Article

Global Trends and Emerging Gaps in Physiotherapy: A Scientometric Analysis with VOSviewer and InCites (2018-2023)

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Abstract:

This study conducts a scientific mapping of the physiotherapy literature during the 2018-2023 period, using the Web of Science database and the VOSviewer and InCites tools. From an initial sample of 26,621 documents, a co-occurrence map of keywords was generated, which allowed the identification of relevant thematic clusters: pain management and manual therapy; cardiac rehabilitation; the interrelationship between health education and mental well-being; post-stroke rehabilitation; and respiratory physiotherapy in intensive care. The analysis highlights emerging gaps in the integration of biopsychosocial approaches, interdisciplinarity with other medical specialties, the incorporation of innovative technologies, and the attention to geriatric populations, in addition to the management of long-COVID. The study is complemented by an analysis of the main authors, incorporating impact metrics and normalized factors, as well as the identification of funding sources and key journals. These findings allow guiding future research towards a more comprehensive and technologically advanced approach in physiotherapy.

Keywords: Physiotherapy, Scientometric Analysis, Global Trends, Emerging Gaps.

Introduction

Physical therapy has undergone a remarkable transformation in recent decades, evidenced by an exponential increase in research and the dissemination of scientific articles. This growth, which has multiplied the number of publications by more than ten in the last 40 years, has expanded research approaches and fostered international collaboration[1,2]. In this context, evidence-based practice has consolidated as a fundamental pillar, systematically integrating high-quality scientific research with clinical experience and patient preferences to ensure effective, safe, and efficient therapeutic interventions, crucial for the continuous improvement of outcomes in this dynamic field [3,4].

Physiotherapy is an integral component of health promotion, prevention, acute care, and rehabilitation, playing a fundamental role within the healthcare ecosystem[5]. Contemporary physiotherapy goes beyond conventional therapeutic exercise and manual therapy, encompassing a wide spectrum of specializations including cardiovascular and pulmonary rehabilitation, sports physiotherapy, neurological rehabilitation, and geriatric physiotherapy[6]. The scope of the profession has expanded to address the multifaceted needs of patients across diverse age groups and clinical conditions. Respiratory physiotherapy plays a crucial role in the comprehensive care of patients with respiratory diseases, highlighting the diversity of the profession and emphasizing the need for further research to validate the efficacy of respiratory therapy techniques. The growing

prevalence of chronic diseases, an aging population, and advancements in medical and surgical interventions have driven the demand for physiotherapy services[5].

The role of research in physiotherapy. As physiotherapy continues to evolve, professionals must adopt continuous learning and stay up-to-date with the latest evidence-based advances to provide optimal patient care[3]. Scientometric analysis emerges as a valuable tool to quantitatively evaluate the research landscape in physiotherapy, offering insights into key trends, emerging gaps, and collaborative networks. By examining scientific publications, citations, and keywords, scientometric analysis helps identify cutting-edge research areas, influential researchers, and the overall impact of physiotherapy studies on the scientific literature[7]. Previous studies using this methodology have evidenced a sustained growth in scientific production in physiotherapy, with an increase in author collaboration and diversification of research areas. Studies have identified that the majority of the output comes from university institutions, with Spain and the United States as leading countries in publications in this field. Additionally, an expansion in topics such as neurological rehabilitation, respiratory physiotherapy, and sports performance has been observed, demonstrating the consolidation of evidence-based physiotherapy and its impact on clinical practice[8]. Disparities in access to physiotherapy services persist across diverse regions and populations, demanding specific efforts to address these inequalities and ensure equitable care for all. This methodology allows professionals to stay informed of the latest advancements, make informed decisions, and contribute to the advancement of evidence-based practice in physiotherapy. Scientometric analysis also helps identify gaps in the research literature, highlighting areas where more research is needed[9]. The analysis of global trends and international collaborations within physiotherapy is essential to understand its current state and future trajectory.

This scientometric study focuses on the scientific literature on physiotherapy and kinesiology, examining academic output both in the Latin American context and globally over the past six years. Through an exhaustive bibliometric analysis, the study aims to identify predominant trends, influential collaborations, and prominent authors who have made significant contributions to the development and transformation of these fields. This study employs scientometric analysis techniques, including co-occurrence analysis of keywords and collaboration mapping using the VOSviewer and Incites software. The objective of this study is to provide valuable insights into the research landscape of physiotherapy and kinesiology, highlighting areas of focus, emerging gaps, and potential avenues for future investigations.

METHODS

Bibliometric data sources and search strategy

From Clarivate, the following indexes were selected as the main data sources: the Science Citation Index Expanded from the Web of Science Core Collection, the Social Science Citation Index, and the Emerging Sources Citation Expanded. The search was conducted using the following strategy: title, abstract, and author keywords with the following strategy: "Physical therapy" OR "Physiotherapy" OR "Physical rehabilitation" OR "Manual therapy" OR "Exercise therapy" OR "Sport rehabilitation" OR "orthopedic rehabilitation" OR "neurological rehabilitation" OR "Cardiac rehabilitation" OR "postoperative rehabilitation"

These terms were selected by a physiotherapist with 30 years of experience and a documentalist based on their relevance in the scientific literature in the field. The analysis period covered 2018 to 2023, in line with the Scoping Review methodology, to identify emerging trends, strategic collaborations, and changes in high-impact areas within a discipline.

