

A Systematic Review of Research in the Mental Health of the Elderly in the Neighborhood Spaces: A Co-occurrence Study

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ABSTRACT: Examining the issue of population aging has put the elderly in urban and residential environments at risk due to reduced movement, space perception and mental capacity. Therefore, the present study aims to evaluate mental health research of the elderly in the neighborhood space, using the qualitative approach, descriptive method, systematic review and co-occurrence keywords technique, the resources of the Scopus database were examined by using the VOSviewer software. The findings showed that the words "greenness", "cross-sectional survey", "physical activity", "objective built environment", "perceived built environment" and "Covid-19" have been used more in recent years. The most studies were conducted in China (37 cases), America (21) and England (16). Scientific productions in the 1982 to 2019 went through an upward trend and in 2020, it had a rapid downward trend. From 2021 onwards, these productions have followed an upward growth again. Correlation, survey and descriptive methods were the most used methods with a frequency of 71, 60 and 58. The most used tools were questionnaire, interview and mapping with frequency of 78, 48 and 31. "Green space" was the most used variable with 66 repetitions. After that, the variables of walkability, accessibility and safety were ranked second to fourth with repetition times of 37, 31 and 27. The results of this research, in the form of network map, help mental health researchers to take steps to speed up meeting the needs of the elderly by knowing as much as possible about the research gaps.

Keywords: *Mental health, Elderly, Co-occurrence, Neighborhood, House, Systematic review*

INTRODUCTION

Since the ever-increasing progress of science increases the volume of information and new scientific fields, authors need to use different methods to review the previous researches and identify the scientific status of the subject under study so that they can find a correct understanding of the status of that field, influential authors and important fields raised in that field in different time periods. Actually, the technique of scientometrics and the use of scientific maps provides clear visual information about the way of connection between different fields, authors, countries and organizations and helps the researcher to identify the weaknesses, strengths, and limitations to identify the gaps and deficiencies in the target area (Ebrahimzadeh et al., 2022). Today, the problem of the aging of the world's population due to important

reasons including; The decrease in mortality due to advances in medical science, health, and education and as a result the increase in life expectancy and life expectancy at the global level is a relatively new phenomenon (Nawabinejad et al., 2013). With aging, individuals suffer from thinning of bones, muscle disorders, exhaustion, balance and strength problems, as well as sight and hearing disorders. All of these factors put the elderly under some risk in city environments because of decrease in their movement capabilities, space perception, and mental capacity. Considering all these health problems, according to Burby and Rohe, the elderly's expectations of housing and environment are very different from those of other age groups (Sobouti& Alavi, 2017).

Today, One of the major problems of the elderly is the mental health. The changes of the aging period have a great impact on the mental health

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of this group, if the person does not have the necessary preparations for the transition from this period of life, with many problems (Nawabi-Nejad et al., 2013) such as the occurrence and strengthening of mental and physical diseases of the period. It will face many problems (Masoudi et al., 2024) such as the emergence and strengthening of mental and physical diseases in old age (Tian, 2016). The course of the elderly population and the special needs of this era make it necessary to carry out studies to find solutions to provide services, support and improve their mental health (Rakhshani & Nastiezaie, 2019). In this regard, a review and analysis of the researches conducted with a scientific approach and a systematic review in the field of mental health in the neighborhood spaces of residential complexes and the elderly in Iran and the world was done in order to identify the shortcomings of previous studies and take steps to fill these research gaps.

In the research of Zhang et al (2024) Scientific publications on healthy aging from January 1, 2000 to October 11, 2022 were retrieved from the Web of Science Core Collection (WoSCC) on October 11, 2022. A total of 6420 publications were included in the scientometric analysis. VOSviewer (1.6.18) was used to conduct scientometric and visualized analysis. The findings showed that the publication growth rate was 35.68 from 2000 to 2021. The United States of America (USA) led in both productivity and citations. PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA was prominent in terms of both the highest citation count and the highest average citation count. The National Institute on Aging (NIA) and Evans, Michele K. were the most influential organization and author, respectively.

Statistical descriptive analysis was complemented with two bibliometric techniques: performance analysis and co-word analysis in the research of the Berta et al (2022). There was an increase in publications that had passed from 1 article published in 2010 to 172 papers published in 2020. The 398 articles in the sample had 1,910 authors in total, being most of them occasional contributors. The Journal of Affective Disorders was the one with the highest number of publications on network analysis in psychopathology and mental health, followed by the Journal of Abnormal Psychology and Psychological Medicine stood out.

The other research was conducted as an applied research using the scientometric method and social network analysis indicators. The research community included all the information sources indexed in the Web of Science database in the field of human health and growth, amounting to 18,188 works. Vosviewer software was used for network analysis. The results showed that in terms of the centrality of the categories of health, disease, human health, sustainable growth, human rights, nursing and care, human development, obesity, growth and education, the most centrality index and in terms of the density and clustering coefficient of the health categories, human development, human rights and nursing and care were more important than other categories (Rahmani, 2023).

In the study of Oladinrin et al (2021) presented a bibliometric analysis of the current status of the aging in place research themes published as scientific articles between 1970 and 2021, using the Web of Science database. VOSviewer software was employed to map and visualize the 1331 items of bibliographic data retrieved. The findings revealed a

continuous growing trend in the publication of aging in place research. Most productive institutions derive from the USA. The International Journal of Environmental Research and Public Health was the most preferred Journal. The most popular research hotspots or areas included; older adults, aging, housing, dementia, long-term care, and technology, and their associations with the field of "aging in place" field were elucidated.

In the analysis of similar studies that have been conducted inside Iran, it can be concluded that so far no research has been conducted in the field of citation analysis and scientometrics in the field of mental health of the elderly in a co-occurrence manner, and the existing studies only examine journals, the field of study, and the year of publication and co-authorship network. Also, the studies showed that although in the past few decades, the research conducted in the field of mental health of the elderly has followed an upward trend in Iran and globally; But currently, this field does not benefit from a fruitful scientific survey, and so far no attempt has been made to draw an illustrated map in this field. Therefore, the examination of the vocabulary co-occurrence network and a systematic review of the research on the mental health of the elderly in Iran is a matter that has been addressed for the first time in this study. This leads to the evaluation and identification of the position of this field among researchers and can have an effect on increasing the mental health of the elderly in the future.

