 377 publications or 41.34% of the 912 publications.

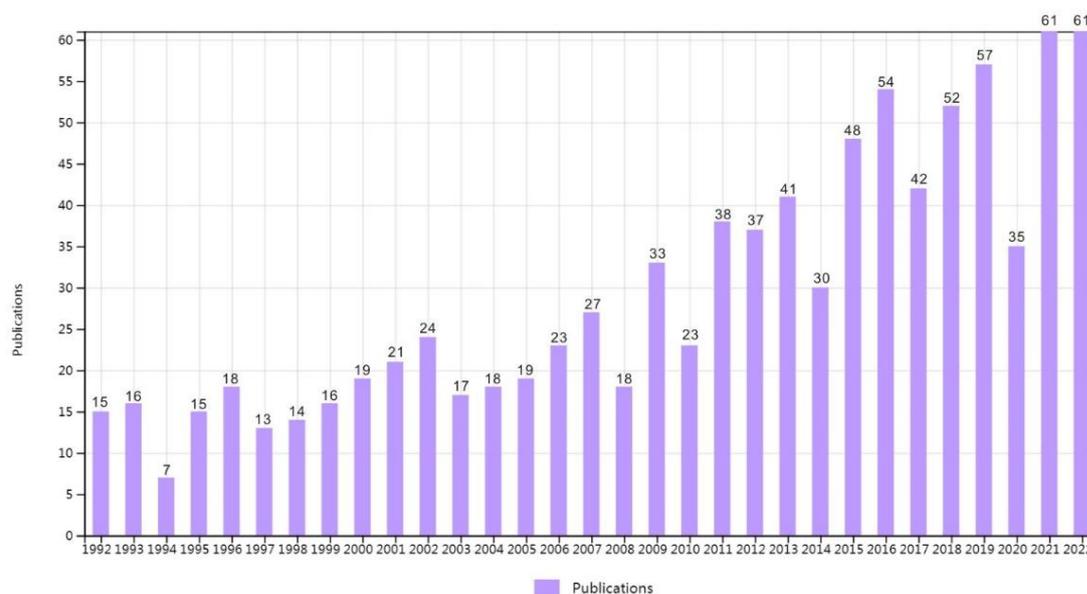


Figure 2 Number of publications in retirement communities literature

Source: WoSCC

Table 3 Number of articles published by WoSCC in different research areas

Research Areas	Record Count	Percentage
Geriatrics Gerontology	377	41.34%
Public Environmental Occupational Health	71	7.79%
Nursing	63	6.91%
Psychiatry	57	6.25%
Psychology	55	6.03%
Environmental Sciences Ecology	54	5.92%
Health Care Sciences Services	48	5.26%
Neurosciences Neurology	44	4.83%
Engineering	43	4.72%
Computer Science	42	4.61%

2. Citation analysis

Table 4 shows the highly cited papers relating to the retirement community in the WoSCC database as of February 19, 2023. *CLOX: An executive clock drawing task* was cited 585 times, ranking first. *Social isolation, loneliness and health in old age: A scoping review* was cited 544 times, ranking second. *Bedside assessment of executive cognitive impairment - the executive interview* was cited 502 times, ranking third. The rest of the highly cited literature is shown in Table 4.

Table 4 The top 10 most cited papers in WoSCC*

No.	Author(s)	Paper Title	Journal	Citations
1	Royall et al. (1998)	CLOX: an executive clock drawing task	Journal of Neurology Neurosurgery and Psychiatry	585
2	Courtin and Knapp (2017)	Social isolation, loneliness and health in old age: A scoping review	Health & Social Care in the Community	544
3	Royall et al. (1992)	Bedside assessment of executive cognitive impairment - the executive interview	Journal of the American Geriatrics Society	502
4	Paganini-Hill and Henderson (1996)	Estrogen replacement therapy and risk of Alzheimer disease	Archives of Internal Medicine	413
5	Resnick and Jenkins (2000)	Testing the reliability and validity of the self-efficacy for exercise scale	Nursing Research	403
6	Boyle et al. (2010)	Physical frailty is associated with incident mild cognitive impairment in community-based older persons	Journal of the American Geriatrics Society	309
7	Lyles et al. (1993)	Association of osteoporotic vertebral compression fractures with impaired functional status	American Journal of Medicine	289
8	Shibata et al. (1992)	Intake of vegetables, fruits, beta-carotene, vitamin-c and vitamin supplements and cancer incidence among the elderly - a prospective-study	British Journal of Cancer	279
9	Adams et al. (2004)	Loneliness and depression in independent living retirement	Aging & Mental Health	263

