

Original Article

Nursing Research on Complementary Therapies for Haemodialysis Patients: A Bibliometric Mapping Study

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Abstract

Aim: This study aimed to conduct a bibliometric analysis of complementary therapy methods used in haemodialysis patients, to systematically examine the existing literature and create a conceptual map of these methods.

Methods: The Web of Science database was searched using keywords 'dialysis' OR 'haemodialysis' NOT 'peritoneal dialysis' AND 'complementary therapy' in nursing field on August 19, 2024, without publication year restrictions. Four hundred fifteen publications were analysed using VOSviewer and R-based Bibliometrix software.

Results: The most frequently used keywords were 'renal dialysis' (n=91), 'haemodialysis' (n=81), 'nursing' (n=66), 'chronic kidney disease' (n=40), and 'quality of life' (n=39). Brazil produced the most publications (n=180), followed by Iran (n=40), China (n=34), and the United States (n=28). Publication output was highest in 2018. The most prolific authors were Barbosa DA (n=12), Lira ALBD (n=11), and Kusumota L (n=9).

Conclusions: Complementary therapy methods are increasingly used in haemodialysis treatment and have extensive coverage in literature.

Keywords: haemodialysis, bibliometric analysis, nursing, complementary therapy

Introduction

Chronic kidney disease (CKD) represents a significant global health challenge with increasing prevalence and serious complications worldwide (Ates et al., 2022; Bello et al., 2022). Haemodialysis (HD) serves as a crucial renal replacement therapy for patients with end-stage renal disease, playing a vital role in maintaining quality of life and

reducing mortality (Bello et al., 2022; Tuzun Ozdemir, & Akyol, 2023). However, HD treatment is associated with numerous challenging symptoms including fatigue, sleep disturbances, muscle cramps, pain, nausea, and psychological symptoms such as depression and anxiety, which significantly impair patients' quality of life (Flythe et al. 2015; Tuna et al., 2018; Flythe et al. 2015).

In response to these challenges, complementary therapies have gained increasing attention as adjunctive approaches to conventional HD treatment. These therapies encompass various health practices, products, and care methods used to support health, manage diseases, and alleviate symptoms (Buyukbayram et al., 2021; Eroglu et al., 2021; Mambap et al., 2022). Evidence indicates substantial utilization of complementary therapies among HD patients, with prevalence rates ranging from 43.5% to 94% for different modalities (Mambap et al., 2022)

The growing body of research on complementary therapies in HD care includes approaches such as aromatherapy, massage, music therapy, relaxation techniques, acupuncture, and reflexology (Buyukbayram et al., 2021; Eroglu et al., 2021; Mambap et al., 2022). Physical therapies including acupressure and reflexology have demonstrated efficacy for symptom management in clinical studies (Bayulgen, & Gun, 2022). Numerous clinical studies are being conducted to investigate the effectiveness of these approaches in managing symptoms associated with HD (Tuzun Ozdemir, & Akyol, 2023; Mambap et al., 2022; Zyoud et al., 2016; Bullen et al., 2018; Bahall, 2017). However, studies in the literature regarding the effectiveness and frequency of use of these therapeutic methods are limited, and there is a need for a more comprehensive understanding of the topic.

Bibliometric analysis has emerged as an important methodological approach for examining the development of scientific fields, identifying research trends, and mapping collaborative networks through the quantitative analysis of publication data (Donthu et al., 2021). This method enables a comprehensive examination of research patterns, citation networks, and conceptual structures using specialized software such as VOSviewer, R-based Bibliometrix, Python, and CiteSpace (van Eck & Waltman, 2010; Aria & Cuccurullo, 2017; Osińska & Klimas, 2021). In nursing research, bibliometric analysis has been increasingly applied to explore evolving topics such as evidence-based practice, patient safety,

nursing education, and the use of digital technologies in care delivery. It allows scholars to identify influential authors, leading journals, and emerging themes within the nursing literature, thereby providing valuable insights into the discipline's scientific growth and research priorities.

Despite the substantial clinical research on complementary therapies in HD care, a comprehensive analysis of the research landscape, global trends, and conceptual development in this field remains absent from the literature. Previous bibliometric studies in nursing have mostly focused on specific topics such as massage therapy, yet no study has comprehensively evaluated complementary therapy research in HD patients. Therefore, this study aims to address this gap by conducting a bibliometric analysis to examine the conceptual structure and evolutionary patterns of complementary therapy research in HD care.

Research questions:

- a. In which years were studies on the subject most frequently conducted?
- b. What are the most frequently used keywords in the studies?
- c. Who are the authors who produce the most publications?
- d. In which countries were the most publications made?
- e. Which studies are most cited?
- f. What are the trending topics shown by these studies?

Aim: This study aims to conduct a bibliometric analysis and visualization of complementary therapy research in HD patients to map the conceptual structure and global trends in this field.

Materials And Methods

Study design: A descriptive bibliometric analysis was conducted to examine the conceptual structure and global trends of complementary therapy research in HD care. The analysis followed established bibliometric methodology guidelines, including data

collection, standardization, metric calculation, analysis, and interpretation stages (van Eck & Waltman, 2010; Aria & Cuccurullo, 2017). This design enables the quantitative assessment of publication patterns, collaboration networks, and research fronts in complementary therapy applications for HD patients.

Search method: A systematic search was conducted on August 19, 2024 via the Web of Science (WoS) core collection database. The search strategy was designed to capture the broad scholarly discourse on complementary therapies in HD care and was informed by the structure of standardized vocabularies such as Medical Subject Headings (MeSH) to ensure comprehensive coverage of key concepts, even though WoS does not utilize MeSH for indexing. Boolean operators were employed as detailed in Table 1. No publication year restrictions were applied to ensure comprehensive coverage of the literature.