MATERIALS AND METHODS

With the aim of evaluating scientific research in the field of mental health of the elderly, this research used the qualitative approach, descriptive research method, content analysis, and the technique of systematic review and co-occurrence of key words. The method used in this research was done in two steps. In the first step, with the aim of focusing on scientific research about the mental health of the elderly in the neighborhood of residential complexes, the literature of scientific productions in this field was reviewed with the method of descriptive analysis and systematic review technique that works based on the adaptation of the available evidence to the desired conditions. The framework and principles of this systematic review were set based on the PRISMA checklist. In this technique, it is suggested to report 17 cases of the dominant criteria. Therefore, after defining the desired principles for data collection, sources are searched and then, using the PRISMA checklist, the desired criteria are extracted from among the reviewed articles (Ebrahimzadeh et al., 2023 ; Eskandari et al., 2021).

In the next step, in consultation with a psychologist specializing in the field of housing, the desired scientific products were outputted from Scopus electronic database by entering the keywords of mental health, elderly, neighborhood, housing and its synonyms such as welfare, residential, home, aging, aged, ageing, senior, old, oldest, retired and neighborhood was done until January 2023. The search method was done in two ways, "and" and "or" in the "Scopus" database in the document search section by searching the article title, abstract and keywords. After removing duplicate sources, 97 scientific researches were included in the screening circle.

By applying the data entry criteria in line with the aim of the research, which was to review scientific productions and identify the most suitable methods and tools for measuring the mental health of the

elderly in the neighborhood spaces, Abstracts unrelated to the purpose of the subject were reviewed so that, if eligible, their full text would be reviewed in the next step. Excluded abstracts were related to review articles, which left 94 references after screening. The text-sources were studied completely, one scientific production was removed due to the unavailability of the full text and another source due to being a review. Then, by applying the criteria to the remaining 91 sources, the sources

that were not included in the scope of the study's objectives (such as a survey of people who dealt with the elderly, not the elderly themselves, and research whose age range was below the age range of the elderly in the present study) were excluded. After determining the defined inclusion and exclusion criteria and re-reviewing, 89 full-text scientific productions were included in this systematic review. The stages of this screening are shown in Figure 1.

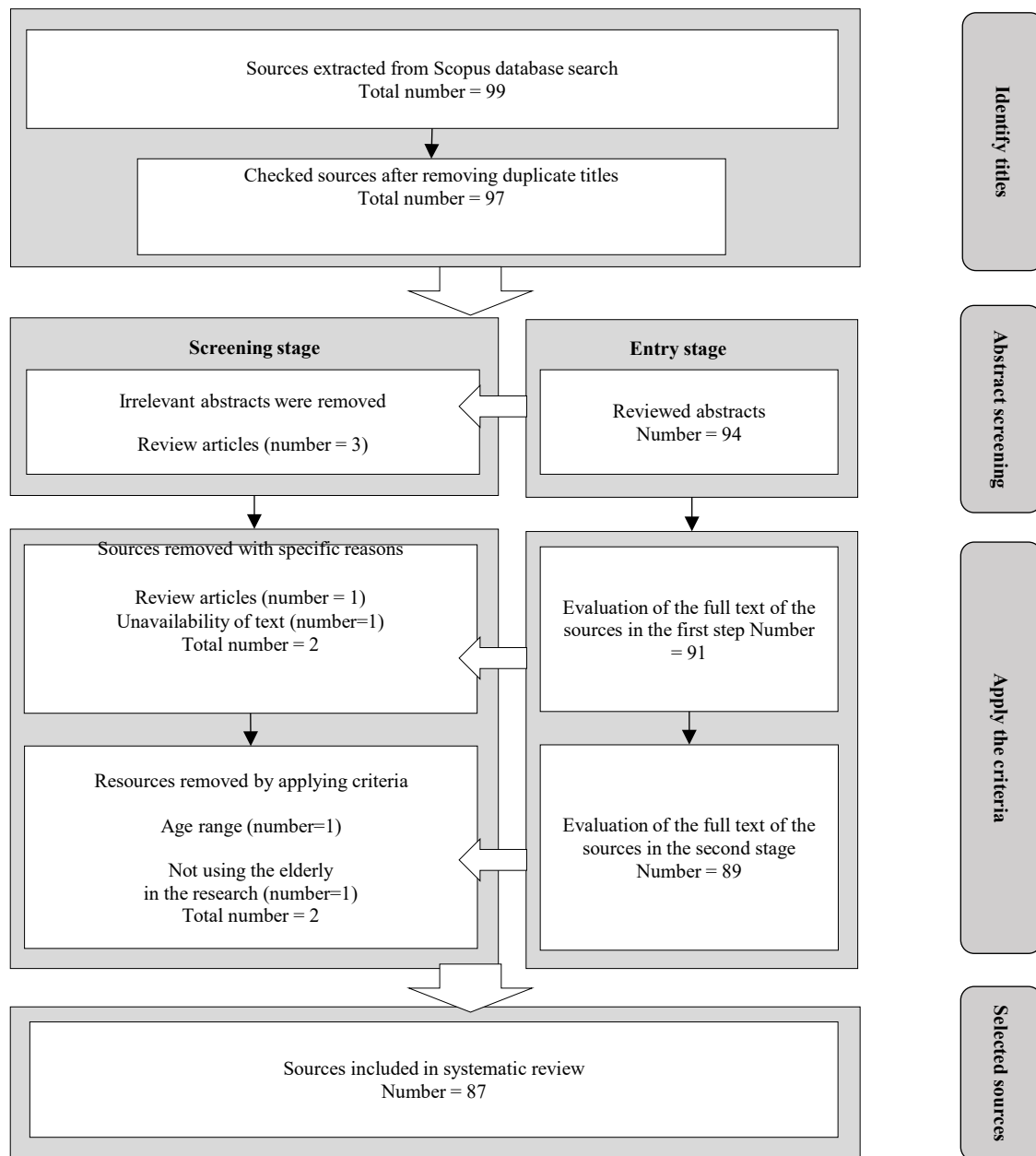


Fig 1: Screening of scientific productions related to the mental health of the elderly in the neighborhood spaces in a systematic review

After the review, the full version of the remaining sources was evaluated in two stages. In the first stage, the output data from 89 articles were saved in Excel software with the extension "CSV". The keywords of all these obtained sources were prepared in the form of a co-occurrence matrix in an Excel file and then transferred to VOSviewer version 16.6.1 software. In order to analyze the co-occurrence of keywords, a repetition threshold of 5 was considered for keywords in the software input by trial and error. Among 302 keywords, 55 keywords were selected for co-occurrence analysis with a threshold of 2. These words were drawn and analyzed by the co-occurrence network of words in this software.

