

Mapping the Intellectual Architecture of Rehabilitation Science Through Bibliometric and Informetric Lenses

¹ Marcel Adebayo Okonkwo

¹ University of Lagos, Nigeria

Received: 10th Nov 2025 | Received Revised Version: 15th Nov 2025 | Accepted: 23th Nov 2025 | Published: 10th Dec 2025

Volume 01 Issue 02 2025 | Crossref DOI: [10.64917/ajmscr/V01I02-003](https://doi.org/10.64917/ajmscr/V01I02-003)

Abstract

Rehabilitation science, encompassing occupational therapy, physical and rehabilitation medicine, geriatric care, and allied health disciplines, has evolved into a deeply interdisciplinary and evidence driven domain. Alongside this evolution, the systems used to evaluate, disseminate, and validate scientific knowledge have also transformed, moving from print based citation indexes to complex digital bibliometric and webometric ecosystems. This article develops a comprehensive, theory rich, and empirically grounded analysis of how bibliometric, informetric, and webometric frameworks shape the production, visibility, and perceived value of rehabilitation research. Drawing strictly from the provided corpus of authoritative references, this study integrates insights from occupational therapy scholarship, medical trial reporting, and information science to demonstrate how research impact is constructed rather than merely measured. Classical foundations of informetrics and bibliometrics, as articulated by Blackert and Siegel, Garfield, and Bellis, are connected to modern citation based evaluations and journal metrics discussed by Brown, Gutman, Corr and colleagues, and Belter. These measurement systems are then contextualized within the real world epistemic demands of rehabilitation research, as illustrated by seminal clinical and methodological works such as Andrews et al. on misdiagnosis of vegetative state, Close et al. on fall prevention, and Higginson et al. on integrated palliative and respiratory care. By weaving together these literatures, the article demonstrates that bibliometric indicators do not simply reflect quality or utility but actively shape research agendas, editorial priorities, professional hierarchies, and even clinical knowledge pathways. The methodological section explains how citation analysis, core journal identification, keyword indexing, and webometric mapping are applied to rehabilitation science, drawing particularly on the analytical frameworks developed by Ho and colleagues, Franchignoni and Munoz Lasa, and Almind and Ingwersen. The results section presents a detailed descriptive synthesis showing how occupational therapy and rehabilitation journals are positioned within broader scientific ecosystems, how impact factors and alternative metrics influence professional legitimacy, and how clinical trials achieve symbolic authority through publication channels. The discussion critically examines the limitations, biases, and ethical implications of relying on quantitative indicators in fields where patient centered outcomes, qualitative insights, and long term care trajectories are central. The article concludes by arguing for a reflexive, pluralistic approach to research evaluation in rehabilitation science, one that integrates bibliometric rigor with epistemological humility and clinical relevance.

Keywords: Bibliometrics, rehabilitation science, occupational therapy, journal metrics, informetrics, research evaluation.

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Cite This Article: Marcel Adebayo Okonkwo. 2025. Mapping the Intellectual Architecture of Rehabilitation Science Through Bibliometric and Informetric Lenses. American Journal of Medical Sciences and Clinical Research 1, 02, 14-19. <https://doi.org/10.64917/ajmscr/V01I02-003>

1. Introduction

Rehabilitation science occupies a distinctive position within the landscape of modern knowledge production. Unlike

many laboratory based sciences, rehabilitation research is inherently relational, patient centered, and context sensitive. It spans occupational therapy, physical and rehabilitation medicine, geriatric care, palliative care, and social

dimensions of disability and recovery. At the same time, it is embedded within the same academic publishing system that governs physics, chemistry, and molecular biology, a system increasingly driven by bibliometric indicators, citation counts, impact factors, and digital visibility metrics. Understanding how rehabilitation knowledge is produced, disseminated, evaluated, and legitimized therefore requires not only clinical insight but also a deep engagement with the theory and practice of bibliometrics and informetrics.

The classical foundations of informetrics were laid long before the emergence of digital databases. Blackert and Siegel articulated early concerns about whether there was space for informetrics within scientific and technical information systems, highlighting the tension between qualitative knowledge and quantitative measurement in scholarly communication (Blackert and Siegel, 1979). Their work framed informetrics not merely as a technical tool but as a theoretical lens through which scientific communication could be analyzed and critiqued. This perspective was later expanded by Garfield, whose development of citation indexing and Keywords Plus fundamentally reshaped how scholars search for, connect, and evaluate scientific literature (Garfield, 1990). Garfield demonstrated that citations are not neutral references but indicators of intellectual influence, cognitive linkage, and scholarly recognition.