The WoS core database includes three major indexing sources: the Social Sciences Citation Index (SSCI), the Science Citation Index Expanded (SCIE), and the Arts & Humanities Citation Index (A&HCI). These indexes facilitate a comprehensive review of the literature, contribute to the theoretical background of academic studies, and enable the tracking of citations and evaluation of relevant sources (van Eck & Waltman, 2010; Aria & Cuccurullo, 2017; Donthu et al., 2021).

Data collection and preprocessing: Data collection was conducted using the search strategy outlined in Table 1. The retrieved records were exported from the WoS database in plain text format containing complete bibliographic records for bibliometric analysis. During data preprocessing, duplicate records were identified and removed to ensure dataset integrity. The dataset included key bibliometric information such as publication titles, authors, publication years, journals, citation counts, and keywords.

Inclusion and exclusion criteria: Primary research articles published in English and indexed in the WoS database were included. Publications were required to address complementary therapy interventions specifically in HD patients within nursing

research context. Exclusion criteria comprised: (1) non-research publications (editorials, letters, conference abstracts), (2) studies not specifically focused on HD patients, and (3) publications not within nursing journals.

Selection of sources of evidence: The systematic search yielded 415 publications for bibliometric analysis. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) flow diagram was adapted to present the search and screening process (Figure 1).

Data analysis: The data were analyzed using bibliometric methods with the aid of VOSviewer (version 1.6.18, Leiden University, Netherlands) and Biblioshiny (a web interface for the Bibliometrix R package). These tools facilitated the visualization and quantitative analysis of bibliographic data. The bibliometric analysis examined the numerical distribution of publications and citations over the years, leading countries, journals, active institutions, prominent publications, co-authorship networks, institutional and international collaborations, key researchers, and the most frequently used keywords. VOSviewer employs a probability-based normalization approach and offers various visualization options. In these visualizations, node size represents frequency, distance between nodes indicates the strength of relationships, and colors denote different categories (van Eck & Waltman, 2010). This tool was used to generate different networks, such as co-authorship, co-occurrence, co-citation, and keyword networks, while also analyzing the strength of connections between nodes.

Biblioshiny (part of the Bibliometrix R package) is an open-source software designed for scientific mapping and bibliometric analysis (Aria & Cuccurullo, 2017). Using this tool, we extracted key bibliometric information, including publication sources, citation counts, and content analysis, from the WoS dataset. The analytical approach encompassed both performance analysis and science mapping to provide a comprehensive assessment of the research landscape.

Ethical considerations: As this study utilized publicly available bibliometric data without

human subjects involvement, institutional review board approval was not required.

Results

Publication trends and growth patterns

The bibliometric analysis of 415 articles published between 2001 and 2024 revealed a total of 1,601 authors in co-authored articles, with only 16 single-author publications. The percentage of international co-authorship was 12.53%, the total number of author keywords was 917, the average age of the documents was 6.5 years, and the average citation count per document was 7.429 (Figure 2). When evaluating the number of publications by year, the highest number of publications occurred in 2018, followed by 2021 and 2022 (Figure 3).

Author productivity and institutional contributions

The analysis of authors publishing on the topic revealed that the authors with the highest number of publications on complementary therapy methods in HD patients were 'Barbosa DA (n=12)', 'Lira ALBD (n=11)', 'Kusumota L (n=9)', and 'Orlandi FD (n=9)' (Figure 4). The authors with the highest citation counts were 'Bonner A (n=153)', 'Barbosa DA (n=114)', and 'Orlandi FD (n=104)'. The mapping of authors' publications demonstrated that 'Barbosa DA', 'Kusumota L', and 'Cesarino CB' maintained consistent publication records, while 'Chen L' received continuous citations since publication (Figure 5). Institutional analysis showed the University of São Paulo (n=52), Federal University of Rio Grande do Norte (n=33), and Federal University of Ceará (n=27) as the most prominent institutions (Figure 6).

Conceptual structure and keyword analysis

The most frequently used keywords were visualized using VOSviewer and Bibliometrix. The frequencies of keyword usage were presented in direct proportion to font sizes in the visuals [16,17]. VOSviewer analysis identified

'renal dialysis' (n=91), 'haemodialysis' (n=81), and 'nursing' (n=66) as the most frequent keywords (Figure 7a), while Biblioshiny analysis revealed 'haemodialysis' (n=86), 'quality of life' (n=51), 'chronic kidney disease' (n=41), and 'care' (n=38) as predominant terms (Figure 7b).

Thematic evolution and trending topics

Analysis of keyword changes across time periods identified distinct thematic shifts. Between 2001-2015, a total of 7 keywords were used, with 'haemodialysis', 'kidney disease', 'symptoms', and 'mortality' being most frequent. During 2016-2020, 'haemodialysis' remained predominant, followed by 'outcomes', 'risk factors', 'nurse', and 'validation'. From 2021-2024, 'haemodialysis' again ranked first, with 'reliability', 'depression', 'acute kidney injury', and 'access' as subsequent preferences (Figure 8). Trend topic analysis revealed accelerated interest post-2015, with 'haemodialysis', 'dialysis', 'quality of life', 'management', 'outcomes', and 'depression' as most trending topics (Figure 9).