No.	Author(s)	Paper Title	Journal	Citations
		communities: risk and resilience factors		
10	Delfino et al. (2008)	Circulating biomarkers of inflammation, antioxidant activity, and platelet activation are associated with primary combustion aerosols in subjects with coronary artery disease	Environmental Health Perspectives	262

*Search date: February 19, 2023.

3. Research Co-authorship analysis

3.1 Author Collaboration Network

The threshold for the bibliometric data was set to a minimum of 1 relevant publication per author and at least 30 citations. The number of citations is 30 times the number of publications because the average number of citations per paper in the retirement community is about 30. Visualization parameter settings: Scale 2.00, Weights: Documents, Labels Size variation: 0.65, Lines Size variation: 1.00, and the rest of the default values. Out of 2855 authors, 906 authors met the criteria. Figure 3 shows seven author collaboration clusters, indicating an initial author collaboration network in this research area. The largest cluster (red) has 12 scholars, with Bolling as the bridge author, connecting the red cluster to several other clusters. The second largest cluster (green) has eight scholars, of which Crist is a highly productive scholar with 11 publications. The third largest cluster (blue) has seven scholars.

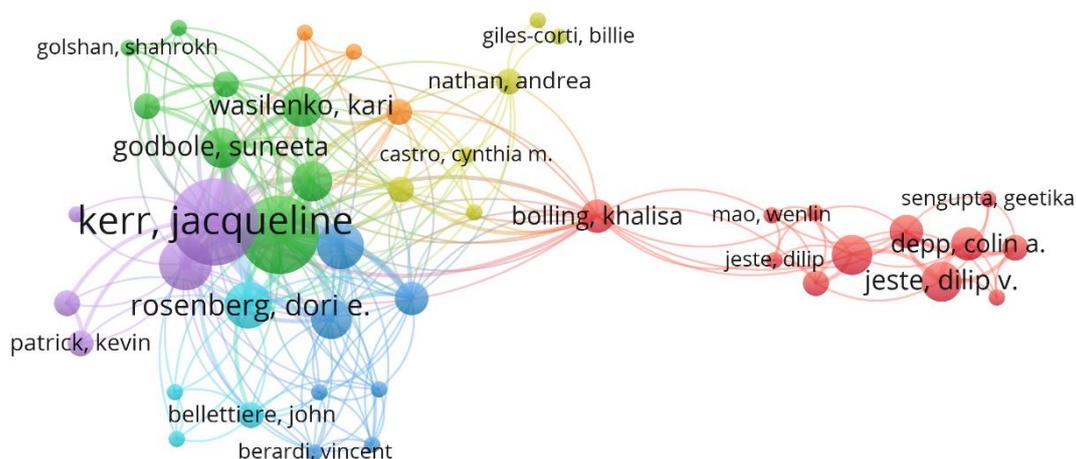


Figure 3 Collaborative network of authors of WoSCC documents

Source: By the author

3.2 Institution Collaboration Network

The threshold for the bibliometric data was set to a minimum of 3 relevant publications per institution and at least 90 citations. Visualization parameters were set: Scale 1.15, Weights: Total link strength, Labels Size variation: 0.51, Lines Size variation: 1.00, and the rest of the default values. Out of 917 institutions, 83 institutions met the criteria. Figure 4 shows the ten institutional collaboration clusters. The University of Washington has the most prominent research collaboration network, with 23 collaborating institutions and a total link strength of 31. Case Western Reserve University has 11 collaborating institutions and a full link. The University of Maryland has nine collaborating institutions, with a total link strength of 19, and the University of Maryland Baltimore has the closest collaboration.