In the second stage, the research method and the tools used to measure the mental health of the elderly in the neighborhood spaces in housing were carefully evaluated in 89 scientific sources resulting from a systematic review, using the descriptive analysis method and also according to the definitions proposed by [Sarmad et al. \(2016\)](#) were taken and named. Then, the frequency of methods and tools used were obtained and drawn in a diagram format. Also, using the

descriptive analysis method, the remaining 89 sources were examined and analyzed in terms of the year of publication, the country and the publishing journals. The co-authorship networks of the authors and countries of these scientific productions were also drawn by "VOSviewer" software.

RESULTS AND DISCUSSIONS

In order to identify the highly cited keywords in the field of mental health of the elderly in the neighborhood spaces, the method of co-occurrence of words was used. The keywords of all these 87 obtained sources were transferred to VOSviewer software. This software identified 8 clusters by analyzing the keywords of the abstracts. This graphic network indicates that if two terms are used together in the same document and the frequency of their repetition is high, the two words have a greater semantic connection, which helps to discover and understand the connection and connection between two subjects in a field of study ([Ahmadi & Asraei, 2017](#)). The results of this can be seen in the form of figure (Fig 2) and table 1.

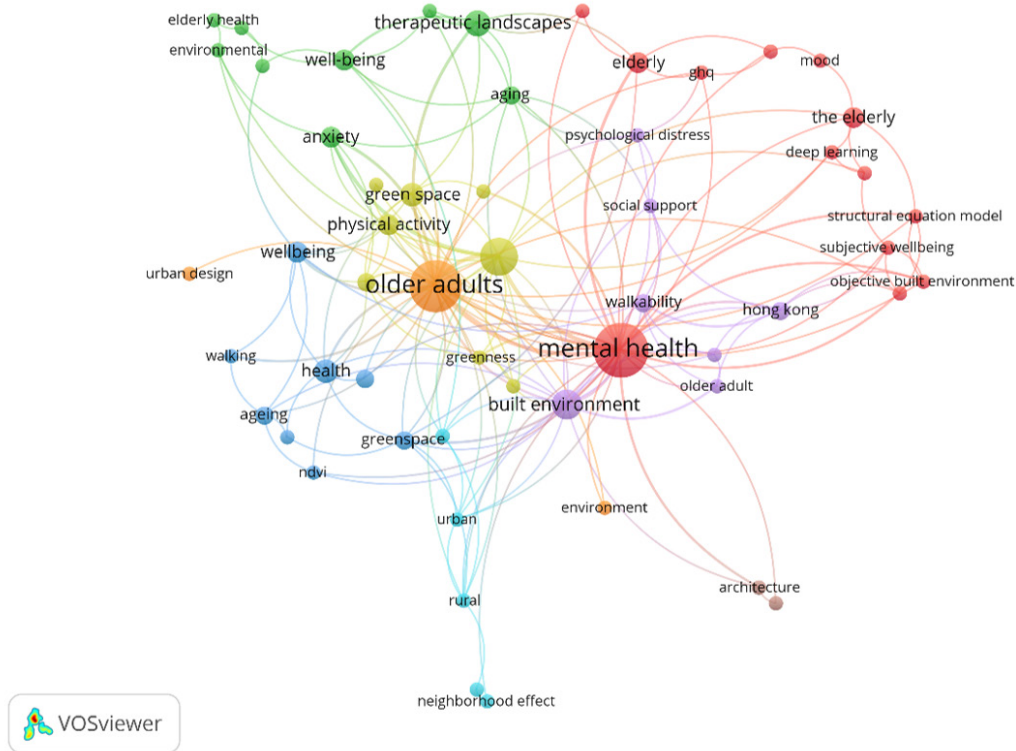


Fig 2: Co-occurrence map of keywords in the field of mental health of the elderly in neighborhood spaces during 2005-2023

The first cluster, marked with red color, consists of 13 keywords. The two words "mental health" and "elderly" in this cluster, with total link strength of 54 and 8 and occurrence frequencies of 26 and 4, were in the category of high frequency words. The second and third clusters, which are shown in green and blue colors, consist of 9 and 8 keywords, in the second cluster, the two words "anxiety" and "therapeutic landscapes" with link strength of 12 and 11 and occurrences of 4 and 6; In the third cluster, "green space" and "wellbeing" were among the highly frequent words with a total link strength of 11 and 10.

The fourth cluster, which is distinguished by yellow color, includes 8 keywords, the words "depression" and "green space" had the most links with points of 31 and 10. The fifth and sixth clusters, distinguished by purple and ruby blue, were "built environment" and "Hong Kong" with 23 and 11 links, and "trees" and "rural" with a frequency of 8 were the most powerful words. The 7th and 8th clusters, which are marked with orange and gray color, respectively, words such as "older adults" and "architecture", with a power of 48 and 4, were keywords with high link strength.

Table 1: The frequency of words and their connection strength in the field of mental health of the elderly in the field of housing during the years 1982-2023

Cluster 1 (13 items)	Total link strength	Occurrences	Cluster 2 (9 items)	Total link strength	Occurrences	Cluster 3 (8 items)	Total link strength	Occurrences	Cluster 4 (8 items)	Total link strength	Occurrences
mental health	54	26	anxiety	12	4	greenspace	11	3	depression	31	12
elderly	8	4	therapeutic landscapes	11	6	wellbeing	10	4	green space	10	5
objective built environment	8	2	aging	9	3	health	9	5	covid-19	10	3
perceived built environment	8	2	well-being	8	4	ageing	6	3	physical activity	8	4
the elderly	6	4	health geography	5	2	walking	4	2	cross-sectional study	5	2
structural equation model	6	2	environmental	4	2	ndvi	4	2	greenness	5	2
ghq	5	2	public open space (pos)	3	2	neighbourhood	3	2	general health	3	2
subjective wellbeing	5	2	place attachment	3	2	urban environment	3	3	healthy ageing	3	2
natural environments	4	2	elderly health	2	2						
deep learning	4	2									
senior housing	4	2									
gardening	3	2									
mood	2	2									
Cluster 5 (7 items)	Total link strength	Occurrences	Cluster 6 (5 items)	Total link strength	Occurrences	Cluster 7 (3 items)	Total link strength	Occurrences	Cluster 8 (2 items)	Total link strength	Occurrences
built environment	23	8	trees	8	2	older adults	48	23	architecture	4	2
hong kong	11	3	rural	8	2	environment	2	2	environmental design	2	2
walkability	9	3	urban	7	2	urban design	1	2			
social support	6	2	neighborhood effect	2	2						
older adult	6	2	self-rated health	2	2						
psychological distress	5	2									
quality of life	5	2									

In Figure 3, a view of these clusters along with their sub-categories and their color were arranged according to the year of publication in the period of 2014-2023. In this way, yellow words and words that tend to be green-yellow, such as "greenness", "cross-sectional survey study", "physical activity", "objective built environment", "perceived built environment", "neighborhood effect" and "Covid-19" has been used more in recent years, and the keywords that have a dark-blue color are among the words that were used in the past.

