SCOPUS-BASED BIBLIOMETRIC ANALYSIS OF PUBLICATION ACTIVITY IN THE FIELD OF HEALTHY AGING IN 2013-2022

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Abstract

Introduction: Life expectancy is getting longer, and the proportion of the elderly population is increasing. Therefore, the concept of healthy aging gains importance and attracts attention in the scientific community. This article presented a ten-year bibliometric analysis of articles on healthy aging in the Scopus database.

Methods: The Scopus database was used for the bibliometric analysis. The publication list was created using the keywords «aging well» and «healthy aging.» The number of articles, active countries-journals, frequent keywords, prolific authors, and funding sources were defined.

Results: An upward trend was observed in the number of articles related to healthy aging between 2013 and 2022. The five leading countries in publication activity were the United States, China, the United Kingdom, Germany, and Canada, respectively. The most prolific authors were Ferrucci, L., Franceschi, C., Evans, M.K., Bennett, D.A., and Deary, I.J. The five most active journals were Plos One, Scientific Reports, International Journal of Molecular Sciences, International Journal of Environmental Research and Public Health, and Frontiers in Aging Neuroscience.

Conclusion: Bibliometric analysis is a valuable method for assessing global trends in producing scientific literature on particular topics. This study revealed an upward trend in articles on healthy aging over time, indicating an increasing interest and focus on this topic. As the elderly population grows, it is anticipated that interest in healthy aging will progressively increase. It will be advantageous for researchers interested in this field to establish collaborations with prominent authors and institutions. Thus, they will canalize their future investigation in the proper direction.

Keywords: bibliometrics; healthy aging; aging well; bibliographies as topic; geriatrics

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Bibliometric analysis is an established tool for objectively assessing global scientific productivity in specific fields or disciplines. It involves quantitative and qualitative evaluation of scholarly publications to gain insights into research trends, collaboration patterns, citation impact, and other relevant factors [5, 6]. Bibliometric analysis provides researchers with valuable and comprehensive information on a particular topic. Thus, researchers can better understand the existing literature and identify gaps and opportunities. In addition, bibliometric analysis-related data can support their decision-making process and help them plan their future research direction [7, 8].

Healthy aging incorporates multiple disciplines, making it a complex research field [9]. Given the expanding population of older individuals, it is clear that healthy aging research will remain a prominent focus for researchers. This study aimed to analyze ten years (2013-2022) of healthy aging articles using the Scopus database. The objective was to examine the publication trends, influential authors, leading countries, and prominent journals.

Methods

In the current bibliometric analysis, the Scopus database was utilized to compile a list of publications related to healthy aging as of May 15, 2023. Scopus is a commonly used database in bibliometric studies due to its extensive coverage and comprehensive indexing of scholarly literature [10]. The search option «Article title, Abstract, Keywords» was selected for compiling the publication list, and the phrases «healthy aging» and «aging well» were utilized as the search terms. The search was limited to publications in English within the date range of January 2013 to December 2022. In addition, the publication type for the search was limited to articles and reviews.

The bibliometric factors utilized in analyzing articles related to healthy aging included the total number of articles, publication year, country of publication, authors, keywords, affiliated institutions, funding sponsors, and journals. The number of articles published annually was recorded from 2013 to 2022. The total number of articles published from 2013 to 2022 was recorded, and countries that contributed 1% or more of this total were categorized as the main active countries [11, 12]. ‘https://www.cia.gov/the-world-factbook/countries/’ was consulted for information on the main active countries’ population and gross domestic product (GDP).

The authors, institutions, and journals that have made substantial contributions to the field of healthy aging, as well as the funding sources that have provided the most support for research in this area, were identified and recorded (as top five). Subsequently, the publication data were exported to Microsoft Excel in CSV format. Descriptive data obtained from the analysis were visualized using Microsoft Excel. Figures were created to present the findings clearly and comprehensively.

Results

Following applying the specified restriction criteria, 101629 documents were listed in Scopus. An upward trend was observed in the number of articles related to healthy aging, with the publication count increasing from 6591 to 10551 over the specified period (Figure 1).

Of the analyzed countries, 21 met the main active countries criteria in the field. The five leading countries in terms of publication activity were the United States with 30571 publications, followed by China with 13652 publications, the United Kingdom with 9072 publications, Germany with 8622 publications, and Canada with 5916 publications (Table 1).

When the number of articles was normalized per million population, Switzerland emerged as the most productive country with 319.52 articles per million. Denmark closely followed it with 254.91 articles per million population and Sweden with 239.52 articles per million. When considering calculations based on GDP, Sweden (450.71) ranked as the most productive country. Switzerland (445.24) was closely followed, and Denmark (443.65) was next (Table 1).

Of the total publications, 87712 were classified as articles and 13917 as reviews (Figure 2). The most prolific authors were Ferrucci, L. (n = 151), Franceschi, C. (n = 130), Evans, M.K. (n = 118), Bennett, D.A. (n = 91), Deary, I.J (n = 91) (Figure 3). The five most frequent keywords in healthy aging-related publications were human (n = 56302), article (n = 51754), humans (n = 47242), aging (n = 38162), and female (n = 38087) (Figure 4).