Inclusion and exclusion criteria

All documents indexed in the SCI-Expanded, SSCI, and ESCI indexes of the Web of Science Core Collection between 2018 and 2023 were included, which met the following criteria:

Document type: original scientific research articles. Inclusion of at least one of the terms established in the search strategy in the title, abstract, or author keywords fields. Accessibility through English language search, considering that WoS indexes standardized metadata in English for all records.
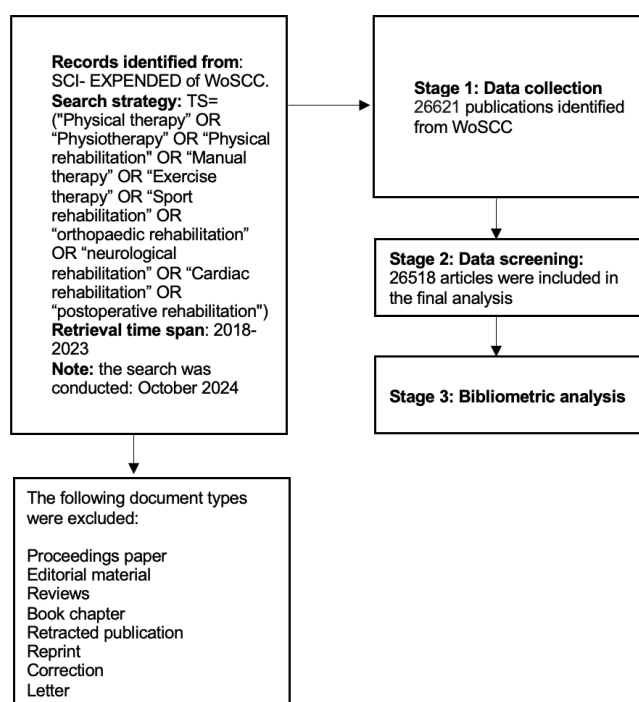
The following document types were excluded: conference proceedings, editorial material, reviews, book chapters, retracted publications, corrections or errata, letters to the editor, protocols.

No filters were applied by country, institutional affiliation, full-text language, or journal impact factor. The choice of an inclusive approach responded to the study's objective of capturing a broad and unbiased view of global scientific production in physiotherapy during the analyzed period.

Data export and extraction

The results were exported in RIS format compatible with various bibliographic managers and editable by different word processors; the complete records were previously edited using Notepad++ for review and cleaning, and then a matrix file with the data was generated, which was imported into the VOSviewer 1.6.20 software to generate a co-occurrence study of keywords. In parallel, the set of records resulting from the search in WoS was exported to Incites to conduct a study on the general information, including countries, institutions, authors, source journals, and funding sources. Any disagreements were resolved through discussion or, if necessary, with the intervention of a third author. The selection process is detailed in Figure 1.

Figure 1. Flow diagram of the publication identification, selection, and analysis process, based on an adaptation of the PRISMA guidelines.

Records identified from: SCI- EXPENDED of WoSCC.
Search strategy: TS= ("Physical therapy" OR "Physiotherapy" OR "Physical rehabilitation" OR "Manual therapy" OR "Exercise therapy" OR "Sport rehabilitation" OR "orthopaedic rehabilitation" OR "neurological rehabilitation" OR "Cardiac rehabilitation" OR "postoperative rehabilitation")
Retrieval time span: 2018-2023
Note: the search was conducted: October 2024

Stage 1: Data collection
26621 publications identified from WoSCC

Stage 2: Data screening:
26518 articles were included in the final analysis

Stage 3: Bibliometric analysis

The following document types were excluded:

Proceedings paper
Editorial material
Reviews
Book chapter
Retracted publication
Reprint
Correction
Letter

Results

A total of 26,621 documents were obtained, of which 71 were identified as retracted, 6 were duplicates, and 25 were book sections. The final sample included 26,518 documents. The analysis was conducted in October 2024.