The names of the most cooperation among the countries resulting from the output of VOSviewer software with a minimum number of 5 publications from each country can be seen in Figure 4. The number and thickness of the lines indicate the amount and number of cooperation between them. The diameter of each node also shows the number of releases of each country (Ebrahimzadeh et al., 2023).

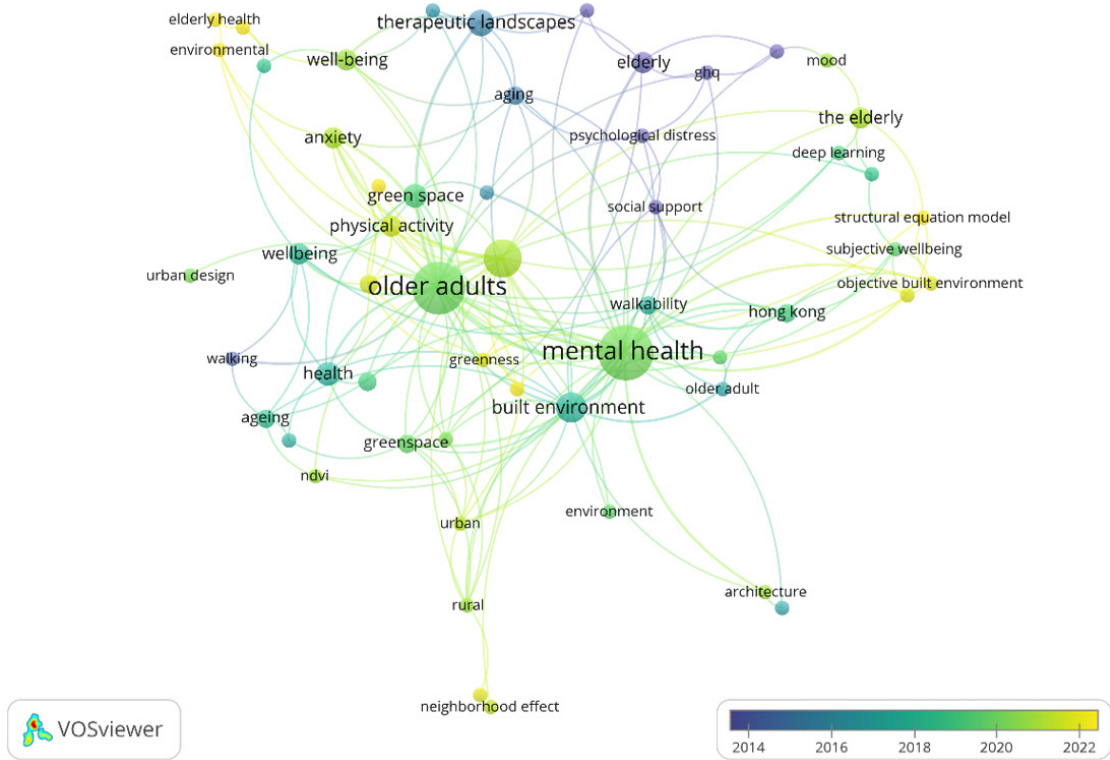


Fig 3: Co-occurrence map of words in the field of mental health of the elderly in the field of housing by year of publication

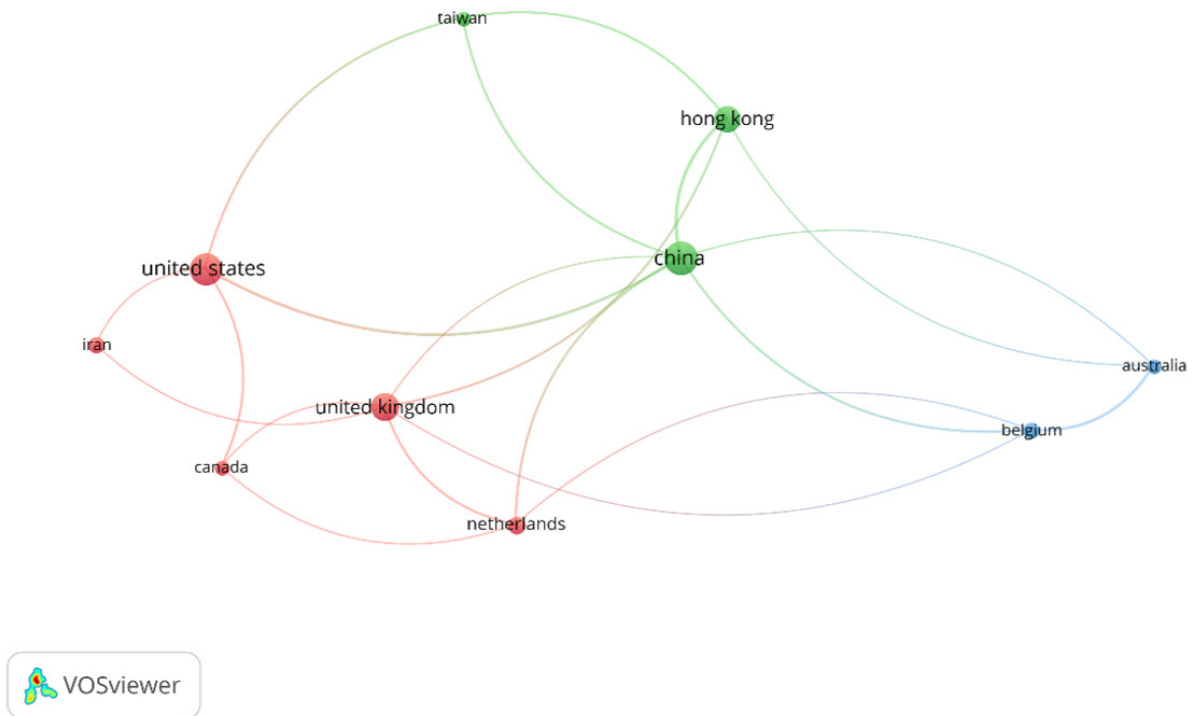


Fig 4: Authorship network map for international collaboration among countries in scientific productions in the field of mental health of the elderly in the neighborhood spaces

