



BRAZILIAN JOURNAL
of **SPORT PSYCHOLOGY**
& HUMAN DEVELOPMENT
BJSPHD

**PHYSICAL ACTIVITY, DEPRESSION AND
ELDERLY POPULATION:**
a bibliometric study

**ATIVIDADE FÍSICA, DEPRESSÃO E POPULAÇÃO
IDOSA:**
um estudo bibliométrico

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ABSTRACT

Objective: To map the global evolution of scientific production on physical activity and depressive disorders in the elderly (2015–2025) and to uncover structural biases in the literature. **Method:** A bibliometric analysis of 9,876 documents from SCOPUS was conducted. Data were processed using Rayyan (blind screening), Biblioshiny (trend detection), and VOSviewer (network analysis). A selective filtering strategy was applied to reduce semantic noise and reveal genuine thematic clusters. **Results:** Scientific output quadrupled in the last decade, with a 47.9% surge during the COVID-19 pandemic (2020–2021), redirecting focus toward clinical trials. Network analysis revealed a critical gender bias: while female health is central to mental health clusters, male mental health appears “invisible,” statistically submerged within cardiovascular disease clusters. Furthermore, a dichotomy was identified between physical interventions (robust clinical trials) and psychosocial outcomes (fragmented by heterogeneous psychometric scales). **Conclusion:** Although physical activity is consolidated as a non-pharmacological pillar in gerontology, the field suffers from methodological fragmentation. Future research must prioritize longitudinal designs and standardization of assessment tools to overcome the current “data babel.” Additionally, there is an urgent need to address the male aging perspective, moving beyond the treatment of depression merely as a somatic comorbidity.

Keywords: Aged; Bibliometrics; Depression; Exercise; Sexism.

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RESUMO

Objetivo: Mapear a evolução global da produção científica sobre atividade física e transtornos depressivos em idosos (2015–2025) e revelar vieses estruturais na literatura. **Método:** Foi conduzida uma análise bibliométrica de 9.876 documentos indexados na base SCOPUS. Os dados foram processados nos softwares Rayyan (triagem cega), Biblioshiny (detecção de tendências) e VOSviewer (análise de redes). Aplicou-se uma estratégia de filtragem seletiva para reduzir o ruído semântico e revelar clusters temáticos genuínos. **Resultados:** A produção científica quadruplicou na última década, com um salto de 47,9% durante a pandemia de COVID-19 (2020–2021), redirecionando o foco para ensaios clínicos. A análise de rede revelou um viés de gênero crítico: enquanto a saúde feminina é central nos clusters de saúde mental, a saúde mental masculina aparece “invisível”, estatisticamente submersa nos grupos de doenças cardiovasculares. Além disso, identificou-se uma dicotomia entre as intervenções físicas (ensaios clínicos robustos) e os desfechos psicossociais (fragmentados por escalas psicométricas heterogêneas). **Considerações finais:** Embora a atividade física esteja consolidada como pilar não farmacológico na gerontologia, a área sofre com a fragmentação metodológica. Pesquisas futuras devem priorizar desenhos longitudinais e a padronização de instrumentos para superar o atual cenário de dados desconexos. Adicionalmente, há uma necessidade urgente de abordar a perspectiva do envelhecimento masculino, indo além do tratamento da depressão somente como uma comorbidade somática.

Palavras-chave: Bibliometria; Depressão Exercício Físico; Idoso; Sexismo.

1 INTRODUCTION

Given the significant aging of the population and the current demographic transition, the elderly population should be considered a priority by health policies and systems. Identifying risk factors associated with depression in old age can help in understanding its etiology, favoring the development of more appropriate preventive actions and therapeutic interventions (Fernandes; Rodrigues, 2022; Salazar et al., 2021; Macedo et al., 2025). The proportion of elderly people around the world is increasing and, by the middle of the 21st century, it is estimated that 30% of the population in many countries will be composed of this age group (Maung et al., 2022).

In this context, Depressive Disorders (DDs) stand out, considered the most common mental illness in this population, with a significant impact on quality of life (Soenarti; Rakha; Harumbay, 2024). The World Health Organization reported that DDs have consistently been ranked among the top ten causes of disability worldwide since 2000, accounting for 39% of global disability in 2019 among all mental disorders (World Health Organization, 2017).