During the six-year period analyzed, the scientific production in physiotherapy indexed in WoS shows a clear growth trend. Between 2018 and 2019, the number of published documents remained relatively stable, with a slight increase.. Following this increase, productivity remained stable, with a slight growth in 2021 and 2022, reaching its peak in the latter year, followed by a slight decrease in
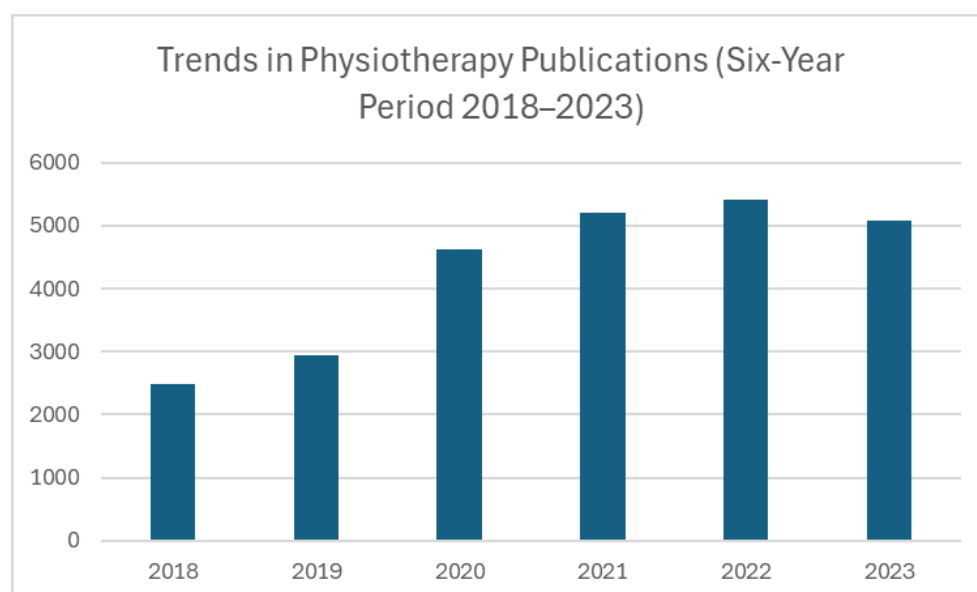
Trends in Physiotherapy Publications (Six-Year Period 2018–2023)

Figure 2. Trends in Physiotherapy Publications During the Six-Year Period 2018–2023..

Analysis by country and institution

The analysis of scientific production in physiotherapy reveals a concentration in countries of the Global North, with marginal participation from Hispanic American nations. Between 2018 and 2023, of the 1,341 indexed journals, only 0.45% corresponded to Spanish-speaking countries, a figure attributed exclusively to Spain. This limited representation highlights the need to strengthen the visibility and recognition of Latin American and other peripheral scientific production.

The most productive countries were, first, the United States, followed by Australia, England, and China. The global distribution is detailed in Figure 3.

The institutions with the highest scientific production were, first, the University of Toronto, followed by the University of Sydney, the University of London, and Harvard University. At the Hispanic American level, the University of Valencia stood out, while in Latin America, the University of São Paulo led the production with 236 documents. The distribution of the most productive institutions is detailed in Figure 4.

Geographic

Web of Science Documents

| 0 | 2K | 4K | 6K |

Indicators: Web of Science Documents.**Time Period**:2018-2023. **Schema**:Web of Science. **Dataset**: FisioterapiaSexenio18-23
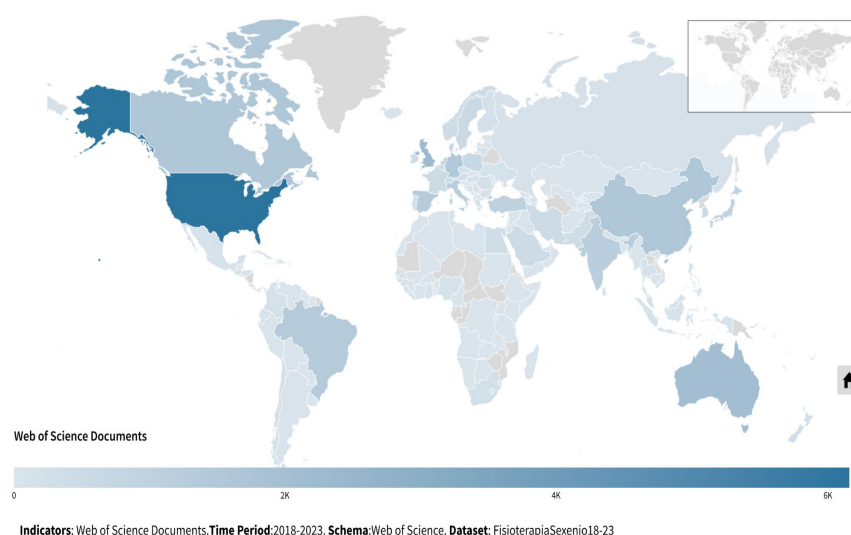
Figure 3. Geographical Distribution of Scientific Production in Physiotherapy (2018–2023), Based on Documents Indexed in Web of Science. Chart generated using InCites Benchmarking & Analytics (Clarivate Analytics).
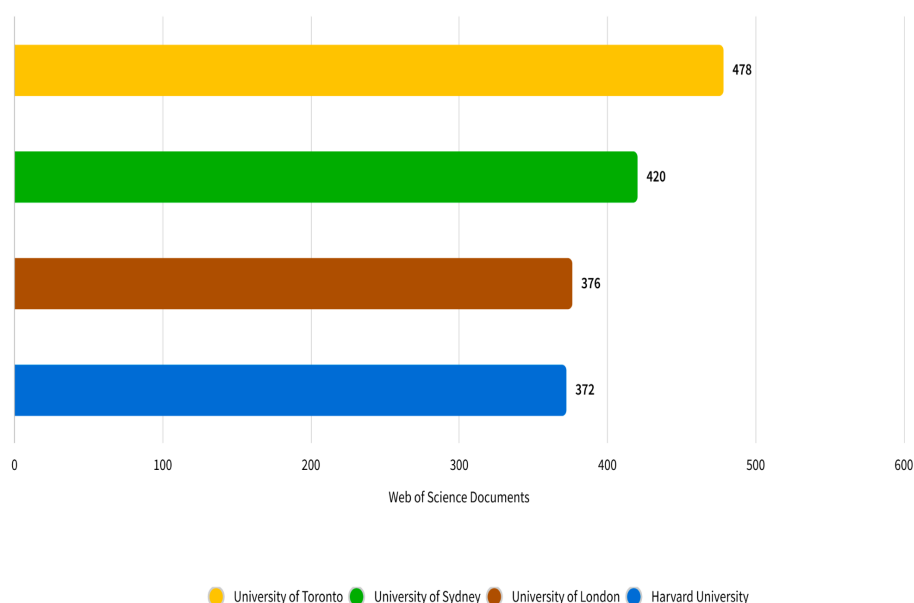
Bar Graph