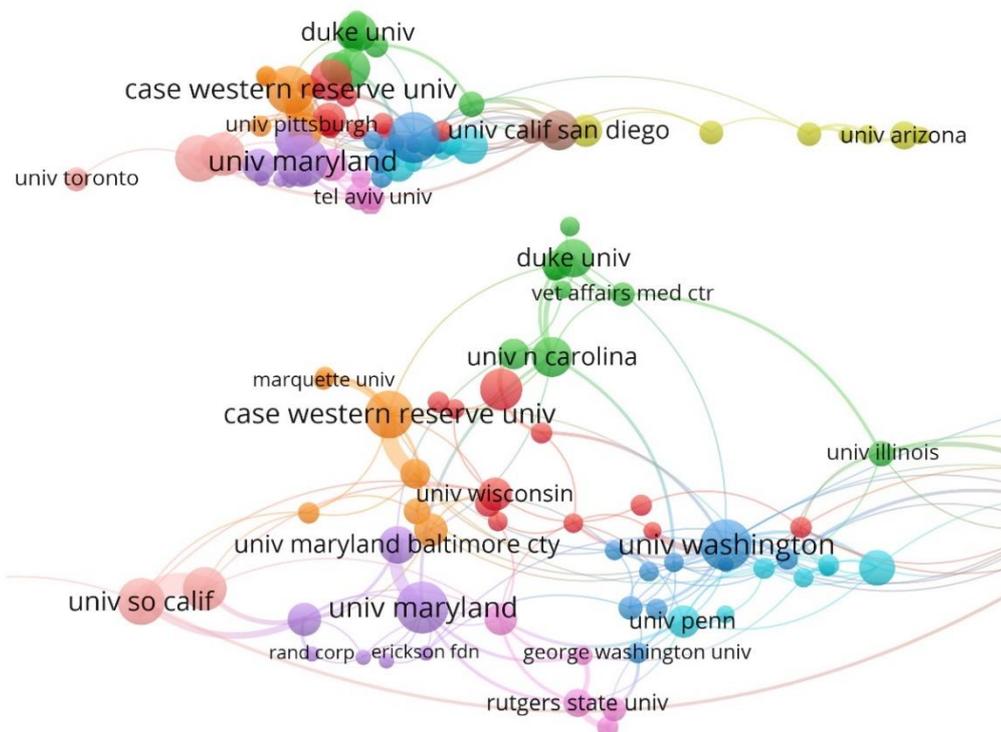


Figure 4 Institutional cooperation network for WoSCC documentation

Source: By the author

3.3 Country (Region) collaboration network

The threshold for the bibliometric data was set to a minimum of 5 relevant publications per country (region) and at least 150 citations. Visualization parameters were set: Scale 2, Weights: Total link strength, Labels Size variation: 0.65, Lines Size variation: 1.00, and the rest of the default values. Out of 42 countries (regions), 10 countries (regions) met the criteria. Figure 10 shows the five countries (regions) collaborative clusters. Only the United States stands out in the research cooperation network, with seven countries (regions) cooperating and Total link strength of 56 (Figure 5).