Bellis further systematized these developments by tracing the evolution from the Science Citation Index to contemporary cybermetrics, showing how bibliometrics moved from paper based indices to complex digital analytics (Bellis, 2009). This historical trajectory is essential for understanding the current situation of rehabilitation science, which now exists within a globalized, digitally mediated research environment. The rise of webometrics and cybermetrics, as described by Almind and Ingwersen and by Bjorneborn and Ingwersen, has further extended the scope of impact measurement beyond traditional journals to websites, repositories, and online interactions (Almind and Ingwersen, 1997; Bjorneborn and Ingwersen, 2004). In this expanded ecosystem, the visibility of rehabilitation research is shaped not only by where it is published but also by how it circulates through digital networks.

Within occupational therapy and rehabilitation medicine, concerns about journal quality and impact have been particularly acute. Brown emphasized that impact factors, while widely used, are not the only or necessarily the best indicators of journal quality, especially in applied health disciplines (Brown, 2011). In a subsequent analysis, Brown

examined how the Canadian Journal of Occupational Therapy measures up when different quality metrics are considered, illustrating the complexity of evaluating journals that serve both scholarly and professional communities (Brown, 2012). Gutman also reflected on how online publication has altered the meaning and influence of the impact factor in occupational therapy, noting that digital dissemination changes readership patterns and citation dynamics (Gutman, 2010). Corr and colleagues highlighted how internationalization and impact factors intersect, raising questions about whose voices are amplified in global occupational therapy scholarship (Corr et al., 2005).

These debates are not merely academic. They have profound implications for how rehabilitation research is funded, disseminated, and translated into practice. Clinical studies such as Andrews et al. on misdiagnosis of the vegetative state and Close et al. on fall prevention in the elderly demonstrate that rehabilitation research can have life altering consequences for patients and families (Andrews et al., 1996; Close et al., 1999). Higginson et al. further showed how integrated palliative and respiratory care can transform the experience of patients with advanced disease (Higginson et al., 2014). Yet the recognition and uptake of such studies are mediated by the journals in which they appear, the citations they receive, and the metrics that signal their importance to policymakers, clinicians, and researchers.

Despite the centrality of bibliometric indicators, there remains a significant literature gap in how these tools are theorized and applied specifically within rehabilitation science. Much of the bibliometric literature has focused on fields such as chemistry, environmental science, and engineering, as illustrated by the extensive analyses conducted by Ho and colleagues and by Fu, Wang, and Ho (Ho, 2007; Ho, 2012; Ho, 2013; Fu et al., 2012). Franchignoni and Munoz Lasa provided one of the few focused bibliometric studies in physical and rehabilitation medicine, identifying core journals and indicators of influence (Franchignoni and Munoz Lasa, 2011). However, even this work primarily described citation patterns rather than interrogating their epistemological and professional consequences.

This article addresses that gap by integrating bibliometric theory, informetric methodology, and rehabilitation scholarship into a single, coherent analytical framework. It asks not only how rehabilitation research is measured but also what those measurements mean for the field's identity, priorities, and future trajectory. By grounding the analysis strictly in the provided references, the study ensures

theoretical rigor and empirical traceability, while the extensive elaboration allows for a nuanced exploration of competing perspectives and implications.

2. Methodology

The methodological approach adopted in this study is grounded in informetric and bibliometric theory as articulated by foundational and contemporary scholars. Bibliometrics refers to the quantitative analysis of written communication in science, particularly through the study of publications and citations, while informetrics encompasses a broader set of quantitative measures related to information production, dissemination, and use (Bellis, 2009; Blackert and Siegel, 1979). Webometrics and cybermetrics extend these concepts into the digital domain, analyzing hyperlinks, online documents, and web based indicators (Almind and Ingwersen, 1997; Bjorneborn and Ingwersen, 2004).

The first methodological pillar of this study is citation analysis. Citation analysis is based on the assumption that when one scholarly work cites another, it acknowledges intellectual influence or relevance. Garfield's development of the Science Citation Index operationalized this principle by creating structured databases that track who cites whom, thereby enabling the mapping of scholarly networks and the identification of highly influential works (Garfield, 1990). Ho and colleagues refined this approach by systematically analyzing top cited articles within specific fields, such as chemical engineering and environmental science, to reveal patterns of productivity, collaboration, and thematic focus (Ho, 2007; Ho, 2012; Ho, 2013). These methods are adapted here to the domain of rehabilitation science by examining how occupational therapy and rehabilitation journals are positioned within broader citation networks, as suggested by Franchignoni and Munoz Lasa (2011).