Beyond individual suffering, geriatric depression puts pressure on the healthcare system and has a strong economic impact, being associated with increased medical burden, greater use of services, prolonged hospitalizations, and greater functional impairment than

most medical disorders (Balqis-Ali et al., 2024). Depression among older adults can have catastrophic results, including high risks of suicide if not treated adequately. Thus, identifying risk factors and, especially, modifiable protective factors such as regular physical activity become vital to guide preventive research and more effective interventions (Dishman; McDowell; Herring, 2021; Stevens et al., 2021; Waisberg; Silva, 2022).

In this search for regulatory factors, evidence suggests that intrinsic capacity, physical and cognitive reserve, and especially the maintenance of physical activity, are significant determinants (World Health Organization, 2015). This is true not only for successful aging but also for managing depression. Initiatives that promote engagement in exercise groups show promise in raising population levels of physical activity and reducing loneliness (Stevens et al., 2021).

However, despite its clinical relevance, scientific production on the interface between physical activity and depression in older adults presents significant methodological challenges. A multiplicity of terms and assessment instruments can hinder the systematization of knowledge and diagnostic accuracy. Recent studies warn that the variety of nomenclatures and the low psychometric quality of some tests can compromise the robustness of the data, especially in contexts of high comorbidity. Furthermore, the overlap of symptoms with other clinical conditions can mask diagnoses, requiring greater rigor in the analysis of the literature (Zis et al., 2017; Sá; Rebustini, 2023).

Given this gap, it becomes necessary not only to quantify the production, but also to analyze the quality of the connection between these areas. Thus, the objective was to outline a global overview of publications on depressive disorders, physical activity, and the elderly population through a bibliometric study in the SCOPUS database, identifying trends, gaps, and methodological weaknesses.

2. PROCEDURES AND METHODS

A descriptive bibliometric study with a quantitative approach was conducted, without initial language restrictions, encompassing scientific production indexed in the SCOPUS database. Data collection was carried out on January 12, 2026. To ensure the comprehensive retrieval of relevant studies on the interface between mental health, physical activity, and quality of life in aging, an advanced search strategy was used, combining descriptors and Boolean operators, as per the string: TITLE-ABS-KEY (“depressive disorder” OR “major depression” OR “depression”) AND (“physical activity” OR “exercise”

OR “sedentary behavior” OR “sport”) AND (“elderly” OR “aged” OR “older adults” OR “geriatric” OR “aging”) AND (“quality of life” OR “mental health”).

The initial search returned 12,921 documents. To ensure timeliness and methodological rigor, sequential filters were applied: first, the period from 2015 to 2025 was selected to encompass the most recent decade of production, a period in which the DSM-5 (2013) criteria were already widely disseminated and operationalized in clinical and research practice; then, two document types were selected: original articles and reviews, excluding editorials and proceedings due to lower bibliometric consistency, resulting in a final sample of 9,876 records.

The metadata was initially exported to Rayyan (v5.0.96.3) for eligibility screening and manual duplicate detection. Subsequent bibliometric analysis was conducted in two complementary steps: first, the Biblioshiny interface (Bibliometrix package for R) was used for performance analysis, temporal evolution, and burst detection; and second, processing was performed in VOSviewer (v1.6.17) for the construction and visualization of complex keyword co-occurrence networks.

To optimize conceptual visualization and mitigate semantic noise, a selective filter was applied via thesaurus.txt in VOSviewer, excluding 12 non-discriminative generic terms (e.g., human, humans, article, adult, middle-aged, controlled study, major clinical study). This debugging is methodologically necessary to prevent high-frequency, but low-informational-value descriptors from masking specific thematic relationships between the variables of interest. By removing these ubiquitous terms (>90% prevalence), the network topology was allowed to reveal genuine and discriminating thematic clusters, focused on clinical and psychosocial outcomes, rather than indexing artifacts.

3. RESULTS AND DISCUSSION

A search of the SCOPUS database, conducted on January 12, 2026, retrieved a total of 9,876 records after applying the eligibility criteria (2015–2025, articles and reviews). Inspection using Rayyan software confirmed the integrity of the sample, which was used in its entirety for bibliometric mapping.