The five leading funding sponsors for healthy aging research were the National Institutes of Health with 8530 publications, the National Natural Science Foundation of China with 6524 publications, the National Institute on Aging with 6197 publications, the Japan Society for the Promotion of Science with 1937 publications, and the National Science Foundation with 1913 publications (Figure 5).
Figure 1. The trend of the number of articles in the field of healthy aging from 2013 to 2022.

<table>
<thead>
<tr>
<th>Main active countries</th>
<th>n</th>
<th>n&lt;sup&gt;a&lt;/sup&gt;</th>
<th>n&lt;sup&gt;b&lt;/sup&gt;</th>
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<tbody>
<tr>
<td>USA</td>
<td>30571</td>
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<td>144.66</td>
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<td>China</td>
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<tr>
<td>Canada</td>
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<td>Norway</td>
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<td>303.38</td>
</tr>
</tbody>
</table>

n: number of articles  
 n<sup>a</sup>: number of articles per million population, n<sup>b</sup>: number of articles per $100 billion gross domestic product

Table 1. The main active countries in healthy aging-related articles between 2013 and 2022.
Figure 2. Distribution of articles and reviews

Figure 3. The five most prolific authors in the field of healthy aging

Figure 4. The five most frequent keywords in healthy aging-related articles

Figure 5. Top five funding sponsors in the healthy aging field

Figure 6. Top five journals in terms of the number of articles related to healthy aging
The five most active journals in terms of number of articles were Plos One (n = 3084), Scientific Reports (n = 1756), International Journal of Molecular Sciences (n = 1122), International Journal of Environmental Research and Public Health (n = 855), and Frontiers in Aging Neuroscience (n = 835) (Figure 6).

Discussion

Bibliometric analyses present comprehensive information regarding global publication output, trends over time, and the standing of countries, institutions, and journals. During the specified period, the number of articles related to healthy aging increased from 6591 to 10551, indicating an upward trend. This result is not surprising considering the increase in life expectancy and the proportion of the geriatric group in the population [13]. As a result, researchers will increasingly focus on this topic, and the number of articles produced will likely continue an increase over time. The fact that the issue of healthy aging is related to several fields will further support this trend.

The top five countries regarding article production in healthy aging were the United States, China, the United Kingdom, Germany, and Canada, respectively. The United States emerged as the clear leader in article production, demonstrating its dominant position in the field. Numerous bibliometric studies across different areas consistently highlight similar countries, with the United States often emerging as a prominent contributor to academic productivity [14, 15, 16, 17]. The United States’ leadership in academic productivity can be attributed to the high financial support devoted to scientific research, the presence of respected researchers from various countries, and the existence of institutions with solid scientific backgrounds and a strong research tradition.

The population-adjusted data ranked Switzerland, Denmark, and Sweden as the top three countries. In GDP-based analyses, Sweden, Switzerland, and Denmark were the most prominent countries. It is noteworthy that similar countries stand out in both analyses. Despite the relatively smaller population and fewer researchers, it can be concluded that these countries use their human resources and research budgets more efficiently than other countries.

The most prolific authors were Ferrucci, L., Franceschi, C., Evans, M.K., Bennett, D.A., and Deary, I.J. It would be beneficial for researchers interested in this field to follow leading authors in healthy aging. Thus, researchers can track up-to-date data and gain new ideas for future research.

The five most common keywords were human, article, humans, aging, and female. The findings are in line with expectations, as it is typical for research in the field of healthy aging to focus on human studies, particularly among female

The five leading funding sponsors in this field were the National Institutes of Health (United States), the National Natural Science Foundation of China (China), the National Institute on Aging (United States), the Japan Society for the Promotion of Science (Japan), and the National Science Foundation (United States). The United States, in addition to its socio-economic development, actively supports research in healthy aging. This finding is consistent with the undisputed lead of the United States in terms of the total number of articles, indicating its substantial contribution to advancing knowledge in this area.

The five most active journals were Plos One, Scientific Reports, International Journal of Molecular Sciences, International Journal of Environmental Research and Public Health, and Frontiers in Aging Neuroscience. The prominence of general medical journals alongside journals specializing in the aging process may indicate the subject’s popularity among researchers. The complex structure of healthy aging, which incorporates numerous disciplines, may have also contributed to this outcome [18].

Using a single database for the research can be seen as a limitation, but it was not deemed significant due to the comprehensive data provided by Scopus, which is highly regarded and reliable in the scientific community. Scopus was chosen for its wider coverage. Furthermore, the study focused only on English articles within a specific period to ensure up-to-date information. Although the timeframe could have been extended, the selected range was deemed appropriate for obtaining the most current data.

Conclusion

Bibliometric analysis is a valuable method for assessing global scientific production trends on specific topics. The findings of this study revealed an upward trend in the number of articles on healthy aging over the years, indicating a growing interest and focus in this area. The United States, China, the United Kingdom, Germany, and Canada were prominent countries in terms of the number of articles on the subject.
In addition, it has been revealed that Sweden, Switzerland, and Denmark use GDP and human resources more efficiently. It was determined that United States-based institutions supported the healthy aging field with more financial facilities. As the geriatric population grows, the interest in healthy aging is expected to increase gradually. It will be beneficial for researchers interested in this field to establish collaborations with leading authors and institutions, to recognize hot spots and gaps. Thus, they will give a correct direction to their future research.

REFERENCES


FUNDING

None

CONFLICT OF INTEREST

The author have completed the ICMJE Disclosure Form. The author declare that there are no potential conflicts of interest.

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