Available on: https://nursingjurnal.respati.ac.id/index.php/JKRY/index
Jurnal Keperawatan Respati Yogyakarta, 12(1), January 2025, 01 – 10

Global Trends and Emerging Themes in Sleep Disorders Research in Chronic Kidney Disease A Bibliometric Analysis

Hesti Fathan Nurfais Fauziah[1,*)], Erna Rochmawati[2]
[1,2]Master of Nursing, Universitas Muhammadiyah Yogyakarta, Indonesia

Abstract

Sleep disorders are common in chronic kidney disease (CKD), significantly impairing quality of life and accelerating disease progression. Despite growing research, no comprehensive bibliometric analysis has been conducted on this topic. This research contributed to analyzing global research trends and identifying emerging themes in sleep disorders research in CKD patients from 2014 to 2024. A bibliometric analysis of publications in the Scopus database was performed, with visualization, co-occurrence, and trend analyses conducted using VOS viewer software (version 1.6.20). From 516 publications indicated increasing research activity despite periodic fluctuations. The United States was the leading contributor. Key emerging themes included the impact of dialysis on sleep disorders, physical and mental health, and quality of life; pathophysiological mechanisms of sleep regulation in CKD; comorbidities and risk factors exacerbating sleep disorders; and the types of sleep disorders and their effects on mortality and morbidity in CKD patients. Future directions emphasize technology-based monitoring, psychosocial interventions, personalized medicine approaches, and innovations in dialysis therapies. This first comprehensive bibliometric analysis provides insights into global research trends and key emerging themes on sleep disorders in CKD, guiding clinicians in holistic care and researchers in addressing literature gaps to improve patient outcomes.

Keywords: *Bibliometric Analysis; CKD; Quality f Life; Sleep Disorders*

Article info: *Sending on April 04, 2024; Revision on November 26, 2024; Accepted on December 10, 2024*

**) Corresponding author: Hesti Fathan Nurfais Fauziah*
E-mail: hestifathannurfaisfauziah22@gmail.com

1. Introduction

Chronic kidney disease (CKD) is a significant global health challenge, affecting over 10% of the population, or approximately 800 million individuals worldwide (Kovesdy, 2022). Patients with CKD often experience various complications, including cardiovascular diseases, anemia, and metabolic disorders, which collectively impair their quality of life. Among these, sleep disorders affect up to 80% of patients undergoing dialysis and contribute significantly to the progression of CKD (Eloot et al., 2021).

Sleep disorders, such as insomnia, sleep apnoea, restless legs syndrome (RLS), and excessive daytime sleepiness (EDS), have been shown to exacerbate the progression of CKD and increase morbidity and mortality rates (Brown & Unruh, 2020). These conditions are influenced by multifactorial mechanisms, including uremia, hormonal dysregulation, chronic inflammation, and psychological stress (Gela et al., 2024; Roumelioti et al., 2021). Moreover, the bidirectional relationship between sleep disorders and CKD is evident, as poor sleep quality accelerates CKD progression, while CKD worsens sleep patterns (Lyons, 2024).

Over the past decade, global research on sleep disorders in CKD has expanded, with studies exploring their prevalence, pathophysiology, and potential interventions (Brown & Unruh, 2020; Lyons, 2024; Shieu et al., 2020). However, despite the growing body of literature, systematic bibliometric analysis to evaluate research trends, identify gaps, and guide future studies in this field remains lacking. Bibliometric analysis, a quantitative method combining statistical and bibliographic approaches, offers valuable insights into publication trends, emerging themes, and the contributions of countries, institutions, and authors (Donthu et al., 2021).

The objective of the study is to analyze global research trends and identify emerging themes in sleep disorders in CKD patients from 2014 to 2024. This study seeks to provide

Copyright ©Autor, 2025. Jurnal Keperawatan Respati Yogyakarta, p-ISSN: 2088-8872; e-ISSN: 2541-2728

actionable insights for clinical practice and guide future research efforts to improve patient outcomes by systematically identifying key emerging themes, trends, and unexplored areas.

2. Method

Design

This is a bibliometric analysis, a type of research used to determine research trends and analyze the themes found to identify themes that have not been widely researched and provide new information for further research (Donthu et al., 2021)**.** The BIBLIO checklist for reporting the bibliometric review of the biomedical literature was followed in preparing this review (Montazeri et al., 2023).

Data Sources and Search Strategy

The Scopus database was chosen as the source of this study. Most bibliometric studies utilize Scopus as the central database (Abushamma et al., 2021; Al-Jabi, 2023). The Scopus database was chosen for its comprehensive coverage of high-quality academic publications across various disciplines, including health and biomedical sciences (Pranckutė, 2021). In addition, Scopus provides a simple bibliometric tool that is easy to understand (AlRyalat et al., 2019).

A systematic search was conducted to identify publications on sleep disorders in chronic kidney disease in the last decade, from January 1, 2014, to October 28, 2024. This timeframe is chosen to capture the latest trends and advancements in this field. Scopus Engine integrates relevant words with the keywords "sleep disorder" and "chronic kidney disease" and their synonyms. The search strategy uses Boolean operators to ensure relevant matches. Quotation mark symbol ("") to check the search for a specific term or phrase. Publication is limited to original articles and reviews in English. The search formula will target the article's title, abstract, and keywords. The search process was completed on October 28, 2024, to avoid inconsistent results due to database updates.