Figure 4. Institutions with the Highest Scientific Productivity in Physiotherapy (2018–2023), Based on the Number of Documents Indexed in Web of Science. Chart generated using InCites Benchmarking & Analytics (Clarivate Analytics).

Funding Sources

The analysis of funding sources in physiotherapy showed a predominance of government funds. Among these, the United States National Institutes of Health emerges as the main funding entity, with 255 documents.(figure 5).
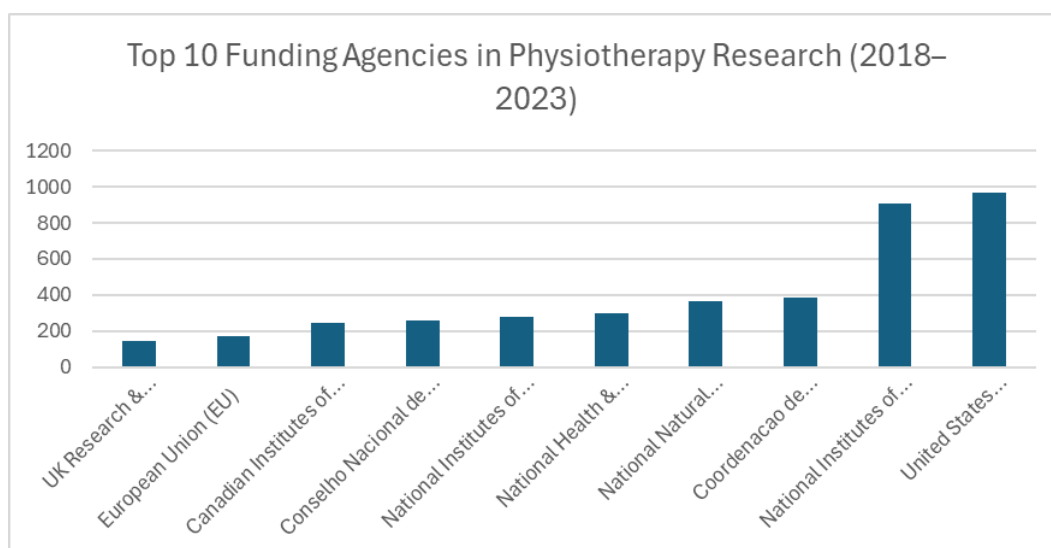

Figure 5. Top 10 Funding Agencies in Physiotherapy Research (2018–2023).

Analysis by authors

The analysis of the 10 most prolific authors in physiotherapy showed that Phansopkar, Pratik stands out with 106 documents, followed by Grace, Sherry L. with 81 publications, Oh, Paul, and Fritz, Julie.

Regarding the distribution of research areas, the interests of the most productive authors cover a wide range of topics, such as cardiac rehabilitation, respiratory physiotherapy, aging, and disability.
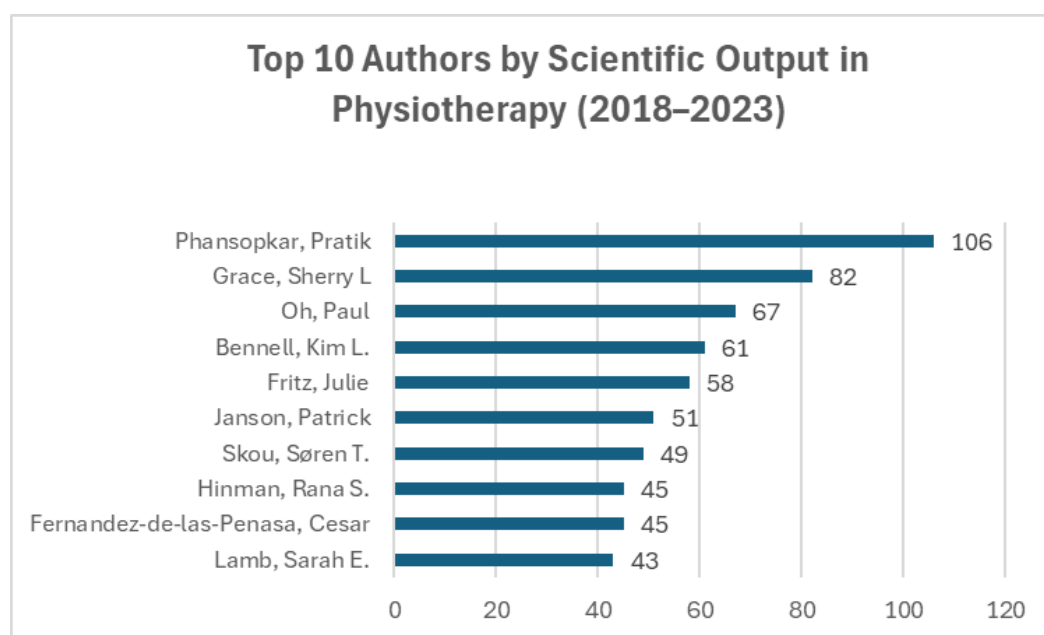