The second methodological pillar is journal level metric analysis. Journals function as gatekeepers and amplifiers of scientific knowledge, and their perceived quality shapes where researchers choose to publish and how their work is evaluated. Impact factors, derived from citation counts within a specific time window, are the most widely used journal metric, but they have been extensively critiqued. Brown argued that impact factors fail to capture dimensions such as clinical relevance, methodological rigor, and professional influence, which are especially important in occupational therapy (Brown, 2011). Carpenter, Cone, and Sarli showed how publication metrics can highlight academic productivity and research impact, but they also acknowledged the need for careful interpretation (Carpenter

et al., 2014). This study therefore treats journal metrics not as objective truths but as socially constructed indicators that must be contextualized within disciplinary cultures.

The third methodological pillar is keyword and content analysis. Garfield's Keywords Plus system demonstrated that algorithmically generated keywords based on cited references can reveal thematic structures within the literature (Garfield, 1990). By analyzing how rehabilitation topics such as falls, vegetative state, and palliative care are indexed and connected through keywords and citations, one can infer how the field conceptualizes its own priorities and boundaries.

The fourth pillar is webometric extension. Almind and Ingwersen emphasized that the World Wide Web introduces new forms of scholarly communication that are not captured by traditional citation indexes, including institutional websites, online repositories, and digital archives (Almind and Ingwersen, 1997). In rehabilitation science, professional bodies such as the College of Occupational Therapists disseminate research priorities and evidence based guidelines through online documents, which influence practice and policy even if they are not heavily cited in journals (College of Occupational Therapists, 2007). Webometric analysis thus broadens the methodological lens to include these non journal sources of influence.

Rather than producing numerical tables or graphs, this study employs a descriptive analytic strategy. Following Belter's argument that bibliometric indicators have both opportunities and limits, the methodology emphasizes interpretive depth over numerical precision (Belter, 2015). Patterns of citation, journal positioning, and thematic prominence are discussed in narrative form, drawing on the insights of the provided references to ensure conceptual coherence.

3. Results

The application of bibliometric and informetric frameworks to rehabilitation science reveals a complex intellectual architecture in which clinical knowledge, professional identity, and scholarly recognition are tightly interwoven. One of the most striking findings is the centrality of certain core journals and articles in structuring the field. Franchignoni and Munoz Lasa demonstrated that physical and rehabilitation medicine is anchored by a relatively small set of highly influential journals that serve as hubs of citation and knowledge exchange (Franchignoni and Munoz Lasa, 2011). These core journals not only disseminate

research but also define what counts as legitimate and important within the field.

In occupational therapy, similar dynamics are evident. Brown's analyses of journal quality metrics show that journals such as the American Journal of Occupational Therapy and the Canadian Journal of Occupational Therapy occupy pivotal positions in citation networks, shaping both academic and professional discourse (Brown, 2011; Brown, 2012). Gutman observed that the shift to online publication has increased the accessibility and citation potential of these journals, thereby amplifying their influence (Gutman, 2010). However, Corr and colleagues cautioned that internationalization driven by impact factor competition can marginalize locally relevant research, as journals seek to attract global citations rather than address specific community needs (Corr et al., 2005).

The citation patterns of landmark clinical studies further illustrate how bibliometric recognition intersects with epistemic authority. Andrews et al. produced a retrospective study on the misdiagnosis of the vegetative state that challenged prevailing clinical assumptions and highlighted the ethical stakes of accurate assessment (Andrews et al., 1996). The fact that this study appeared in the British Medical Journal, a high impact general medical journal, ensured its wide dissemination and citation across disciplines, thereby elevating its influence beyond the rehabilitation community. Similarly, Close et al.'s randomized controlled trial on fall prevention in the elderly, published in Lancet, achieved a level of visibility and authority that shaped geriatric care guidelines (Close et al., 1999). Higginson et al.'s work in Lancet Respiratory Medicine further demonstrates how high profile journals can legitimize innovative care models such as integrated palliative and respiratory services (Higginson et al., 2014).

From a bibliometric perspective, these publications accrue symbolic capital through citations, which in turn reinforces their status as evidence based benchmarks. Carpenter, Cone, and Sarli noted that such metrics are often used to evaluate academic productivity and institutional performance, meaning that researchers who publish in highly cited journals gain professional advantages (Carpenter et al., 2014). In rehabilitation science, this can create incentives to prioritize topics and methodologies that are more likely to be published in high impact journals, potentially at the expense of qualitative, community based, or practice oriented research.

The keyword and thematic structure of rehabilitation literature also reflects bibliometric influences. Garfield's

Keywords Plus system reveals how certain concepts become central nodes in the literature, linking diverse studies through shared references (Garfield, 1990). In rehabilitation science, keywords related to falls, disability, rehabilitation outcomes, and palliative care create clusters of research that attract sustained citation attention. Ho's analyses in other scientific fields show that highly cited articles often define research frontiers, guiding subsequent investigations (Ho, 2013). By analogy, in rehabilitation science, landmark trials and reviews serve as intellectual anchors around which new studies are organized.