As seen in the [table 2](#), the most studies were conducted in China (37 cases), America (21 cases) and England (16 cases). The highest amount of cooperation with other countries in publishing scientific products in this field belonged to China with 24 cooperations. England and

America were in second place with 8 collaborations. Iran's contribution was relatively high among other Asian countries with 6 publications, but it was ranked low in terms of authorship in this field with 2 collaborations with other countries.

Table 2: The frequency of the number of publications and their co-authorship by countries in scientific productions in the field of mental health of the elderly in the open space of housing

Rank	Country	Link strength	Number of publication	Number of citation	Rank	Country	Link strength	Number of publication	Number of citation
1	China	15	23	703	5	Netherland	6	7	472
2	Hong kong	9	14	464		Taiwan	6	5	140
3	England	8	16	1096	6	Australia	5	5	90
	America	8	21	964	7	Canada	4	5	344
4	Belgium	7	6	171	8	Iran	2	6	6

The number of releases for each country is shown in detail in chart form, in [figure 5](#).

The countries of Germany, Africa, Italy and India were in the last ranks with one study.

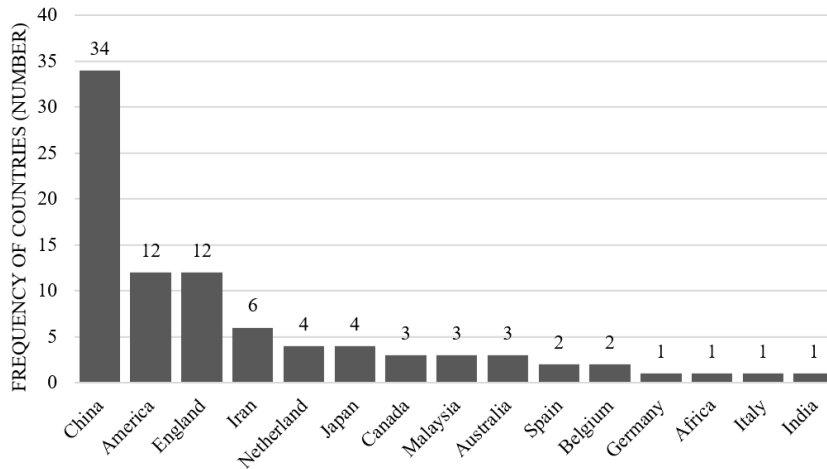


Fig 5: The frequency of the studied countries of scientific productions in the field of mental health of the elderly in the field of housing

The most important official sources of information exchange in the fields of scientific productions are the scientific journals of that field, therefore, identifying highly cited journals in the field of the subject under study is of great importance ([Ebrahimzadeh et al., 2022](#)). The frequency of scientific productions carried out in the field of mental health of the elderly in the housing environment related to architectural fields, as seen in [Figure 6](#), were evaluated

and drawn in the order of the year of publication. Scientific productions in this field have almost gone through an upward trend in the period from 1982 to 2019 and experienced a rapid downward trend in 2020. From 2021 onwards, these productions have followed an upward growth again. In 2023, since the search circle has been completed until November, the publication process has not been completed.

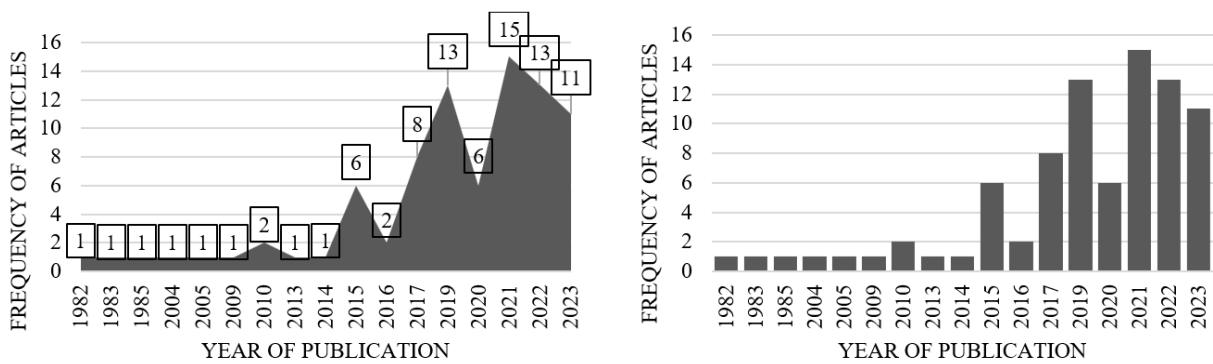


Fig 6: The process of publication of scientific productions in the field of mental health of the elderly in the area of the neighborhood

Scientific journals of a subject are the most important sources in the fields of scientific productions for exchanging information; Therefore, it is very important to identify highly cited journals in the field of the subject under investigation (Ebrahimzadeh et al., 2023). The top 5

magazines with the most publications in the field of open spaces, housing and mental health of the elderly are shown in table 3. The International "Journal of Environmental Research and Public Health" and "Health and Place" were among the most published with 22 and 9 publications.

Table 3: The share of journals in scientific productions in the field of mental health of the elderly in the field of housing

Rank	Journal	Number of papers	H-index	SJR ₂₀₂₃	Impact factor ₂₀₂₁
1	International Journal of Environmental Research and Public Health	22	198	0.81(Q2)	4.614
2	Health and Place	9	137	1.28 (Q1)	4.078
3	Social Science and Medicine	7	283	1.95 (Q1)	5.379
4	Environment International	4	252	3.02 (Q1)	13.35
	Urban Forestry and Urban Greening		117	1.62 (Q1)	6.4
5	Landscape and Urban Planning	3	211	2.36 (Q1)	7.9
	PLoS ONE		435	0.84 (Q1)	3.752

Among the variables that were examined in these 89 scientific productions, "green space" was the most used variable with 66 repetitions. After that, the variables of "walkability", "accessibility" and "safety" were ranked second to fourth with repetition times of 37, 31 and 27. The variables of "age of the building", "ventilation", "area" and "height (stairs)" each repeated once, were among the least independent variables investigated in articles on mental health in the neighborhood spaces (Fig 7).