Citation impact and influential publications

Citation analysis identified the foundational works shaping the research landscape. The most cited publications focused on symptom management, quality of life interventions, and clinical efficacy of complementary therapies in HD populations. These highly cited works primarily addressed non-pharmacological interventions for managing fatigue, pain, anxiety, and depression in HD patients.

Global collaboration networks

Co-authorship analysis revealed distinct collaborative patterns, with Brazil emerging as the dominant contributor (n=180 publications), followed by Iran (n=40), China (n=34), and the United States (n=28). Network visualization demonstrated emerging international collaborations, though regional research clusters remained predominant in the field.

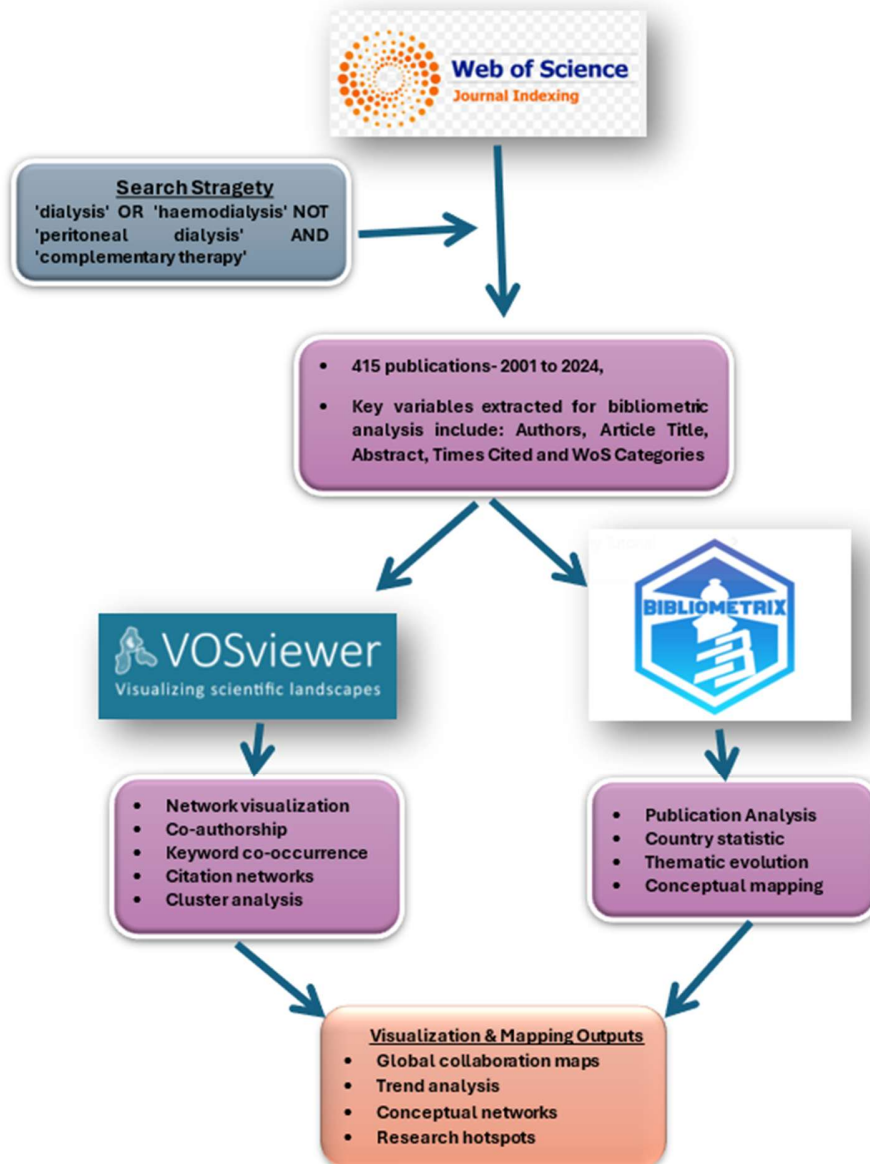


Figure 1. Flowchart Of Study



Figure 2: Basic Publication Information

