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The emergence of the global south in aging research

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Abstract

Historically, aging research has been dominated by the United States and Europe. However, the expansion of scientific efforts in countries from the global south and their demographic transitions invite to explore the evolution and content of their aging research portfolios. This chapter presents a scientometric cartography of the last thirty years of aging research in China, India, and the countries of the African Union (AU), the community of Latin America and the Caribbean (CELAC), and the Association of Southeast Asian Nations (ASEAN). The participation of the global south in aging research showed a substantial increase over the last three decades with China achieving a volume of annual publications similar to that of the United States or the European Union. The content of the publications reveals differences between the countries and regions with China and India showing an important biomedical component in their research portfolios while the research efforts of the AU and ASEAN countries are more oriented, comparatively, to health management and policies. The CELAC research portfolio on aging, as a region, is similar to that of China and India, although with a lower frequency of clinical-therapeutic terms and a distinctive emphasis on topics related to frailty and the musculoskeletal system. These differences in research portfolios on aging could be related to different research capacities as well as different knowledge needs between the countries and regions studied.

Introduction

The history of both geriatrics (1) and modern aging research (2) has been led by the United States and Europe throughout the twentieth century in terms of both its key actors and its major discoveries. However, recent decades have witnessed the emergence of countries from the global south, particularly Brazil, China, India, Russia and South Africa (grouped in the intergovernmental organization BRICS (3)) both in terms of gross expenditures on science and technology and in the volume of scientific publications produced (4). By itself, the expansion of research capacities in the countries of the global south would be sufficient to infer the possible emergence of local scientific communities in gerontology, geriatrics and aging research. However, the countries of the global south face a diversity of challenges derived from their respective demographic evolutions, demanding specialized and localized knowledge to respond to their problems. China, for example, will have more than 400 million inhabitants over 65 years of age and 150 million inhabitants over 80 by 2050 with a strong demand for health care in chronic diseases and mental health (5). Similarly, it is estimated that by 2050 India will have 300 million inhabitants over 60 years of age demanding greater resources for health care for older adults (6). In the case of Sub-Saharan Africa, it is estimated that in 2050 the population over 60 years of age will reach 150 million people, exhibiting a speed of aging higher than that historically shown by developed countries (7). In Latin America and the Caribbean, 20% of the population or approximately 147 million people will be over 65 years of age by 2050 (8), with 14 million of them requiring long-term care (9). Although there is an extensive scientometric literature on aging, it tends to focus on specific topics such as healthy aging (10), the impact of physical activity (11) or cognitive aging (12), there is no published research that analyzes the evolution of aging research from a geopolitical approach. This chapter offers the reader a macroscopic perspective of research efforts on aging carried out from various regions and countries in the global south. To facilitate the integration of information from countries in regions, we rely on the membership of supranational organizations, specifically the African Union, the Community of Latin America and the Caribbean (CELAC), and the Association of Southwest Asian Nations. We also

include in the analysis China and India whose economies, populations and territorial extension are comparable to the aforementioned regions. For the analysis, a search of scientific literature published between 1994 and 2023 on aging, geriatrics and gerontology was carried out in the Web of Science and a content analysis (text mining) of the documents found (title and abstract) was carried out using the KH Coder tool (13) with methodologies previously developed by the authors (14, 15).

The expansion of aging research in the global south

While in the 1990s the United States published half of the papers on geriatrics, gerontology, and aging studies, its share has been steadily declining, reaching thirty percent in recent years (Figure 1). The European Union as a whole (excluding the United Kingdom) shows moderate growth in the 1990s and 2000s, from 24 to 29% of the global publication of academic papers on aging (Figure 1). China, for its part, has multiplied its participation in these areas of research by over 100 in the same period, from 0.2 to 22.4% of publications on aging (Figure 1). India and the other regions studied in the global south have also shown enormous growth that, without being as exceptional as the case of China, has seen its participation in aging research multiplied between 3 and 9 times in the last three decades (Figure 1). India went from 0.6 to 2.1% in its global share, while the AU went from 0.3 to 1.9%, ASEAN went from 0.3 to 2.7% and CELAC went from 1 to 4.6%.