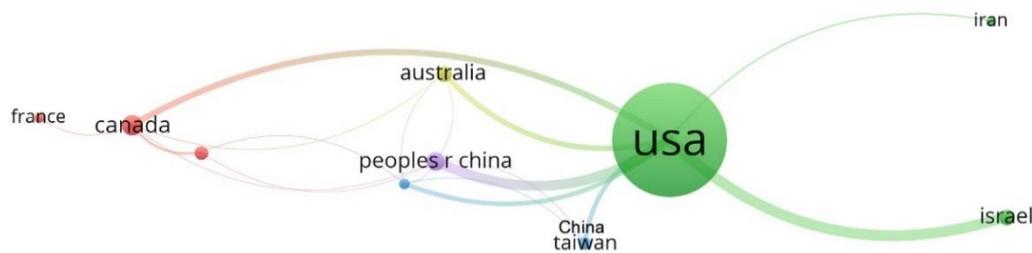


Figure 5 Country (Region) cooperation network for WoSCC documentation

Source: By the author

4. Keywords co-occurrence analysis

Some essential concepts of CiteSpace need to be explained: Betweenness Centrality, Bursts, Q value, and the S value. Betweenness Centrality is the ability of a node to carry information between groups of unconnected nodes (Donthu et al., 2021), which measures a node's importance in the network. In CiteSpace, nodes with Betweenness Centrality ≥ 0.1 , highlighted with a purple outer circle, may be critical nodes connecting two domains, also known as Turning Point (Li & Chen, 2022). Kleinberg J proposed the algorithm of Citation Bursts in 2002 (Kleinberg, 2002). A cluster is an emerging trend if it contains many nodes with solid citation bursts (Cortese et al., 2022). Generally, a Q value greater than 0.3 is considered significant for clustering; the S value greater than 0.5 is considered reasonable, and greater than 0.7 is considered convincing (Sabe et al., 2022).

The main parameters of CiteSpace were set as follows: LRF=3.0, L/N=10, LBY=5, e=1.0. Time Slicing: From 2018 JAN to 2022 DEC, #Years Per Slice: 1; Text Processing: Term Source Title, Abstract, Author Keywords, Keywords Plus. Node Types: Reference. Selection Criteria: g-index, k=25, Pruning=MST. Operational Results: Merged network: N=209 E=101. The clustering graph was generated by turning on the computational centrality and burst detection. The size of the origin in the graph represents the number of documents, the color represents the corresponding time, the red dots indicate the bursts keywords, and the purple circles are the keywords with high betweenness centrality. The top 10 keywords of betweenness centrality were organized into Table 5.

Observing Table 5, we find that the centrality of the “naturally occurring retirement community” is very high, at 1.15, ranking first, the most apparent research hotspot and trend in the past five years. The centrality of the “supportive services model” is also very high at 0.91, ranking second, which is also an apparent research trend in recent years. “Aging in place” ranks fourth, with a centrality of 0.81. It is close to “aging in place,” which ranks seventh. This indicates that aging in place (aging in place) is typical of hot spots and trends.

The main parameters of CiteSpace were set as follows: LRF=3.0, L/N=10, LBY=5, e=1.0. Time Slicing: From 2018 JAN to 2022 DEC, #Years Per Slice: 1; Text Processing: Term Source Title, Abstract, Author Keywords, Keywords Plus. Node Types: Reference.

Selection Criteria: g-index, k=25. Operational Results: Merged network: N=209, E=934. After the visualization operation is completed, click All in One, select the default Title words (T) and Latent Semantic Indexing (LSI) to generate the clustering graph, then click Timeline to generate the timeline graph. CiteSpace calculated nine clusters, showing 8 of the typical clusters, and the font size and color were adjusted to get the clustering graph (Figure 5). The results showed that $Q=0.4545$, good clustering effect; $S=0.7901$, high reliability.

Table 5 Betweenness centrality top 10 keywords

Centrality	Keywords	Count	Year
1.15	naturally occurring retirement community	6	2021
0.91	supportive services model	2	2022
0.82	adult	10	2018
0.81	aging in place	8	2018
0.74	age-friendly city	1	2021
0.70	activities of daily living	2	2020
0.67	ageing in place	1	2022
0.64	barrier	5	2021
0.56	life	21	2018
0.51	mortality	13	2018