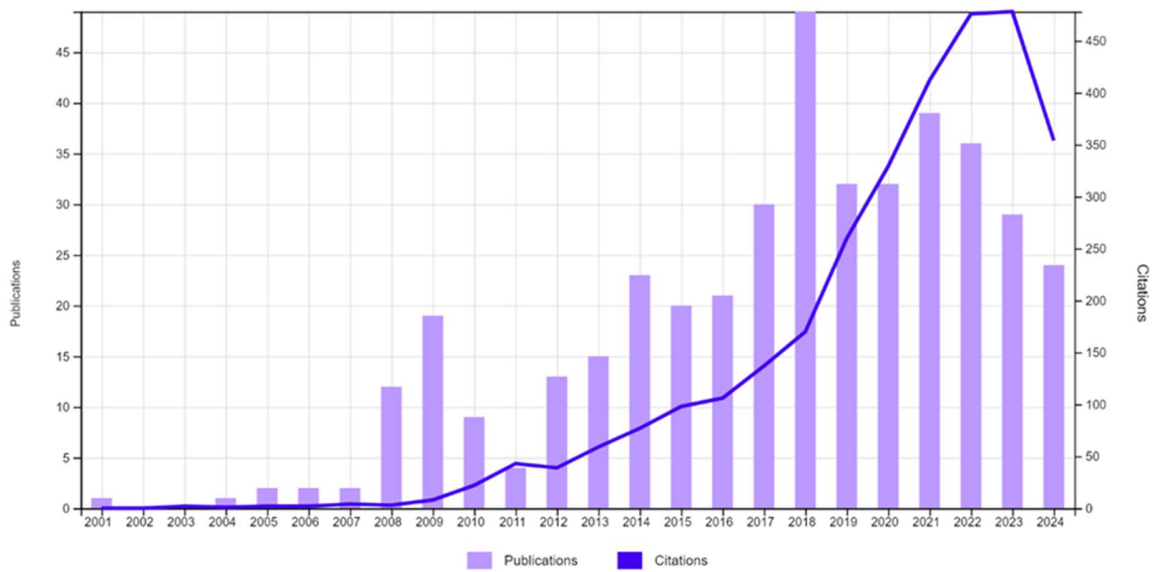


Figure 3. Number of Publications by Year

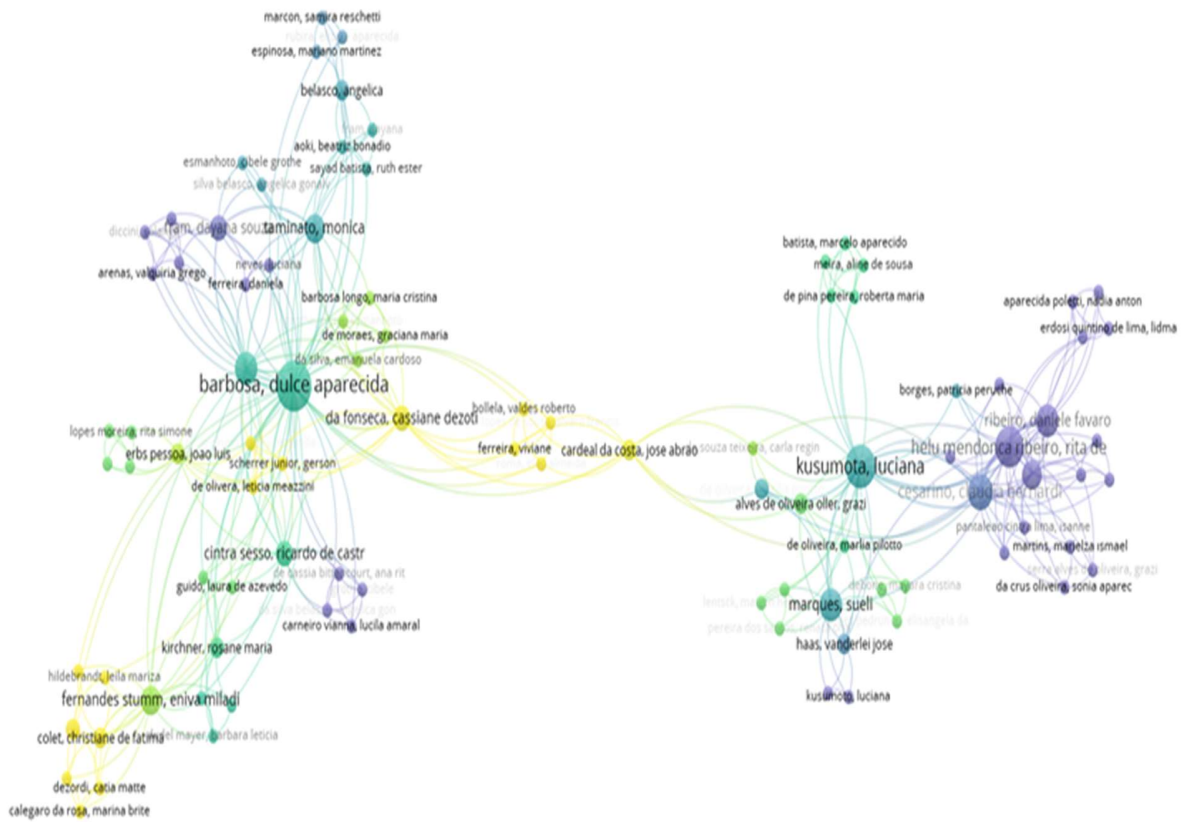


Figure 4. Author Analysis

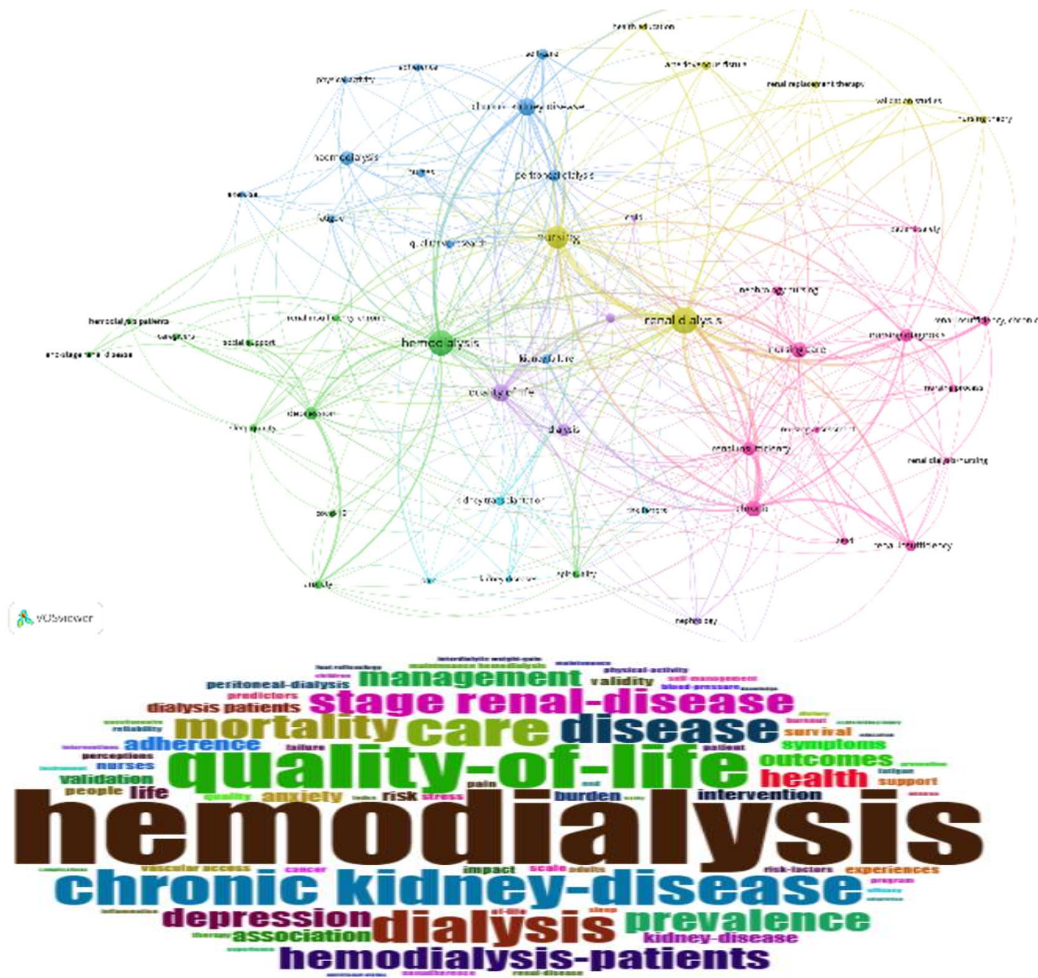


Figure 7a. VOSviewer Keyword

Figure 7b. Biblioshiny Keyword

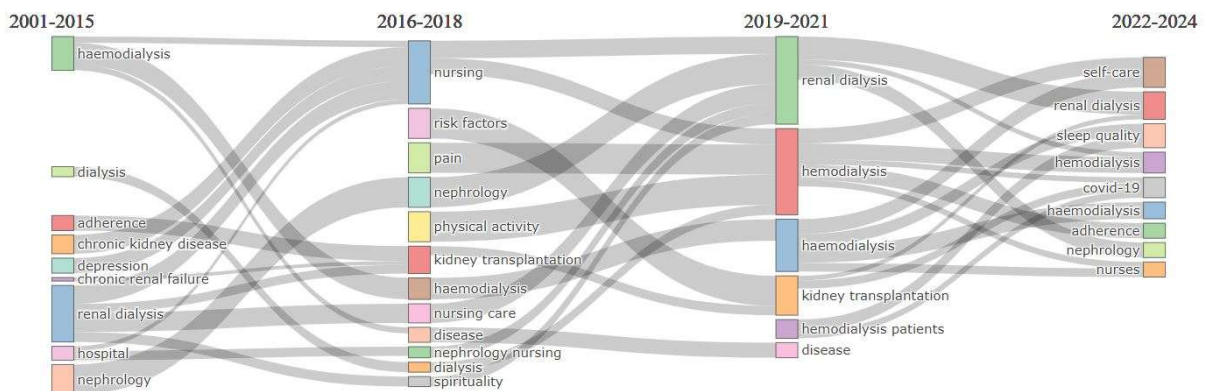


Figure 8. Thematic development

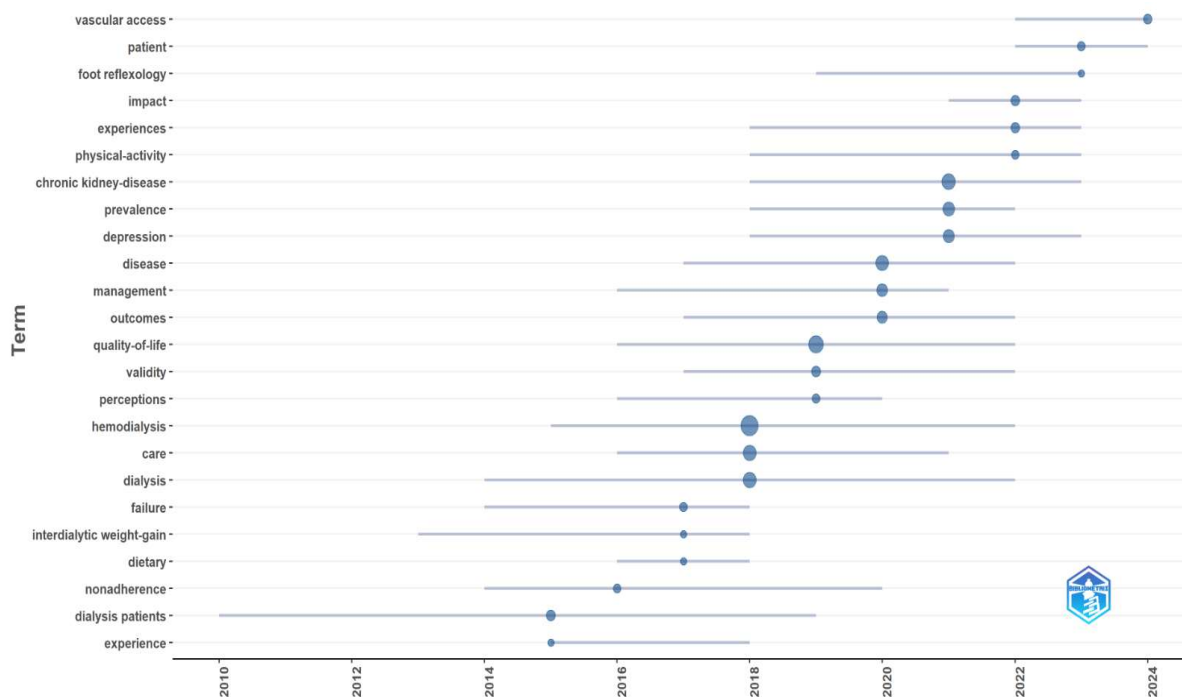


Figure 9. Trending headlines

Table 1. Search strategy to identify publications for bibliometric analysis.