3.1 Temporal evolution and the impact of the pandemic

Analysis of the annual distribution (Table 1) reveals that scientific interest quadrupled in the last decade, jumping from 413 documents in 2015 to 1,805 in 2025. The most revealing data is the inflection point between 2020 and 2021, where production grew by 47.9% in a single year. This abrupt increase coincides with the COVID-19 pandemic, corroborating the literature that points to social isolation as a catalyst for the worsening of depressive symptoms and sedentary lifestyles in the elderly (Kim; Kil, 2021). A second peak in growth is observed in 2024 (+48.9%), suggesting that interest in the topic was not only circumstantial to the pandemic, but generated a sustainable research agenda, possibly driven by the late publication of longitudinal studies initiated during isolation.

Table 1 – Annual distribution of publications indexed in SCOPUS (2015–2025)

Yer	Number of Documents	Growt (%)
2015	413	—
2016	419	+1,4%
2017	449	+7,1%
2018	529	+17,8%
2019	679	+28,3%
2020	741	+9,1%
2021	1.096	+47,9%
2022	1.136	+3,6%
2023	1.048	— 7,7%
2024	1.561	+48,9%
2025	1.805	+15,6%
Total	9.876	—

Source: Prepared by the authors (2026)

Complementing the temporal evolution described in Table 1, the analysis of trending topics (Figure 1 – on the last page) allows us to identify which specific themes drove this accelerated growth. Using the burst detection technique via Bibliometrix software, it is observed that the terms “diabetes mellitus” and “clinical trial” show peaks of intense activity concomitant with the pandemic period (2019–2021).

Although the growth in scientific production is global, it is plausible to suggest that, given diabetes' status as a critical comorbidity in COVID-19, this population has become a priority target for research. However, a detailed analysis of Figure 1 reveals a paradigm shift

in the post-pandemic period (2022–2025). It is observed that descriptors of somatic pathologies (such as “diabetes mellitus” and “hypertension”) are giving way to intervention terms, with “therapy” and “rehabilitation” taking the lead in recent trends.

This may indicate a maturation of the field, which is shifting from associative risk studies to investigations focused on therapeutic efficacy and functional recovery. Additionally, the emergence of the term “Likert Scale” as a prominent topic corroborates the discussion about the need for psychometric refinement, suggesting a growing effort by the scientific community to standardize the measurement of subjective mental health outcomes to overcome past methodological heterogeneity.

In these studies, physical activity and depression frequently emerged as critical covariates, given the impact of confinement on glycemic control and mental health in these patients (Mishra et al., 2020). Thus, the observed increase suggests that the health crisis redirected the methodological focus to clinical trials with at-risk groups, where psychosocial variables were analyzed cross-sectionally.

The temporal analysis also validates the structure of the thematic clusters identified previously. Cluster 1 (Intervention) is corroborated by the strength of the descriptors “clinical trial” and “intervention study”, which denote a growing focus on evidence-based therapies. Cluster 2 (Epidemiology) stands out with the consistent emergence of “epidemiology” and “middle aged” after 2020, reinforcing the concern with chronic comorbidities. In contrast, initial generic terms such as “human” show a decline, indicating thematic maturation of the field.

3.2 Geographic distribution of scientific production

Geographically, the United States dominates with 2,262 documents, followed by China and the United Kingdom. Brazil occupies the 7th global position (532 documents), standing out as the absolute leader in Latin America and the second largest producer in the Southern Hemisphere, behind only Australia (Table 2).

The strength of national production, frequently associated with terms such as “Kinesiotherapy” online, suggests the impact of Brazilian postgraduate programs, which historically emphasize investigating non-pharmacological interventions.

Table 2 – Document production by country

Ranking	Country	Number of Documents	% (N=9.876)
1st	United States	2.262	22,9%
2nd	China	1.241	12,6%
3rd	United Kingdom	1.022	10,3%
4th	Australia	865	8,8%
5th	Canada	625	6,3%
6th	Spain	578	5,9%
7th	Brazil	532	5,4%
8th	Germany	521	5,3%
9th	South Korea	505	5,1%
10th	Italy	436	4,4%

Source: Prepared by the authors (2026)

3.3 Network analysis: thematic clusters and methodological polarization

The network visualization (Figure 2) reveals the formation of three large thematic clusters which, although interconnected, expose the methodological and conceptual dichotomy of the field. A detailed interpretation of these clusters allows us to understand how scientific literature articulates biological, psychological, and social variables.