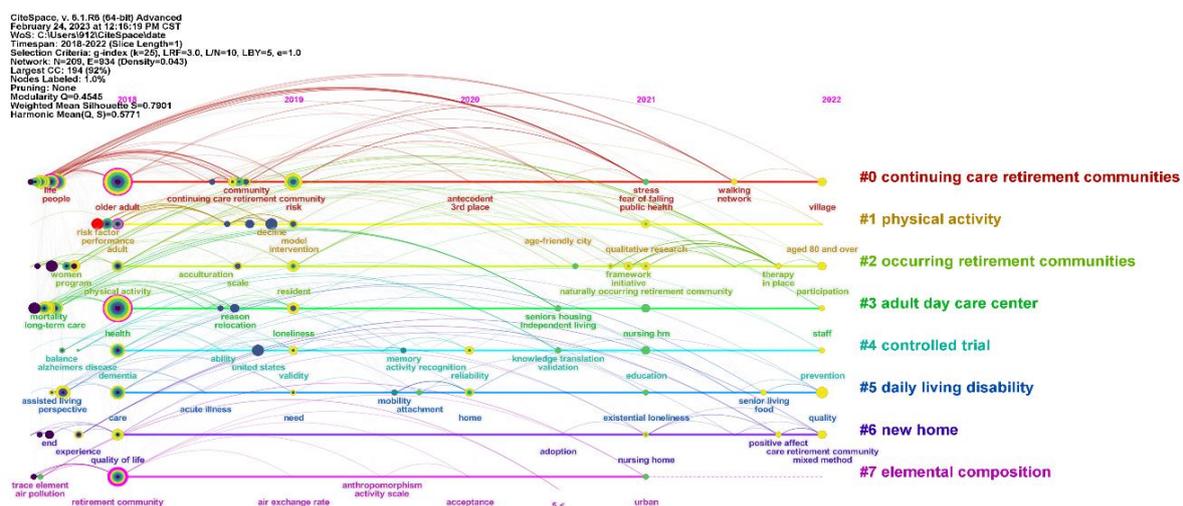


Figure 5 WoSCC keywords co-occurrence overlay visualization

Source: By the author

Figure 5 shows that cluster #0, labeled continuing care retirement communities (CCRCs), is the largest cluster with 36 documents, Silhouette=0.767, Average Year 2019. the

most cited members in this cluster are older adults (86), people (27), and life (21). As early as 1987, Branch, L. G. studied the issue of long-term care insurance for CCRCs (Branch, 1987). This clustered study is ongoing and has lasted a very long time. Ayalon (2019) studied the two social network types of CCRCs and researched their physical and emotional health. Schwitter (2022) reviewed 34 papers to review and summarize the key findings in the literature on social capital in retirement villages.

Cluster #1 label is physical activity with 29 publications, Silhouette=0.721, Average Year 2019. The most cited members in this cluster are adults (10), performance (9), and risk factors (8). Hsu et al. (2019) found that the risk of malnutrition predicted cognitive and functional decline in older men living in a veteran retirement community and predicted the risk of all-cause mortality. Bjornsdottir et al., (2021) studied key factors affecting physical activity in older women and created a checklist to guide physical activity within retirement communities. Noah et al., (2019) examined the relationship between wearing a balance orthosis and falls and found that wearing a balance orthosis for four months reduced the risk of falls in community-living older adults.

Cluster #2 is labeled occurring retirement communities, with 28 publications, Silhouette=0.843, Average Year 2020. The most cited members in this cluster are physical activity (13), resident (12), and program (7). By reading the literature representative of this cluster, the researcher found that the label for this cluster should be Naturally Occurring Retirement Communities (NORCs). Jiaxuan et al. (2022) used content analysis to review previous research related to NORCs and categorize research themes and findings. The study found that the most discussed article was “social environment” and that NORCs are a perfect model for healthy aging. Parniak et al., (2022) summarized the current research on NORCs with 64 articles and described how NORCs can support aging in place for older adults. The study suggested that NORC-SSPs have the potential to be an alternative model for supporting aging in place. DePaul, et al. (2022) Created six NORC and supportive services programs in Ontario, Canada, to draw lessons and approaches that can be replicated in other communities.