Search Query
'dialysis' OR 'haemodialysis' NOT 'peritoneal dialysis' AND 'complementary therapy'

Discussion

Research collaboration patterns and global trends

This bibliometric analysis study provides a comprehensive examination of the literature on complementary treatment methods for HD patients, systematically revealing trends in the field. A total of 415 articles published between 2001 and 2024 were reviewed, with only 16 of these being single-authored, indicating that a significant majority of the studies were conducted under co-authorship. This finding suggests that scientific research is increasingly evolving toward an interdisciplinary and collaborative structure. Furthermore, the fact that international collaborations remain at 12.53% implies that there is a need to enhance

the level of international cooperation in research conducted on a national basis in this field.

Influential researchers and knowledge development

The authors with the highest number of publications are Barbosa DA, Lira ALBD, and Kusumota L., while among the most cited authors are Bonner A., Barbosa DA., and Orlandi FD. This indicates that these researchers have made significant contributions to the fields of HD and complementary treatment methods. Barbosa DA stands out as a prominent researcher in the field due to being among the authors with the highest number of publications as well as the most cited names. This situation indicates that this author has

maintained scientific productivity over many years and has remained active in the academic arena. Continuous publication output indicates these authors' commitment to their research areas and suggests they are engaged in a constant exchange of knowledge with the academic community. Additionally, Chen L.'s works have received regular citations since their publication, consistently creating an impact in the literature. The consistent citations of Chen L.'s works indicate that they possess enduring scientific value and are utilized by a broad academic audience. Chen L.'s studies may have become groundbreaking or established as fundamental references in a specific research area. When considering these two aspects together, the continuous productivity of Barbosa DA., Kusumota L., and Cesarino CB., along with Chen L.'s works that have resonated widely in the literature, demonstrates that they contribute to academia in different ways and have made significant impacts in their respective fields.

Temporal evolution and clinical adoption

When examining the frequency of publications by year, the highest number of publications in 2018, 2021, and 2022 indicates that there has been an increase in academic interest in complementary therapy methods in recent years. Especially the increase in the number of studies since 2015 indicates that complementary therapy methods have gained wider acceptance during this period and solidified their position in the literature. This rise in the literature may be a consequence of the pursuit to enhance the quality of life and alleviate side effects in patients undergoing HD. Tuzun Ozdemir & Akyol (2023), Yeşil Bayulgen (2023), and Zhang et al. (2023) emphasize that complementary therapy methods support the psychological well-being of HD patients, improve sleep quality, and reduce symptoms such as pain, anxiety, and depression.

Conceptual focus and thematic shifts

The analysis of the keywords in the publications has revealed the core topics these studies focus on. Terms such as 'haemodialysis,' 'renal

dialysis,' and 'nursing' emerge as the most frequently used keywords, while concepts like 'quality of life,' 'chronic kidney disease,' and 'depression' are also observed to be used frequently. These findings indicate that the focus is generally on the effects of HD and complementary therapy methods on quality of life and the care processes of these patients. Furthermore, when examining the changes in keywords over the years, the preference for keywords such as 'depression,' 'acute kidney injury,' and 'access' during the years 2021-2024 indicates a greater emphasis on patients' psychological well-being and the challenges encountered in their treatment processes during this period. These findings support the literature (Dehghan et al., 2020; Verberne et al., 2021; Zhang et al., 2021; Yeşil Bayulgen, 2023).

Clinical evidence and future directions

The findings obtained from the analyses indicate that research on complementary therapies for HD patients has been addressed with increasing interest since 2015. Particularly, topics such as 'haemodialysis,' 'quality of life,' 'management,' and 'depression' have been identified as prominent issues in this field. It is evident that efforts to enhance the quality of life for HD patients and the management approaches in these processes have garnered increased attention in the academic literature (Dehghan et al., 2020; Verberne et al., 2021). The prominence of 'depression' in keyword analysis reflects the critical need to address psychological comorbidities in HD patients, with complementary therapies emerging as viable non-pharmacological approaches. Eroglu et al. (2022) found that the combination of the Benson relaxation technique with music therapy is an effective approach for managing symptoms of fatigue, anxiety, and depression associated with HD. Mohammadpourhodki et al. (2021) reported that aromatherapy massage and reflexology interventions are effective in managing fatigue and improving the quality of life in chronic HD patients. Ilali et al. (2021) indicated that a multisensory stimulation intervention with lavender essence is effective in reducing symptoms of anxiety and depression in elderly adults undergoing HD.

Limitations: This bibliometric investigation provides a comprehensive mapping of complementary therapy research in HD care, yet several methodological aspects require consideration. The analytical approach was confined to the WoS database, which, despite its rigorous indexing and citation tracking capabilities, may have excluded relevant studies available in other academic databases. This single-source methodology could affect the complete representation of the research landscape.

The inclusion criteria specified that publications must be openly accessible, which inherently limits the analysis to available open-access literature. This approach, while ensuring accessibility, may have omitted significant contributions published under subscription-based models, potentially influencing the comprehensive scope of findings.