Cluster 1 (Red): Clinical Interventions and Trials, located on the right side of the network, centers terms such as “clinical trial”, “exercise therapy”, “randomized controlled trial”, and “rehabilitation”. It represents the biomedical aspect of the field, focused on validating physical activity as a therapeutic strategy. The strong co-occurrence of these terms confirms the trend of consolidating exercise as an evidence-based public health intervention (World Health Organization, 2017). The predominance of controlled clinical trials in this cluster suggests that literature prioritizes experimental designs to measure physiological efficacy, often at the expense of a more holistic understanding of psychological phenomena, focusing primarily on symptom reduction (Maung et al., 2022).

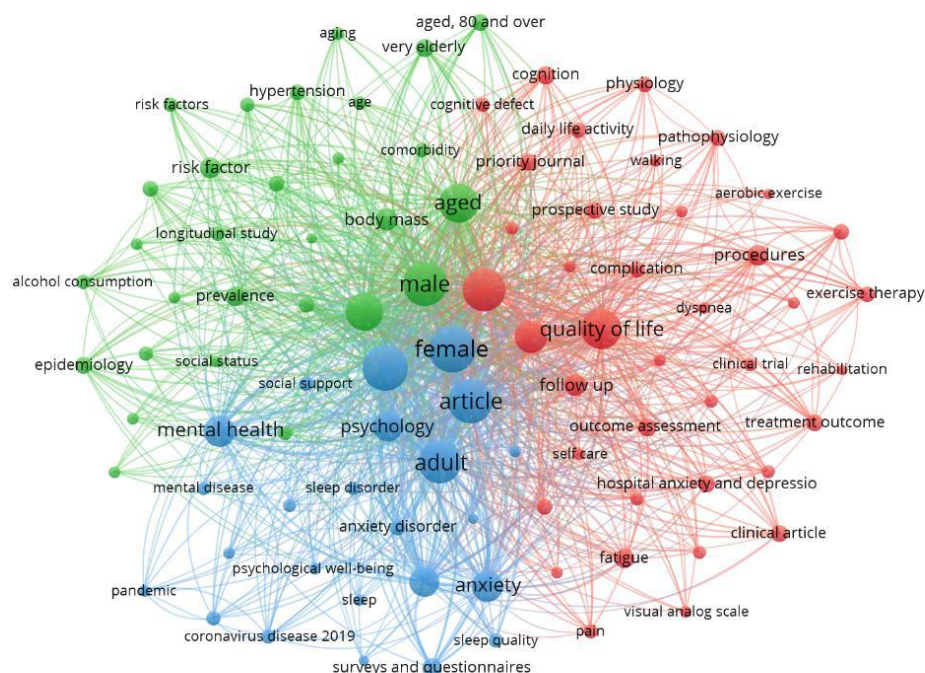
Cluster 2 (Blue): Psychosocial Outcomes and Psychometrics, located at the bottom of the network, groups mood disorders (“depression”, “anxiety”, “mental health”) and their measurement instruments (“surveys and questionnaires”, “psychology”). The analysis reveals a significant fragmentation: while Cluster 1 is cohesive around training protocols,

Cluster 2 is dispersed across a multiplicity of scales and constructs. This dispersion reflects the difficulty pointed out by Sá and Rebustini (2023a; 2023b) in synthesizing evidence: the variety of psychometric instruments with different cut-off points makes it difficult to directly compare the effects of exercise on mental health, generating methodological noise that weakens the robustness of meta-analyses (Zis et al., 2017).

Cluster 3 (Green): Epidemiology, Gender, and Quality of Life connect to risk factors (“hypertension”, “obesity”, “comorbidity”) and demographic variables (“aged”, “female”, “male”). The term “Quality of Life” stands out here, acting as a semantic bridge and exhibiting high Total Link Strength (TLS). This indicator quantifies the cumulative intensity of co-occurrences of a term with all other nodes in the network. In this case, connecting the physical diseases of Cluster 3 to the mental disorders of Cluster 2.