Figure 6. Most Productive Authors in Physiotherapy Research (2018–2023). Source: InCites Benchmarking & Analytics (Clarivate Analytics).

To further analyze the authors obtained from InCites, we studied the scientific collaboration through a co-authorship map generated with VOSviewer. This approach allows identifying not only the authors with the highest production, but also the connection patterns and research communities that structure the field. In Figure 7, we observe the main collaboration network among the most productive authors, grouped into 35 clusters, which evidences the existence of cohesive thematic communities and consolidated international collaborations.
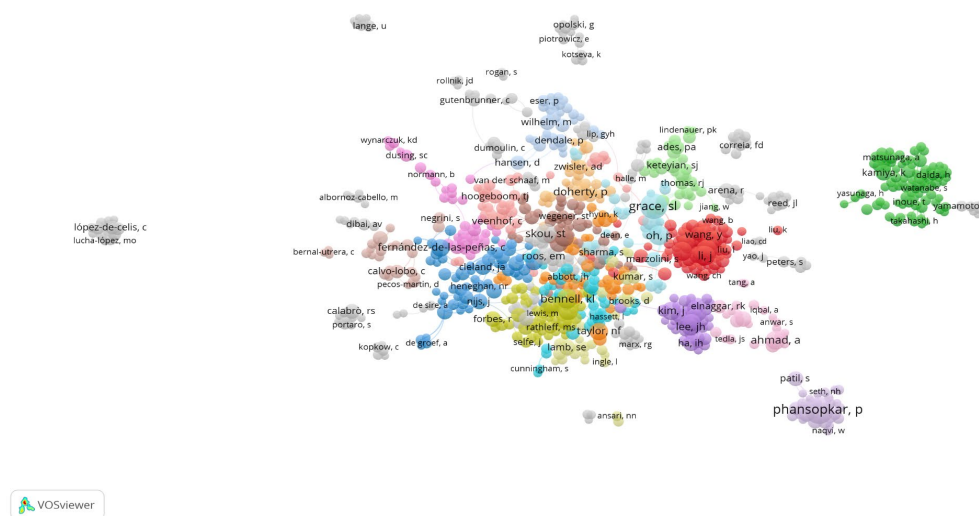
Figure 7. Co-authorship Map in Physiotherapy (2018–2023), Generated with VOSviewer Based on 1,000 Authors with at Least 10 Publications on Physiotherapy in WoS (2018–2023). A Total of 35 Collaboration Clusters Were Identified Among 911 Interconnected Authors. An Additional 89 Authors Without Significant Connections Were Excluded to Improve Visualization. Colors Represent Thematic Communities According to Collaboration Density.

This analysis shows the presence of scientific collaboration hubs concentrated around certain authors and institutions, as well as the existence of specialized thematic communities. The visualization of these clusters reinforces the interpretation of physiotherapy as a dynamic and multidisciplinary field, with collaborative networks that influence both the production and circulation of knowledge.