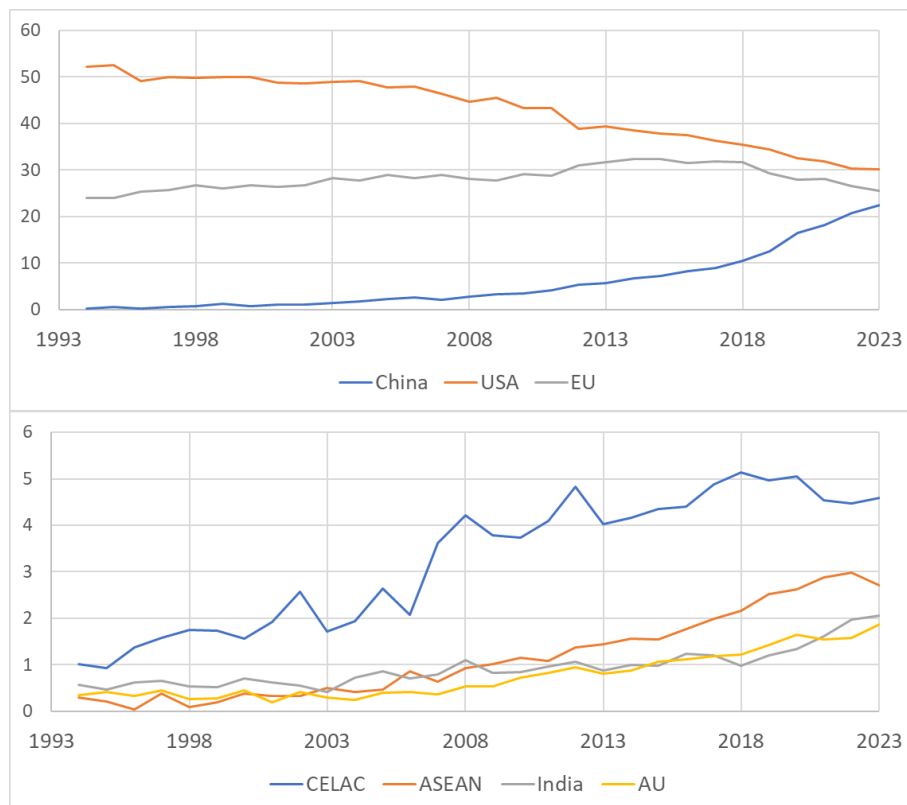


Figure 1. Evolution of the countries and regions of the global south in terms of their percentage participation in the production of scientific literature in the areas of gerontology, geriatrics and aging. AU: African Union. ASEAN: Association of Southeast Asian Nations. CELAC: Community of Latin American and Caribbean States. EU: European Union. USA: United States of America.

It is important to keep in mind that the three regions analyzed are not homogeneous in terms of their technical-scientific development. In the case of CELAC, scientific production on the topic of aging is dominated by Brazilian institutions led by the Universidade de Sao Paulo followed by 7 other Brazilian institutions in the top 10 ranking in the region. Only the National Autonomous University of Mexico

and the University of Buenos Aires appear in positions 7 and 10 respectively. In the case of ASEAN, it is dominated by institutions from Singapore, with five institutions, Thailand with three and Malaysia with two among the ten institutions with the highest volume of articles on aging. In the case of the AU, research on aging is led by universities from Egypt and South Africa.

Differences in the portfolios of aging research among countries and regions in the global south

The quantitative content analysis reveals, through a network of co-occurrence of terms, which topics are common to the regions and countries analyzed and in which they specialize. The two central cluster of concepts around which aging research is organized are demographic and epidemiological in nature (figure 2, nodes blue and turquoise). A third set of terms common to China, CELAC and ASEAN relate to aging research at a clinical therapeutic level (figure 2, green nodes located between China and CELAC nodes). The co-occurrence map shows that China's research portfolio is distinguished by being associated with a set of highly frequent biomedical terms (Figure 2, orange nodes only connected to China). India's research portfolio is also seen associated with some biomedical terms (Figure 2, orange nodes), some of which are shared with China (Figure 2, light green nodes connecting India and China). On the other hand, the joint research portfolio of the CELAC countries differs from other regions in its association with a set of terms related to frailty, physiotherapy and the musculoskeletal system (Figure 2, orange nodes only connected to CELAC). ASEAN is, for its part, associated with a small set of terms related to mental health and UA is connected to health management and policy terms (Figure 2 orange nodes) .