Among the methods used according to Figure 8, the correlation method with 71 frequency was the most used. After that, survey method with 60 times (47 times of cross-sectional survey and 13 times of longitudinal survey) and descriptive method with frequency of 58 were ranked second and third. The research methods of content analysis and experimental were in the fourth and fifth places with 5 and 2 frequencies. The pre-post test and Ethnography were in the last place.

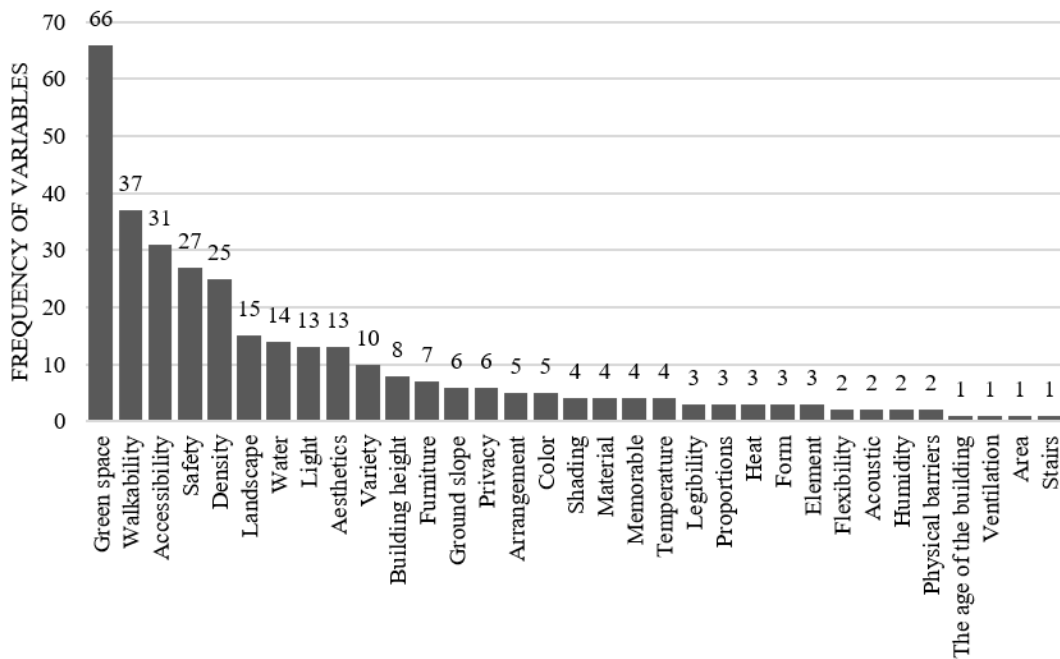


Fig 7: The frequency of studied variables in scientific productions in the field of mental health of the elderly in the field of housing

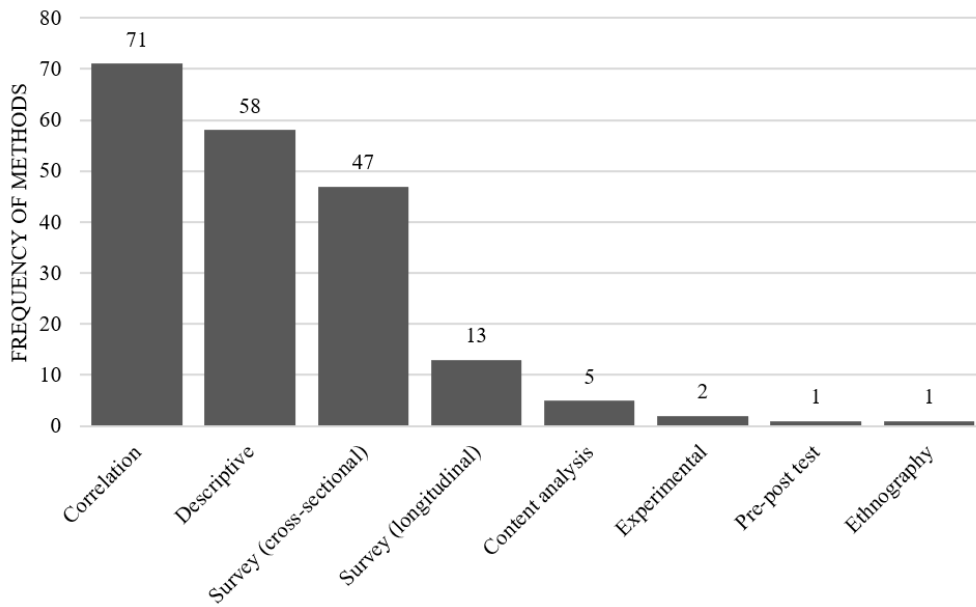


Fig 8: The frequency of methods used in the field of scientific productions related to the mental health of the elderly in the field of housing

Categorizing and sorting the tools used to collect data in 89 studies related to the mental health of the elderly in the field of housing showed that the most used tool in these studies was the "questionnaire", which was used in 78 articles. 48 of the researches used the "interview" technique and 31 used the "mapping" tool. "Electroencephalography" and "painting" tools were in the last ranks with a frequency of 2 and 1. The results of the frequency of the tools used are shown in the Figure 9.

Among the software used in these studies for data analysis, "SPSS", "Stata" and "R" were the most used software with a frequency of 26, 19 and 10 in the first to third ranks.. "SAS", "Mplus" and "LISREL" software had the lowest frequency with the number of repetitions of 2. The results can be seen in the figure 10.