Webometric analysis adds another layer to these findings. The College of Occupational Therapists' document on building the evidence for occupational therapy articulates research priorities that influence funding, education, and practice, even if they are not extensively cited in journal articles (College of Occupational Therapists, 2007). Almind and Ingwersen's framework suggests that such online documents generate web based visibility and professional impact that traditional bibliometrics may overlook (Almind and Ingwersen, 1997). This means that the true influence of rehabilitation research extends beyond citation counts to include guideline adoption, policy references, and professional training materials.

4. Discussion

The results of this analysis underscore the need for a critical and reflexive understanding of bibliometric indicators in rehabilitation science. While citation counts, impact factors, and journal rankings provide useful signals of scholarly attention, they do not capture the full spectrum of value in a field that is fundamentally oriented toward improving human functioning and quality of life.

One major theoretical implication concerns the social construction of research impact. Bellis emphasized that bibliometric indicators are not natural facts but products of specific database designs, indexing practices, and citation cultures (Bellis, 2009). In rehabilitation science, where interdisciplinary collaboration and practice based evidence are crucial, these indicators may privilege certain forms of knowledge over others. Randomized controlled trials published in high impact medical journals, such as those by Close et al. and Higginson et al., are more likely to be cited and thus deemed impactful, even though qualitative studies or practice guidelines may have equal or greater relevance for day to day clinical work (Close et al., 1999; Higginson et al., 2014).

Brown's critique of impact factors is particularly salient

here. He argued that relying on a single numerical indicator can distort editorial policies and research priorities, encouraging journals to favor articles that are likely to be cited rather than those that address pressing professional needs (Brown, 2011). In occupational therapy, this could lead to an underrepresentation of community based interventions, educational research, or culturally specific practices, which may not attract large numbers of citations but are vital for effective service delivery.

Another important dimension is international equity. Corr and colleagues warned that the pursuit of higher impact factors can drive journals to internationalize in ways that marginalize local voices and contexts (Corr et al., 2005). Rehabilitation science is deeply embedded in social, cultural, and economic environments, meaning that research conducted in one setting may not be directly transferable to another. Bibliometric systems that reward global citation appeal may therefore undervalue regionally grounded studies that address specific populations.

The limitations of bibliometric indicators are also highlighted by Belter, who noted that while these measures offer opportunities for assessment and comparison, they cannot capture the qualitative dimensions of research quality, such as methodological rigor, ethical integrity, and practical relevance (Belter, 2015). In rehabilitation science, where patient outcomes, therapeutic relationships, and long term functional trajectories matter, such qualitative dimensions are indispensable.

Future research in this area should therefore pursue a more pluralistic evaluation framework. Drawing on the insights of Ho and colleagues, who demonstrated the richness of bibliometric mapping in other fields, rehabilitation scholars can use citation and keyword analyses to identify emerging trends and collaborative networks (Ho, 2013). At the same time, webometric approaches advocated by Almind and Ingwersen and by Bjorneborn and Ingwersen can capture the broader digital footprint of rehabilitation knowledge, including guidelines, educational resources, and patient advocacy materials (Almind and Ingwersen, 1997; Bjorneborn and Ingwersen, 2004).

Integrating these quantitative tools with qualitative peer review and professional judgment would create a more balanced and ethically grounded system of research evaluation. Case and Huisman's work on researching higher education reminds us that academic systems are shaped by policy, theory, and practice, and that metrics must be interpreted within these broader contexts (Case and Huisman, 2016). For rehabilitation science, this means

aligning evaluation systems with the field's core values of client centeredness, inclusivity, and evidence based practice.

5. Conclusion

This article has demonstrated that bibliometric and informetric frameworks play a powerful but ambivalent role in shaping rehabilitation science. Through citation networks, journal metrics, and digital visibility, these systems influence what research is conducted, how it is disseminated, and how it is valued. By drawing on foundational theories from Blackert and Siegel, Garfield, and Bellis, as well as applied analyses by Brown, Ho, and Franchignoni and Munoz Lasa, the study has shown that metrics are not merely technical tools but social and epistemological forces.

Clinical studies such as those by Andrews et al., Close et al., and Higginson et al. illustrate the profound human stakes of rehabilitation research, reminding us that behind every citation is a patient, a family, and a therapeutic journey. A responsible approach to research evaluation must therefore move beyond simplistic numerical rankings to embrace a richer understanding of impact, one that honors both scholarly influence and real world benefit.

By integrating bibliometrics, webometrics, and professional insight, rehabilitation science can develop a more reflective and just system of knowledge assessment, ensuring that the metrics designed to measure impact do not inadvertently distort the very goals of care, recovery, and human dignity that define the field.

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