Journals

The analysis of the top 10 journals in physiotherapy and related fields, based on data extracted from Web of Science, highlights the diversity and interdisciplinary scope of the field. For example, the journal Physiotherapy Theory and Practice tops the list with 643 documents, evidencing a high level of scientific production, complemented by a considerable number of open access articles. Moreover, the presence of journals such as Cureus Journal of Medical Science and BMJ Open, which integrate topics of general and internal medicine, reinforces the multidisciplinary dimension of the area. The participation of renowned publishers such as Taylor & Francis, Springer Nature, Oxford University Press, and Elsevier not only enhances the quality and impact of the literature but also highlights the strategic role of open access policies in the dissemination of knowledge. These findings complement the present study by demonstrating that scientific mapping not only identifies trends and gaps in physiotherapy but also is embedded in a global context where interdisciplinarity and the visibility of research are key to the advancement of physiotherapy and related sciences.
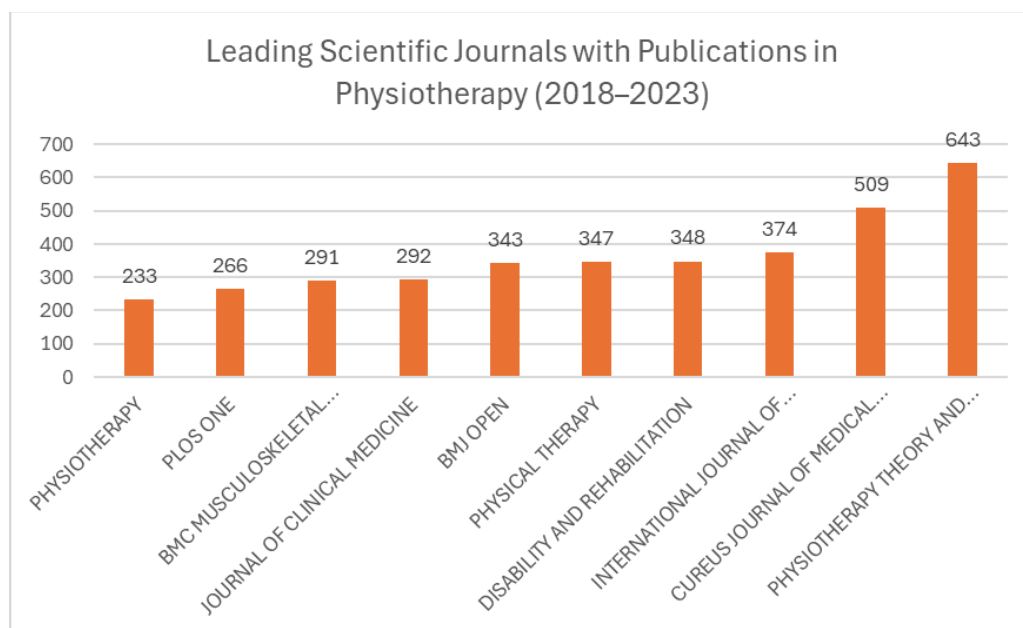
Figure 8: Most Utilized Publication Sources Source Incites

Analysis of keyword co-occurrence

Using VOSviewer, a keyword co-occurrence map was generated based on 26,518 physiotherapy articles indexed in Web of Science (2018–2023). For this final version, a customized thesaurus was applied to unify synonyms, acronyms, and spelling variants, allowing for the consolidation of key concepts such as physical therapy, physiotherapy, and PT under the unified term physical-therapy, as well as quality of life and QOL as quality-of-life, among others. A minimum occurrence threshold of 10 was established, refining the thematic map and reducing terminological dispersion. Fractional counting was applied to avoid overrepresentation of terms that appear in multiple-keyword entries, thus balancing the relative contribution of each term to the co-occurrence analysis.

Five main thematic clusters were identified. The red cluster is dominated by terms such as pain, reliability, manual-therapy, and range-of-motion, encompassing research on musculoskeletal pain management, instrument validation, and functional testing. The blue cluster groups terms like cardiac-rehab, guidelines, mortality, and secondary prevention, consolidating physiotherapy's role in chronic cardiovascular diseases. The green cluster includes topics related to psychological-health, education, and occupational-therapy, highlighting the growing integration of biopsychosocial and educational approaches in physiotherapy care. The yellow cluster organizes studies focused on stroke, balance, muscle-strength, recovery, and older-adults, reflecting the key role of neurological rehabilitation in older populations. Finally, the purple cluster encompasses topics such as intensive-care, respiratory-therapy, and critical-ill patients, linking respiratory physiotherapy to complex hospital settings.Among the terms with the highest frequency and linkage strength in the co-occurrence network are physical-therapy (4,537 occurrences), rehab (4,426), exercise (4,165), pain (1,976), and quality-of-life (1,574), confirming their centrality in the cognitive structure of physiotherapy research during the analyzed period.

In addition to the analysis of the clusters, certain thematic gaps were identified in the literature. Limited interconnection between mental health and pain management was observed, suggesting opportunities for studies that integrate biopsychosocial approaches in physiotherapy. There was also a lack of integration between respiratory physiotherapy and other rehabilitation fields, such as neurology and cardiology.