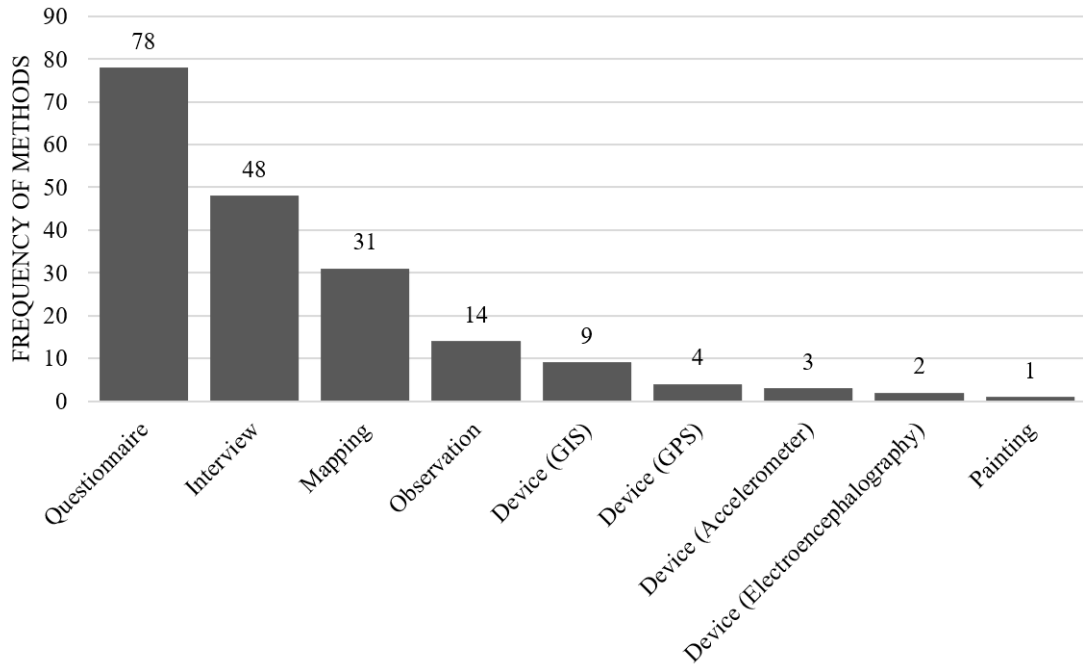


Fig 9: Frequency of tools used in the field of scientific productions related to the mental health of the elderly in the field of housing

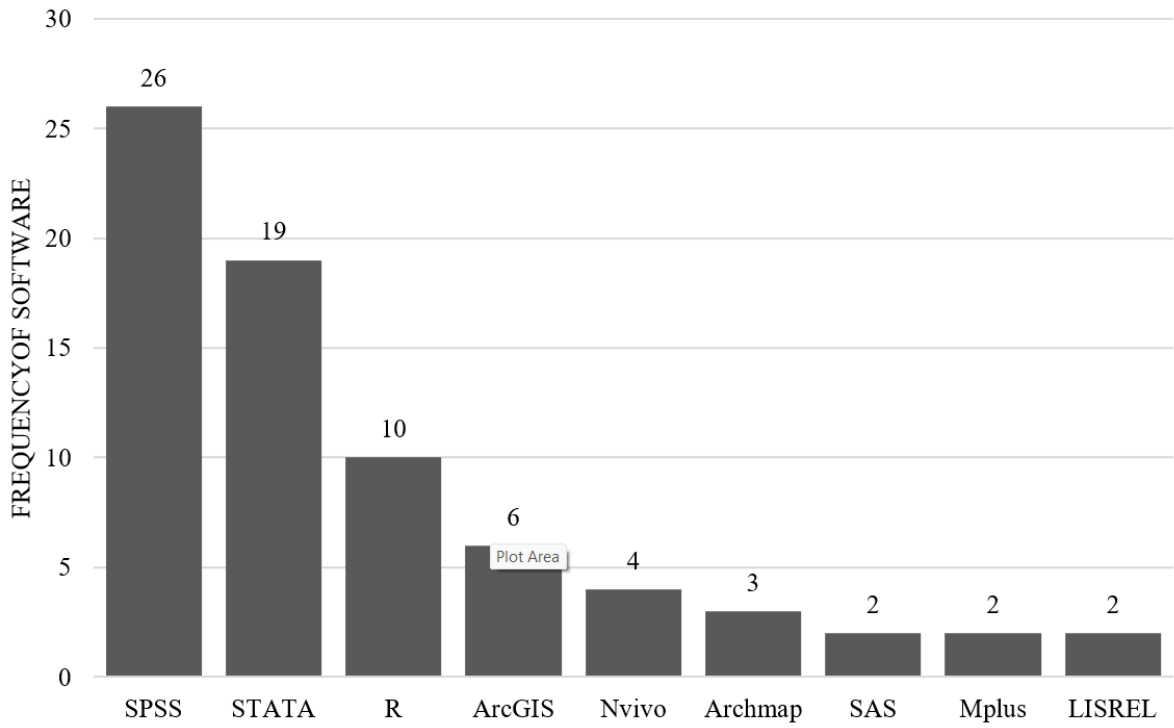


Fig 10: Frequency of software used in the field of scientific products related to the mental health of the elderly in the field of housing

The present research was conducted with the aim of scientific analysis of the mental health of the elderly, to discover the main issues and developments in this field, as well as to find the trend of the emerging performance of the articles, to identify key words, methods and research measurement tools, and to discover the intellectual structure of the mental health of the elderly in neighborhood spaces in housing. Scientific productions in this field have almost gone through an upward trend in the period from 1982 to 2019, and from 2021 onwards, these products have followed an upward growth again. This dramatic increase shows the scientific community's growing interest in the study of symptom in mental disorders. This may happen because the symptom network perspective is a categorical classification alternative that can overcome some of their disadvantages (Berta et al., 2022; Muñoz et al., 2019) and indicating that elderl mental health research in neighborhood spaces continued to attract the attention of scholars in recent years (Wang et al., 2023).

From the findings of this research, it has been made to show frequent words such as green space, trees, depression, physical activity, walkability, architecture and built environment, which emphasize the social and physical aspects of health as aspects affecting the mental health of the elderly (Masoudi et al., 2024). This is due to the fact that inactivity is one of the most important health risk factors at all ages, including the sensitive age of old age; Physical activity and exercise according to the physical conditions of each person can create many beneficial physical and mental effects for the elderly by improving heart and lung function (Nazari et al., 1401); Therefore, one of the important keywords in supporting the mental health of the elderly is emphasizing their physical and daily activities (physical health aspect).