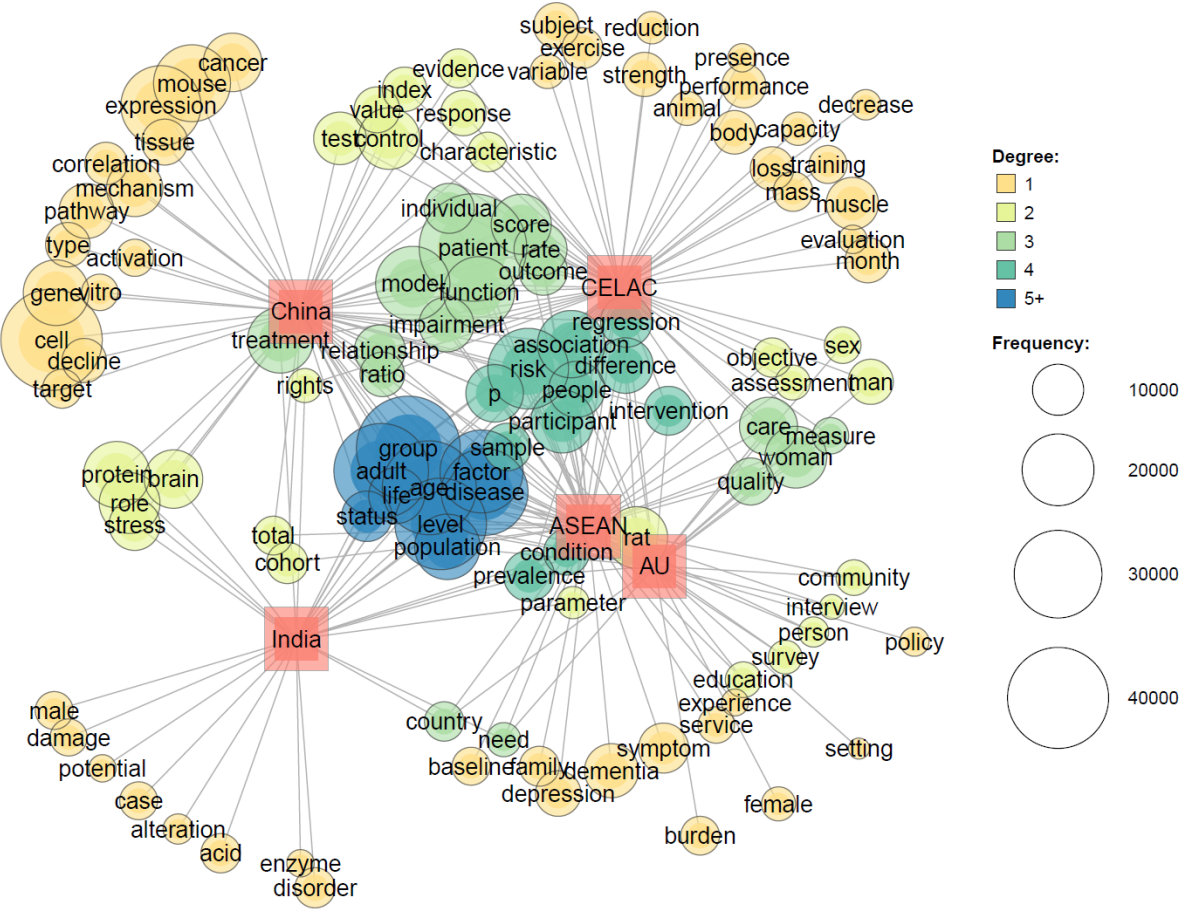


Figure 2. Co-occurrence network of terms associated with the research profiles of the countries and regions of the global south.

An analysis of the distribution of coded terms by research levels allows us to understand more clearly from what approaches do countries and regions of the global south address the issue of aging. The clustered heat map in Figure 3 summarizes the results of this analysis. The heat map shows that the population and risk factor concepts are common to the vast majority of publications from all the regions analyzed, which is consistent with the central cluster of terms that were observed in the co-occurrence network of terms (compare figures 2 and 3). The heat map clusters the different funding channels based on the distribution of the terms coded at the levels of research. On the right side a group formed by the AU and ASEAN prioritizes research on aging at the level of management and health policies over a biomedical approach while in the second group, on the left, formed by China, India and CELAC shows the reverse pattern (figure 3). Research on aging in China is distinguished from the other cases studied by having the highest percentage of publications with terms associated with the basic biomedical, clinical-therapeutic and diagnostic levels, and the lowest percentage of publications at the management and health policy (Figure 3).