Finally, the relationship between physiotherapy and the social determinants of health is not reflected in the map, suggesting the need for further exploration of access to physiotherapy services and their impact on vulnerable populations.
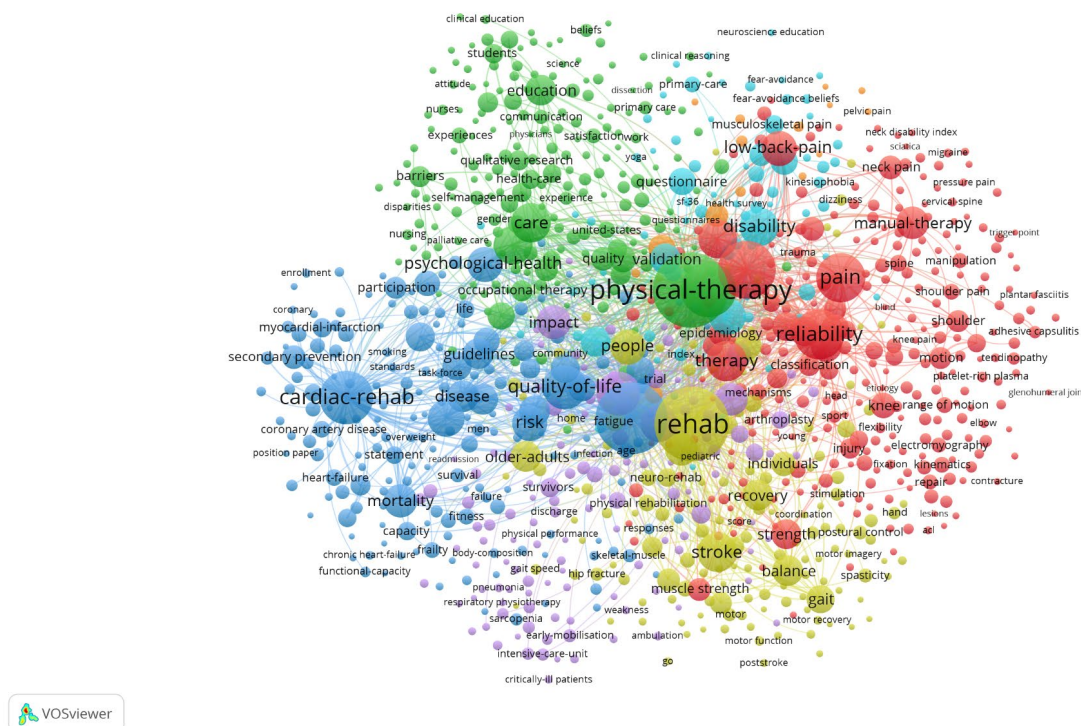

Figure 9. Keyword Co-occurrence Map in Physiotherapy Articles (2018–2023), Generated with VOSviewer.

Discusión

This scientometric and bibliometric analysis, based on 26,518 physiotherapy articles published between 2018 and 2023 and indexed in Web of Science, revealed global trends and emerging gaps in research within the discipline. The use of tools such as VOSviewer and InCites enabled the identification of thematic clusters and areas of growing interest. The results highlight consolidated areas in bibliometric terms such as pain management, cardiac and neurological rehabilitation, and physiotherapy in intensive care settings. These findings underscore the clinical relevance of these domains and the continued generation of supportive scientific knowledge. The relationship between geriatric physiotherapy and quality of life in older adults also warrants deeper exploration, given the aging global population and the imperative to promote well-being in this demographic.Our findings show a progressive and sustained consolidation of physiotherapy-related scientific output, consistent with previous reports by Benton et al. [11] and Moseley et al. [12]. Specifically, our data reveal an upward trend in the volume of WoS-indexed publications between 2018 and 2023, totaling 26,518 documents after filtering, predominantly concentrated in Global North countries such as the United States, Australia, the United Kingdom, and China.

This analysis also exposes a persistent gap in Hispanic-American representation, limited to just 0.45% of indexed journals, all of which are based in Spain. This highlights the limited regional integration of Latin American physiotherapy into global literature.

Our findings add to this perspective by identifying not only an increase in publication volume but also greater thematic diversity and the emergence of new research areas, such as long-COVID, although still underrepresented. While both Moseley and Benton emphasized the need to improve research quality and clinical applicability, our results underscore the urgency of fostering a more equitable distribution of scientific knowledge. This scenario suggests that although physiotherapy has made significant progress toward greater scientific rigor and internationalization, important challenges remain in terms of regional inclusion, thematic innovation, and methodological strengthening.

In this context, our findings show that in Latin America, scientific production presents a marked concentration in Brazil, whose academic and research infrastructure has allowed it to lead the region with high international visibility. According to the 2024 State of Science report, Brazil alone represents 62% of the region's R&D investment. However, countries such as Chile, Colombia, Peru, and Argentina show sustained progress in strengthening their research capabilities, despite structural limitations in access to funding, collaborative networks, and editorial positioning. This panorama, consistent with previous studies, underscores the need to promote regional cooperation strategies that foster equity in the production and dissemination of knowledge, through the strengthening of their own journals, thematic networks, and international alliances that enhance the impact of Latin American physiotherapy[1,3].

It is important to recognize the limitations of the study. The analysis exclusively used the Web of Science database, which could restrict the coverage of relevant literature published on other platforms. Future studies could expand the scope of the analysis by incorporating other databases and applying terminological normalization tools, as well as including complementary document types - such as systematic reviews and editorials - which also contribute to the body of scientific knowledge in physiotherapy. Nevertheless, despite these limitations, the findings presented provide a solid foundation to identify priority research areas and guide future lines of development in the discipline.