However, internal analysis of this block exposes the gender bias discussed earlier: the term “female” shows stronger connections with “depression” and “pain” (Schuch et al., 2019), corroborating the literature that points to higher symptom reporting in women. In contrast, the “male” node appears marginalized and closer to cardiovascular risk factors, suggesting that male depression is often made invisible or treated as secondary to physical problems (Balqis-Ali et al., 2024).

Figure 2 – Co-occurrence network of keywords about physical activity and depression in older adults



Source: Prepared by the authors based on VOSviewer software (2026)

3.4 The Centrality of Quality of Life

The descriptor "Quality of Life" (Green Cluster) showed the highest total linkage strength of the network (TLS > 90,000), acting as the link connecting physical comorbidities (hypertension, obesity) to mental health. This data aligns with the findings of Stevens et al. (2021) and Maung et al. (2022), indicating that physical activity acts as a protective factor not only through physiological pathways, but also by promoting functionality and social support. The network mathematically validates the premise that the treatment of depression in the elderly should transcend symptom remission and focus on maintaining autonomy and quality of life (Jacobs et al., 2023).

3.5 Gender bias and vulnerabilities

Demographic analysis of the network revealed a robust connection to the term "female", signaled by a significant TLS of 124,101, showing that women's health occupies a central position in discussions about anxiety and depression disorders, far surpassing the representation of the term "male". This finding reflects, on the one hand, the greater sociocultural vulnerability of women to mood disorders (Schuch et al., 2019; Balqis-Ali et al., 2024), requiring specific social support strategies (Salazar et al., 2021). On the other hand, it points to a critical gap in the literature: the mental health of elderly men, which appears hidden within the cluster of cardiovascular diseases, suggesting that male depression may be underdiagnosed or treated only as a comorbidity of physical illnesses (Cho et al., 2021; Soenarti; Rakha; Harumbay, 2024).

Although the predominance of the term "female" may reflect the feminization of old age and the greater longevity of women, the underrepresentation of men in mental health clusters also suggests a behavioral barrier, where men tend to seek less psychiatric help or manifest depressive symptoms through cardiovascular somatization.

3.6 Study limitations

The interpretation of the data must consider certain methodological limitations. First, the exclusive use of the SCOPUS database, although comprehensive, may underrepresent the regional scientific production indexed in databases such as LILACS or SciELO, potentially omitting Latin American sociocultural specificities. Second, the analysis focused

on the co-occurrence of keywords; the absence of bibliographic coupling techniques or co-citation analysis prevents the identification of the "seminal articles" that theoretically underpin the field. Finally, the quantitative nature of bibliometrics does not allow for the evaluation of the methodological quality or the risk of bias of the individual studies retrieved.

4 FINAL CONSIDERATIONS

Bibliometric analysis of the last decade confirms the consolidation of physical activity as an essential non-pharmacological strategy in gerontology, driven in an unprecedented way by the COVID-19 pandemic. However, this study reveals a production paradox: although the volume of publications has quadrupled, a methodological divide persists between clinical interventions (focused on biomarkers and functionality) and the assessment of mental health (fragmented into a multiplicity of heterogeneous psychometric scales). This lack of standardization in data collection instruments creates a scenario of disconnected data, hindering the synthesis of robust evidence and comparability between global studies.

A critical finding for public health is the invisibility of men's mental health within the healthcare network. While depression and anxiety appear strongly linked to women's health, mood disorders in older men are hidden within clusters of cardiovascular and metabolic diseases. This suggests a systemic bias in diagnosis and treatment, where male psychological distress is neglected or treated only as a comorbidity of physical illnesses, requiring an immediate reorientation in geriatric and gerontological screening policies.

To advance, the field must transcend descriptive cross-sectional studies. The future of research demands the implementation of longitudinal designs that prove causality and the adoption of a gender perspective that brings men to the center of the psychosocial debate. Only by integrating the rigor of clinical trials with the sensitivity of psychological assessment will it be possible to transform the practice of physical activity from a simple leisure recommendation into a precise tool for promoting autonomy and dignity in aging.