Cluster #3 is labeled adult day care center with 28 publications, Silhouette=0.809, Average Year 2018. The most cited members in this cluster are health (56), long-term care (17), and mortality (13). Ayalon (2020) investigated the differential impact of social networking on a person’s stay in a continuing care retirement community (CCRC) and an adult day care center (ADCC). Results showed that constraints in social networks were particularly harmful to CCRC residents but not to ADCC participants.

Discussion

1. Main findings

1.1 Research status

The current status of research in this paper contains authors, institutions, publications, and countries (regions) of high-producing papers, paper citations, and research collaboration networks.

High-producing authors include Ayalon (2019,2020); Resnick (2000); Bennett (2010). high-producing institutions include the University of California System, University System of Maryland, US Department of Veterans Affairs; high-producing author publications Journal of the American Geriatrics Society, Gerontologist, Journal of Applied Gerontology. High-producing countries (regions) are the USA, Canada, and China, with the USA. The study found that the average number of citations per article was about 1,000.

The study found an average of 30.33 citations per article and an H-index of 82, indicating that the retirement community field is more active. Highly cited literature includes *CLOX: An executive clock drawing task, Social Isolation, loneliness and Health in old age: A scoping review, Bedside Assessment of executive cognitive impairment - the executive interview.*

1.2 Research trends

The first research trend is the naturally occurring retirement community (NORC). NORC is the most apparent research trend, beginning in 1986 and continuing to the present. Table 5 shows that NORC is the highest keyword of betweenness centrality in the last five years. Also, NORC is one of the essential clusters in the retirement community 2018-2002. The research on NORC can be divided into several research directions: First, the study of the concept and basic theory of NORC. In 1986, Hunt and Gunter-Hunt (1986) first proposed the concept of NORC. Jiaxuan et al. (2022) provided an overview of NORC and found that the social environment provides the necessary moral support and material motivation for older adults to live actively in NORC. Parniak et al. (2022) conducted a scoping review of NORC and summarized the current state of the relevant literature. Secondly, NORC Supportive Service Programs (NORC-SSP) were studied (Greenfield, 2014). Third, the relevant cases of NORC were studied (Carpenter & Buday, 2007; Lun, 2011). Fourth, the study of older adults' health in NORC (Hildebrand & Neufeld, 2009; Pickard & Tang, 2009). Fifth, the study of the relationship between NORC and aging in place, noting that NORC is one of the effective ways of aging in place (Greenfield, 2012; 2013). Hou and Cao (2021) concluded that NORC is likely the most promising way of aging in place in the United States.

The second research trend is aging in place. This trend can be divided into several research directions: One is studying the concept and underlying theory of aging in place. For example, Wiles et al. (2012) clarified older adults' understanding of "aging in place" regarding the function, symbolism, emotional attachment, and meaning of homes, neighborhoods, and communities. Cutchin (2003) redefined "aging in place" as a process of place integration and presented a theoretical model for older adults using adult day centers and assisted living residences. Park and Choi (2021). studied the willingness of Korean residents to live in their current homes and communities. They analyzed the factors associated with the willingness to age in place, showing the importance of housing services in aging communities. Ahn et al. (2020) examined environmental domains' direct and indirect effects on aging in place. The results showed that the theory of planned behavior influences the intention to age in place in three ways: Personal, architectural, and interpersonal environments. Second, studying the

technical factors related to aging in place (Peek et al., 2014, 2016). Third, studying the quality of life and satisfaction of older adults who are aging in place. Vanleerberghe, et al. (2017) conducted a literature review on the quality of life of older adults who are aging in place and found that there is no consensus on the definition of quality of life and that there is a lack of accepted instruments to assess the quality of life of older adults. Schorr and Khalaila (2018) explored the impact of perceived environmental accessibility on quality of life in later life through loneliness and connection to place, functional impairment, and marital status. Tao et al. (2021) examined the relationship between neighborhood physical environment, walkability, and physical activity levels in an aging in place community in Singapore and showed that adequate amenities and connectivity to the city were critical factors in the satisfaction of older adults with their community.