This geographical concentration had already been noted by Benton et al[11]., who reported a marked leadership of these regions in international scientific collaboration networks. However, our current analysis also exposes a persistent gap in Hispanic American representation, limited to 0.45% of the total indexed journals, exclusive to Spain, which highlights a lack of regional integration in the global literature. Our findings complement this perspective by identifying not only an increase in the volume of publications, but also a greater thematic diversity and the presence of new emerging lines such as long-COVID, although still underrepresented. While both Moseley and Benton pointed out the need to improve the quality of studies and their clinical applicability, our results add the urgency to promote a more equitable distribution of scientific knowledge. This panorama suggests that, although physiotherapy has advanced towards greater scientificity and internationalization, relevant challenges remain in terms of regional inclusion, thematic innovation, and methodological strengthening.

In this context, our findings indicate that scientific production in Latin America is highly concentrated in Brazil, whose academic and research infrastructure has enabled it to lead the region with strong international visibility. According to the State of Science 2024 report, Brazil alone accounts for 62% of the region's investment in R&D [15]. However, countries such as Chile, Colombia, Peru, and Argentina have shown steady progress in strengthening their research capacities, despite structural limitations related to funding, collaborative networks, and editorial positioning. This landscape, consistent with previous studies [11,12], underscores the need to promote regional cooperation strategies aimed at fostering equity in the production and dissemination of knowledge — through the development of national journals, thematic research networks, and international partnerships that enhance the global impact of Latin American physiotherapy [1,3].

It is important to acknowledge the limitations of the present study. The analysis was based exclusively on the Web of Science database, which may restrict the coverage of relevant literature published in other platforms. Future studies could expand the scope of analysis by incorporating additional complementary databases [11], as well as other document types—such as systematic reviews, editorials, or consensus statements—that also contribute to the scientific knowledge base in physiotherapy. Nevertheless, despite these limitations, the findings presented here provide a methodologically robust foundation for identifying priority research areas and guiding new lines of disciplinary development.

The institutional and geographic concentration observed in the results aligns with the concept of epistemic injustice proposed by Fricker, particularly in its hermeneutical dimension, which highlights how certain groups lack the structural conditions necessary for their knowledge to be recognized, understood, and valued within dominant circuits of scientific dissemination [16]. The limited presence of Spanish-language journals indexed in databases such as Web of Science accentuates this gap between the Global North and the Global South, restricting not only the visibility of Latin American scientific production but also its recognition within the international academic community.

Although a comparative regional analysis could have enriched this study, it was not conducted due to structural limitations inherent in the indexing system. Specifically, in the Latin American context, authors' institutional affiliations often appear fragmented, incomplete, or linked to foreign institutions, as a consequence of the region's low visibility in databases such as Web of Science. This situation may induce interpretative biases regarding the actual origin of scientific production. The level of disaggregation required to correct these distortions exceeds the scope of this study, which is focused on the thematic and structural analysis of global scientific production, rather than a comparative evaluation across geographical regions.In addition, only original research articles were included, while reviews, editorials, protocols, and other document types were excluded. Although this decision is methodologically justified, it limits the representation of other relevant forms of academic production.Regarding InCites, the analysis focused on productivity by country, institution, source, and funding, without incorporating normalized impact indicators, percentiles, or international collaboration. Therefore, the metrics presented should be interpreted as descriptive approximations rather than absolute measures of quality or influence [17].

The observed concentration can be interpreted in light of global discussions on responsible research assessment. Initiatives such as the San Francisco Declaration on Research Assessment (DORA), the Leiden Manifesto, and the United Kingdom's Research Excellence Framework (REF) have warned against the risks of relying exclusively on quantitative metrics—such as publication counts, the h-index, or journal impact factor—to judge the quality, relevance, or utility of scientific knowledge [18–20]. These frameworks advocate for assessment practices that consider context, epistemological diversity, and social impact. From this perspective, the present study reveals how exclusive reliance on databases such as Web of Science may reinforce patterns of exclusion and visibility, particularly affecting regions like Latin America. Integrating these principles is essential to move toward more inclusive and reflective practices of scientific evaluation that go beyond the limitations of traditional bibliometric indicators.

Conclusions

This scientometric analysis of scientific production in physiotherapy between 2018 and 2023 reveals a sustained growth in the volume of publications globally, with a strong predominance of countries in the Global North such as the United States, England, Australia, and China. In Latin America, there is a clear concentration of productivity in Brazil, which acts as a regional research hub, while the rest of the Spanish-speaking countries show an incipient participation, although with signs of progressive development. Despite this inequality, the 25% increase in international collaboration -

especially with institutions in Asia and Latin America - represents a significant step towards greater circulation of knowledge and more equitable scientific integration.

The identification of consolidated thematic clusters, along with emerging gaps such as the low representation of disruptive technologies, mental health, primary prevention, or vulnerable populations, allows not only to map the current priorities in physiotherapy, but also to point out the strategic opportunities for the future development of the field. Furthermore, the marked dependence on public funding for research highlights the need to diversify funding sources, promoting partnerships between the public, private, and academic sectors. Our results highlight the need to strengthen physiotherapy research in Latin America, given its limited representation in the international literature. While Brazil concentrates the largest regional production, other countries show incipient development that requires greater investment, cooperation, and editorial consolidation. Promoting an equitable regional scientific agenda is essential to increase the relevance and global visibility of the knowledge generated in the region.

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