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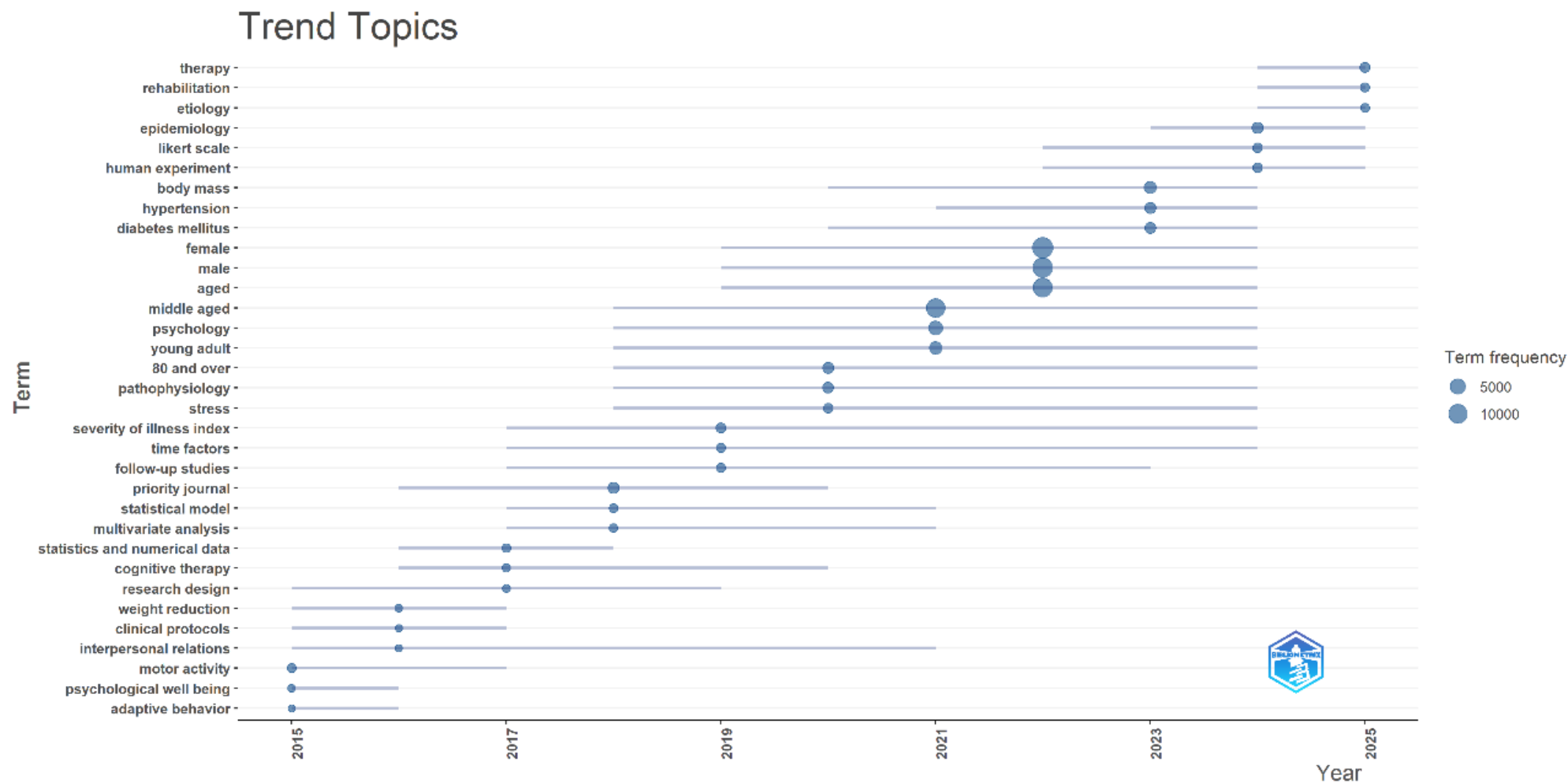
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This work was carried out with the support of the Coordination for the Improvement of Higher Education Personnel - Brazil (CAPES) - Funding Code: 88887.185092/2025-00.

Figure 1 – Trending topics (burst strength, 2015–2025). Concurrent bursts are observed during the pandemic in the keywords “diabetes mellitus” and “clinical trial”



Source: Prepared by the authors using Bibliometrix software (2026)