The third research trend is the continuing care retirement community (CCRC). CCRC originated in the early 19th century (Sanders, 1997), and the earliest paper of WoSCC was published in 1985 and continues to the present. This trend can be divided into several research directions: first, the study of the health of older adults in CCRCs. Second, the study of architectural design in CCRC. Third, the study of architectural design in CCRC. Fourth, the study of business in CCRC.

The fourth research trend is physical activity. Physical activity is encouraged in older adults as a preventive measure against disease and functional decline (Bjornsdottir, 2012). Hosteng et al. (2021) explored mobile health interventions to increase physical activity among older adults living in retirement communities. Physical activity and quality of life associated with physical and mental health are highly correlated; intervening in the physical activity of older adults living in CCRCs may improve their physical and mental status (Taani, 2022).

2. Significance of the research

The research innovation of this paper is in three aspects: First, a more rational search method was used to retrieve 912 valid documents in WoSCC, with a search date up to December 31, 2022. This is the most comprehensive and up-to-date data in the retirement community field. Second, when analyzing the co-citation network, a more comprehensive analysis method was used: two sets of data were analyzed twice, using the last 30 years and the last five years, so the results are comprehensive and reflect the latest research frontier. Third, the researcher used two typical bibliometric software to exploit the strengths of different software. The researcher used VOSviewer for Co-authorship analysis and CiteSpace for Keyword co-occurrence analysis. Such a combination of analyses would present more reasonable and reliable results.

This paper clarifies the current status of retirement community research, research hotspots, and research trends. This study is a valuable reference for scholars, investors, and government agencies in retirement community research.

3. Limitations of the research

The data used for the research in this paper were from the WoSCC database, which has some limitations. The WoSCC database has established strict selection criteria for the selected literature. On the one hand, the strict criteria can ensure the high quality of the literature; on the other hand, the high criteria also lead to a relatively small amount of literature. Therefore, the WoSCC database has good quality literature, but the collection is limited, and the comprehensiveness of the data could be stronger.

Therefore, there is a need to expand the database in subsequent studies to enhance the comprehensiveness of the data. Comparatively, Scopus has a more comprehensive database. Scopus data can be considered for use in subsequent studies.

Conclusions

Based on the WoSCC literature, the researcher analyzed the literature on retirement communities for the past 30 years through bibliometric methods and obtained the following conclusions.

1. Research status

The number of published papers and citations in retirement community research has increased significantly in the last 30 years. The significant scholars are Ayalon, Resnick, Bennett, Royall, Courtin, and Knapp. The major journals are the *Journal of the American Geriatrics Society*, *Gerontologist*, and *Journal of Applied Gerontology*. The main research areas are Geriatrics Gerontology, Public Environmental Occupational Health, and Nursing. The primary research countries are the United States, Canada, and China, with the United States leading the way.

The study found that the author's research collaboration network was more active, with Bolling, as the bridge author, connecting several research clusters. Institutional collaboration networks are also active, with the University of Washington's research collaboration network being the most prominent. The research collaboration networks between countries (regions) were sparse and must be strengthened. Only the U.S. research collaboration network stands out, while the rest of the countries have imperfect research collaboration networks, and many countries still need research collaboration networks.

2. Research trends

There are three possible research trends in retirement community research: (1). naturally occurring retirement community (NORC); (2). aging in place; (3). continuing care retirement community (CCRC); (4). physical activity.

Acknowledgments

This paper is a research project from a Ph.D. program in design at the Faculty of Decorative Arts, Silpakorn University. Assistant Professor Vanvipha Suneta (Ph.D.) assisted extensively in selecting the topic, structuring the article, and writing for this research. Assistant Professor Watanapun Krutasaen (Ph.D.) and Assistant Professor Gomesh Karnchanapayap

(Ph.D.) provided constructive comments while writing the paper. We want to express our sincere gratitude.

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