Additionally, the restriction to nursing field publications represents a focused yet delimiting parameter. While this ensures disciplinary relevance, it may exclude interdisciplinary research published in non-nursing journals that could offer valuable insights into complementary therapy applications.

The fundamental nature of bibliometric analysis emphasizes quantitative patterns in publication metrics, including citation counts and co-occurrence frequencies. This quantitative focus, while revealing broad research trends and collaborative networks, does not incorporate qualitative assessment of methodological rigor, clinical effectiveness, or practical implementation challenges of the complementary therapies examined.

The temporal dimension of citation accumulation also presents a consideration, as recently published works may be underrepresented in citation metrics due to the natural time lag in academic recognition, potentially affecting the visibility of emerging research directions.

Notwithstanding these methodological considerations, this study establishes a valuable foundation for understanding the research

architecture, identifying key knowledge domains, and mapping scholarly collaborations in complementary therapy applications for HD patients.

Implications for policy and practice: The findings of this analysis carry significant implications for healthcare policy and clinical practice in nephrology care. For clinical implementation, healthcare institutions should develop evidence-based protocols for integrating complementary therapies into standard HD care pathways, with particular emphasis on symptom management and quality of life enhancement. These protocols should address the safe administration of therapies such as music therapy, aromatherapy, and relaxation techniques while establishing clear monitoring parameters for patient response and potential adverse effects.

In educational domains, nursing curricula and professional development programs require updating to incorporate comprehensive training on evidence-based complementary therapies. This includes theoretical foundations, practical skills development, and competency assessment for nurses working in HD settings. Such educational initiatives should emphasize the integration of complementary approaches within the broader framework of patient-centered care while maintaining scientific rigor and safety standards.

From a policy perspective, healthcare authorities and professional organizations should establish clear guidelines governing the implementation of complementary therapies in dialysis units. These guidelines should address practitioner qualifications, treatment standardization, documentation requirements, and quality assurance mechanisms. Additionally, reimbursement policies should be developed to support the sustainable integration of these therapies into routine care, recognizing their potential to reduce medication burden and improve patient outcomes.

Recommendations for future research: Future research initiatives should address several critical gaps identified through this analysis. Implementation science approaches are needed to systematically examine barriers and

facilitators affecting the integration of complementary therapies into HD care, considering organizational infrastructure, healthcare provider attitudes, and patient preferences. Comparative effectiveness research should evaluate different complementary therapy modalities to establish hierarchical recommendations based on efficacy, safety, and cost-effectiveness for specific symptom clusters.

Longitudinal studies with extended follow-up periods are essential to determine the sustained benefits of complementary therapies on quality of life, treatment adherence, and clinical outcomes beyond immediate symptom relief. Research exploring cultural adaptations of complementary therapies for diverse patient populations should be prioritized, acknowledging the importance of cultural congruence in treatment acceptance and effectiveness. Furthermore, mechanistic studies investigating the physiological and psychological pathways through which complementary therapies exert their effects in HD populations would strengthen the theoretical foundation supporting their clinical application.

Conclusion: This bibliometric analysis provides a comprehensive mapping of complementary therapy research in HD care, revealing evolving research priorities, established collaboration networks, and emerging trends. The findings demonstrate the field's progression from establishing efficacy to addressing implementation challenges and psychosocial dimensions. The strong focus on quality of life, depression management, and symptom control underscores the alignment of complementary therapy research with nursing care priorities in HD settings.

Future research should address several key areas: enhancing international collaboration to leverage diverse healthcare perspectives, developing standardized protocols for complementary therapy integration in nursing practice, and investigating implementation strategies to overcome barriers to adoption in clinical settings. Additionally, more research is needed on cost-effectiveness, long-term

outcomes, and cultural adaptations of complementary therapies across different healthcare systems to optimize patient-centered care in HD populations.

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References

- Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, 11(4), 959–975.
- Ates, K., Seyahi, N., & Koçyigit, I. (2023). Türkiye’de Nefroloji Diyaliz ve Transplantasyon Registry of the Nephrology, Dialysis and Transplantation in Turkey (Vol. 2).
- Bahall, M. (2017). Use of complementary and alternative medicine by patients with end-stage renal disease on haemodialysis in Trinidad: A descriptive study. *BMC Complementary and Alternative Medicine*, 17(1), 250. <https://doi.org/10.1186/s12906-017-1755-7>
- Bayulgen, M. Y., & Gun, M. (2022). Effect of Complementary and Integrative Treatments on Fatigue Symptoms in Hemodialysis Patients: A Systematic Review. *Holistic Nursing Practice*, 36(1), 17–27. <https://doi.org/10.1097/HNP.0000000000000489>
- Bello, A. K., Okpechi, I. G., Osman, M. A., Cho, Y., Htay, H., Jha, V., Wainstein, M., & Johnson, D. W. (2022). Epidemiology of haemodialysis outcomes. *Nature Reviews Nephrology*, 18(6), 378–395. <https://doi.org/10.1038/s41581-022-00542-7>
- Bullen, A., Awdishu, L., Lester, W., Moore, T., & Trzebinska, D. (2018). Effect of Acupuncture or Massage on Health-Related Quality of Life of Haemodialysis Patients. *Journal of Alternative and Complementary Medicine*, 24(11), 1069–1075. <https://doi.org/10.1089/acm.2018.0030>
- Buyukbayram, Z., & Aksoy, M. (2021). Integrative Methods Used for Symptom Management of Haemodialysis Patients. *Journal of Nephrology Nursing*, 16(1), 30–40.
- Dehghan, M., Namjoo, Z., Bahrami, A., Tajedini, H., Shamsaddini-Lori, Z., Zarei, A., & Nasab, F. R. S. (2020). The use of complementary and alternative medicines, and quality of life in