Figure 3. Heat map and cluster analysis of the profiles of countries and regions of the global south by levels of gerontological, geriatric and aging research.

To correctly interpret the results of the analysis of the distribution of coded terms, it is important to take into account that terms related to different levels of research can co-occur in the same document. For example, a biomedical research article can make use of population or epidemiological information to introduce and provide context to its research. There may also be the case in which research at the level of health policies can deal with the implementation in society of a clinical-therapeutic intervention or the use of diagnostic tools. It is therefore expected that the results of the content analysis show that population and epidemiological concepts are highly pervasive to research on aging, since this tends to

be presented as an emerging demographic phenomenon with high social impact regardless of the type of research reported.

Discussion

The thematic differences in the aging research portfolios could be explained by the relationship between the knowledge and technology needs that different countries and regions require, and national and regional technical-scientific capacities. For example, in the case of China, an analysis of the country's knowledge demands in the face of the challenge of aging identifies the need to reorient the national research agenda towards the institution of a geriatric care system based on home care with community participation and institutional assistance. (5). This agenda proposes not only to carry out therapeutic research efforts, but also to generate knowledge about healthy lifestyles, prevention through community health and the use of information technologies to strengthen mobile geriatric care services (5). However, one of the strategic priorities of Chinese institutions in recent decades has been to promote basic and translational research on aging through increasing funding from the National Natural Science Foundation and the Ministry of Science and Technology of China with an amount of 470.18 million and 917.60 million RMB Yuan respectively in the period 2007-2018 (16). This would explain the particular emphasis on basic biomedical and clinical therapeutic research in the Chinese research portfolio on aging that we observed in the content analysis. In the case of Africa (sub-Aryan), a survey of 72 gerontology scholars from 17 countries in the region and 16 different disciplines identified a priority set of scientific knowledge needs which were related to poverty, lack of professional and long-term care, food insecurity and disability (17). However, an extensive review of studies on aging in sub-Saharan Africa revealed that research in the region is dominated by cross-sectional studies related to HIV-AIDS and non-communicable diseases from a social determinants of health-disease perspective (7). This same review found that more than half of the studies on aging in the region were carried out with the South African population, pointing out a lack of knowledge about population aging in the rest of the subcontinent. The greater volume of South African publications in the field of aging compared to the rest of the continent could be due to an older population as well as the greater economic resources and availability of experts in that country as well as its greater connectivity with global networks of scientific collaboration. (7). Both the demands for knowledge about aging expressed by gerontological experts and the review of the research offer in Sub-Saharan Africa fit with our observation that the content of the region's publications is linked to both population and epidemiological aspects as well as management and health policies. In the case of Latin America and the Caribbean, it is important to keep in mind that unlike other regions of the world, risk factors associated with social, health and lifestyle inequalities have a greater impact than demographic factors such as age and sex (18). A review of publications related to older adults in Ecuador found that the vast majority of studies were cross-sectional and case-control studies related to the epidemiology of diseases in said age group (19). This same review identified a lack of studies on aging policies, and those aimed at treatments, diagnoses and health services (19). Although not representative of the region, the case of Ecuador aligns well with the results of the analysis of the aging research portfolio of Latin America and the Caribbean in the sense of a research offer focused on epidemiological and demographic aspects of aging and a lack research at a clinical, diagnostic, management and health policy level. Finally, in the case of India, a plethora of knowledge needs have been identified to face the challenge of the country's aging population, which includes socioeconomic, cultural, legal and political aspects, in addition to the epidemiological and health dimensions (20). However, Indian health research currently seeks to align itself with the global translational biomedical research agenda in terms of increasing its competitiveness and efficiency in these areas as well as strengthening its collaboration networks with the global north (21). Although we do not find in the literature that funding for aging research in India promotes biomedical and clinical approaches, general health research

policies could help understand why India despite its complex aging knowledge needs could be prioritizing the level of basic biomedical research above the level of management and health policies.

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