Table 2 reveals that the USA and the UK contributed to 40% of the publications which is in accordance with the findings of Vasunilashorn et al (2012) & Xiao et al., (2024). Simultaneously, they were the two most cited countries. The findings show that the literature of scientific productions related to this field is at the disposal of developed countries. China was the most cited country in this case, and all countries in the top five list represent developed economies. The progress of scientific productions related to the mental health of the elderly in urban spaces in developed countries can be seen as a result of several factors, including recommendations and guidelines compiled in order to promote health, available resources and budgets, and the presence of organizations that focus on increasing the mental health of the elderly (Riazi et al., 2022). Therefore, the present scientometric article highlights the necessity of increasing scientific productions related to mental

health in the field of architecture and urban planning in developing countries. This can be done in different ways, such as strengthening cooperation between researchers and creating initiatives to promote the transfer of expertise from developed and developing countries (Ebrahimzadeh et al., 2023). Another aspect of the results of this research indicates the use of descriptive-analytical research methods, correlation and cross-sectional survey and little use of intervention methods in the environment and pre-test and post-test, which in this respect is consistent with the findings of Masoudi et al. (2024) in The widespread use of descriptive-analytical and cross-sectional survey methods in their analyzes are similar to a large extent. Perhaps the limitation of information and knowledge of health researchers regarding interventional studies can be seen as a reason for this issue; However, the time-consuming, economic aspect, lack of equipped laboratories and sudden problems caused by the conditions in conducting environmental intervention studies and longitudinal surveys should not be overlooked (Tian, 2016). The findings of highly-cited journals showed that the top 5 journals had an average impact factor greater than 4, and almost 90% of these journals were among Q-1 journals, which, as Banno et al. stated in 2018, exclusively these journals are written by authors from developed countries. and this can be a justification for the lack of studies in Asian countries, especially Iran, in this field.

CONCLUSION

The present study aims to investigate scientific productions in the field of mental health of the elderly, focusing on neighborhood spaces in housing, and systematically reviewed 89 scientific sources in this field using VOSviewer software. In this research, data retrieval from Scopus databases may have limited the data and as a result, some journals and periodicals without index and non-English language journals were not included in this study; therefore, it is suggested that in future researches, referring to other global databases, such as Web of Science, should be considered by researchers.

In general, the findings of this research about drawing a network-map help the researchers in the field of mental health to know more about the research gaps in the field of housing neighborhood spaces in relation to the elderly, such as low-frequency words, the best methods and tools for measuring the mental health of the elderly, in addition to saving money. In time, by not paying attention to repetitive content and unconsidered aspects, in line with filling these research gaps, take steps to accelerate the needs of the elderly. In the following, the conceptual structure of this article is drawn graphically (Figure 11).

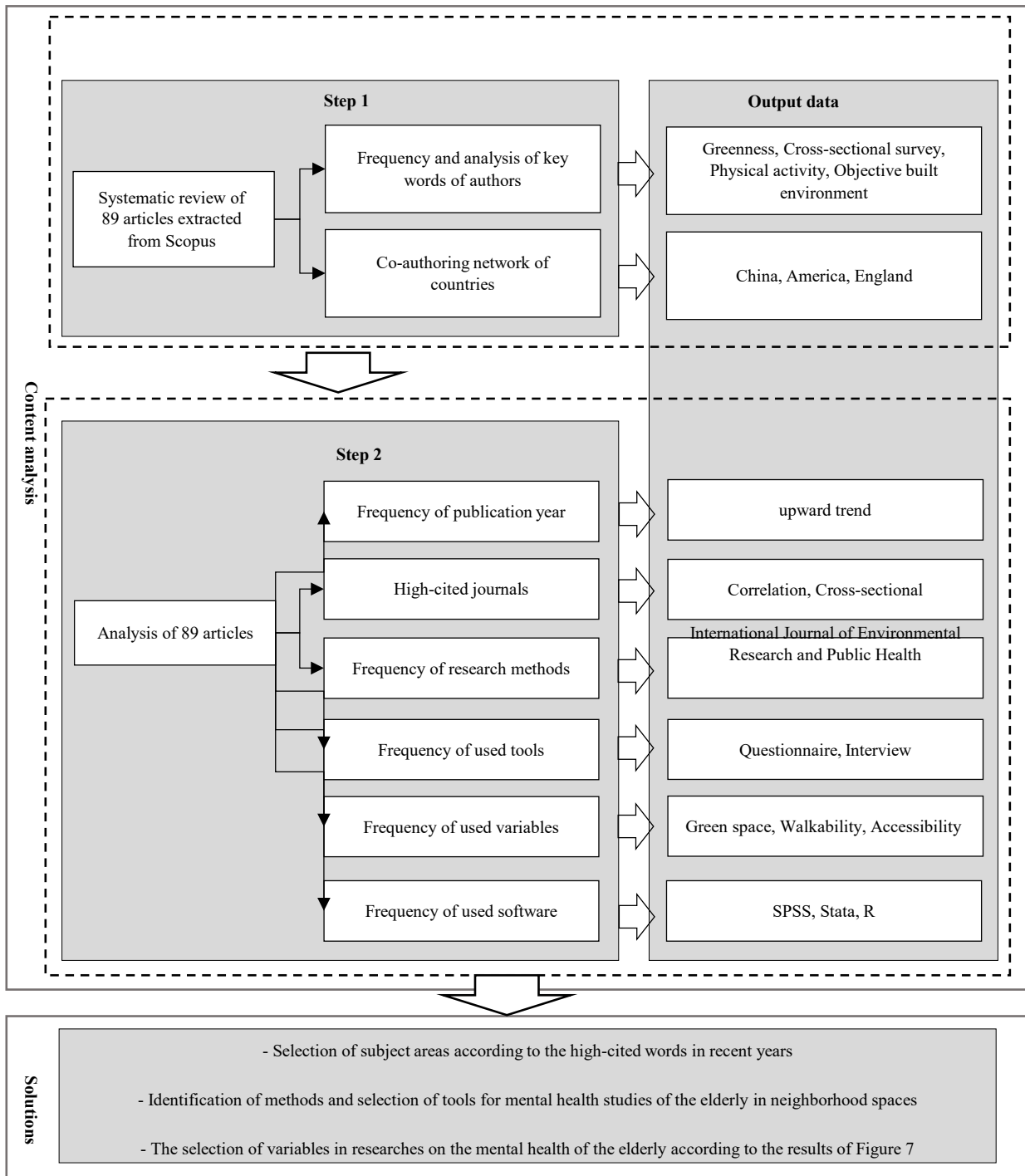


Fig. 11: Conceptual framework

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