- patients under haemodialysis: A survey in southeast Iran. *Complementary Therapies in Medicine*, 51, 102431.
- Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133, 285–296.
- Eroglu, H., & Metin, Z. G. (2022). Benson relaxation technique combined with music therapy for fatigue, anxiety, and depression in Haemodialysis patients: A randomized controlled trial. *Holistic Nursing Practice*, 36(3), 139–148.
- Eroglu, H., & Metin, Z. G. (2021). Complementary and Integrative Approaches to Symptom Management in Patients Undergoing Haemodialysis: A Systematic Review. *Hacettepe University Faculty of Nursing Journal*, 8(3), 252–268.
- Flythe, J. E., Hilliard, T., Lumby, E., Castillo, G., Orazi, J., Abdel-Rahman, E. M., Pai, A. B., Rivara, M. B., St Peter, W. L., Weisbord, S. D., Wilkie, C. M., Mehrotra, R., & Kidney Health Initiative Prioritizing Symptoms of ESRD Patients for Developing Therapeutic Interventions Stakeholder Meeting Participants. (2019). Fostering Innovation in Symptom Management among Haemodialysis Patients: Paths Forward for Insomnia, Muscle Cramps, and Fatigue. *Clinical Journal of the American Society of Nephrology*, 14(1), 150–160.
- Flythe, J. E., Powell, J. D., Poulton, C. J., Westreich, K. D., Handler, L., Reeve, B. B., & Carey, T. S. (2015). Patient-Reported Outcome Instruments for Physical Symptoms Among Patients Receiving Maintenance Dialysis: A Systematic Review. *American Journal of Kidney Diseases*, 66(6), 1033–1046.
- ali, E. S., Taraghi, Z., Koulaee, A. J., Elyasi, F., & Moosazadeh, M. (2021). Comparison of the effect of multisensory stimulation intervention and aromatherapy inhalation with lavender essence on anxiety and depression in the older adults undergoing haemodialysis. *Journal of Nursing and Midwifery Sciences*, 8(3), 155–162.
- Mambap, A. T., Ukum, G. E., Teuwafeu, D. G., Maimouna, M., & Ashuntantang, G. E. (2022). Frequency, types, and factors associated with complementary and alternative medicine use among patients on maintenance haemodialysis. *BMC Complementary Medicine and Therapies*, 22(1), 325. <https://doi.org/10.1186/s12906-022-03815-7>
- Mohammadpourhodki, R., Sadeghnezhad, H., Ebrahimi, H., Basirinezhad, M. H., Maleki, M., & Bossola, M. (2021). The effect of aromatherapy massage with lavender and citrus Aurantium essential oil on quality of life of patients on chronic haemodialysis: A parallel randomized clinical trial study. *Journal of Pain and Symptom Management*, 61(3), 456–463.
- Osinska, V., & Klimas, R. (2021). Mapping science: tools for bibliometric and altmetric studies. <https://doi.org/10.47989/irpaper909>
- Tuna, D., Ovayolu, N., & Kes, D. (2018). Common Problems in Haemodialysis Patients and the Problem Solving Recommendations. *Journal of Nephrology Nursing*, 13(1), 17–25.
- Tuzun Ozdemir, S., & Akyol, A. (2023). Effect of inhaler and topical lavender oil on pain management of arteriovenous fistula cannulation. *The Journal of Vascular Access*, 24(3), 465–474.
- Van Eck, N. J., & Waltman, L. (2017). Citation-based clustering of publications using CitNetExplorer and VOSviewer. *Scientometrics*, 111(2), 1053–1070.
- Verberne, W. R., van den Wittenboer, I. D., Voorend, C. G., Abrahams, A. C., van Buren, M., Dekker, F. W., & Bos, W. J. W. (2021). Health-related quality of life and symptoms of conservative care versus dialysis in patients with end-stage kidney disease: a systematic review. *Nephrology Dialysis Transplantation*, 36(8), 1418–1433.
- Yesil Bayulgen, M. (2023). Examination of graduate nursing thesis regarding the symptom of fatigue in dialysis patients. *BSJ Health Sci*, 6(4), 564–570.
- Zhang, C., Mu, H., Yang, Y. F., Zhang, Y., & Gou, W. J. (2023). Effect of aromatherapy on quality of life in maintenance haemodialysis patients: a systematic review and meta-analysis. *Renal Failure*, 45(1), 2164202.
- Zhang, X., Cai, J., Chen, L., Yang, Q., Tian, H., Wu, J., Ji, Z., Zheng, D., Li, Z., & Chen, Y. (2022). Mapping global trends in research of stem cell therapy for COVID-19: A bibliometric analysis. *Frontiers in Public Health*, 10, 1016237. <https://doi.org/10.3389/fpubh.2022.1016237>
- Zyoud, S. H., Al-Jabi, S. W., Sweileh, W. M., Tabeeb, G. H., Ayaseh, N. A., Sawafta, M. N., Khdeir, R. L., Mezyed, D. O., Daraghmeah, D. N., & Awang, R. (2016). Use of complementary and alternative medicines in haemodialysis patients: a cross-sectional study from Palestine. *BMC Complementary and Alternative Medicine*, 16, 204. <https://doi.org/10.1186/s12906-016-1196-8>