Eligibility Criteria

Inclusion criteria included articles addressing sleep disorders in CKD patients, publications from 2014–2024, English-language articles, original articles, and reviews, while exclusion criteria focused on editorials, book chapters, notes, letters, conference papers, short surveys, conference reviews, retracted articles, errata, and articles in press, non-English publications and studies unrelated to sleep disorders or CKD.

Data Selection

The selection process was carried out in stages. After the initial search, the results obtained were screened based on title and abstract to identify relevant articles that met the inclusion criteria. Irrelevant articles were excluded during this process. Relevant data, including publication year, authorship, institutional affiliation, country of origin, citations, and keywords, were extracted into Microsoft Excel 2019 for analysis.

Data Synthesis

Vosviewer software version 1.6.20 performs bibliometric analysis (Van Eck & Waltman, 2010). This application helps visualize bibliometric maps of co-occurring terms in titles and abstracts (Donthu et al., 2021). Includes three different types of visualizations: network visualization, overlay visualization, and density visualization (Van Eck & Waltman, 2014).

Ethical Considerations

This study involved bibliometric analysis, which analyzes published literature and did not involve direct interaction with human or animal subjects. However, ethical standards were adhered to, particularly in ensuring the integrity and transparency of the review process.

3. Results and Discussion

Publication Trends

Based on search results on the Scopus database, 516 articles on sleep disorders in CKD patients published between 2014 and 2024 were identified, including 303 articles and 213 reviews **(Figure 1)**. Over the past decade, publications discussing sleep disorders have fluctuated, as shown in **Figure 2**. The graph shows that the overall research trend is increasing but unstable, with peaks in 2016 (50 publications), 2020 (58 publications), and 2022 (62 publications), which is in line with the increasing global focus on sleep disorders in CKD.

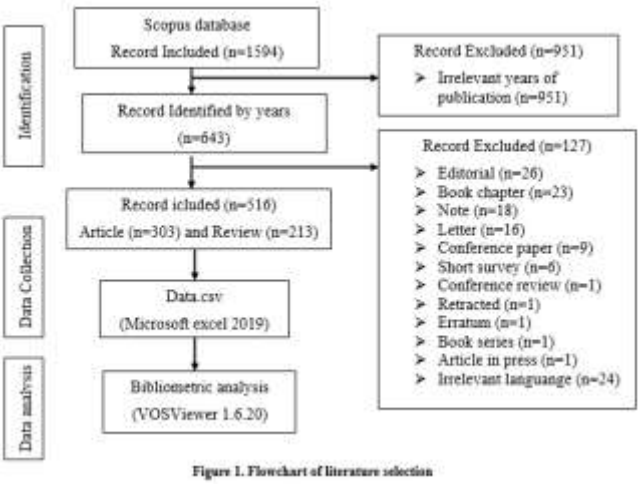

Figure 1. Flowchart of literature selection

Top Country Contributions

Copyright ©Autor, 2025. Jurnal Keperawatan Respati Yogyakarta, p-ISSN: 2088-8872; e-ISSN: 2541-2728

Eighty-six countries contributed to the literature on sleep disorders in CKD. The United States emerged as the leading contributor with 128 publications, followed by China (71 publications) and the United Kingdom (39 publications) **(Table 1)**.

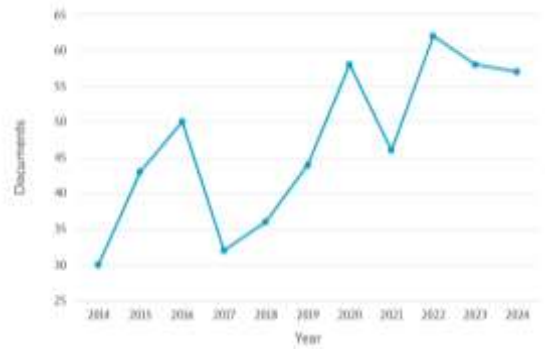

Figure 2. Graph of Research Trends on Sleep disorder in CKD from 2014 to 2024: Source: Scopus Data Analysis

Table 1. Top 10 active countries ranked by article output on sleep disorder in CKD from 2014 to 2024

Ranking	Country	Total Publication
1	United States	128
2	China	71
3	United Kingdom	39
4	Italy	35
5	Taiwan	35
6	Canada	34
7	Iran	33
8	Turkey	26
9	Japan	24
10	Australia	23

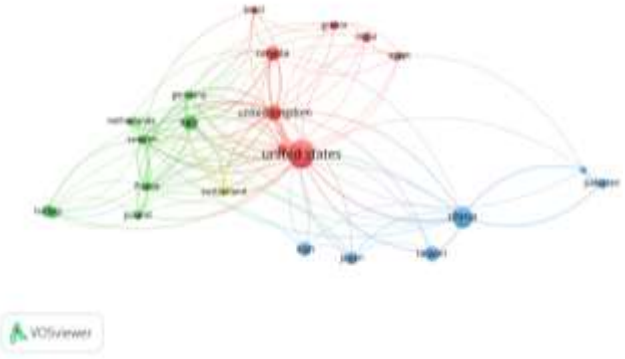

Figure 3. Visualization of the network of international research collaboration on sleep disorder in CKD among 21 countries with a minimum research output of 10 documents.

Collaborative research networks were visualized using VOSviewer, highlighting strong collaborations between the United States, China, and Europe **(Figure 3)**. The dominance of institutions from developed countries underscores the disparity in global research capabilities, highlighting the need for increased contributions from developing regions.

The ten most cited publications can be seen in **Table 2**. The most cited publications are works by (Scherer et al., 2017), published by the American Journal of Kidney Disease, with 98 citations. Then, in second place is a publication by (Ezzat & Mohab, 2015), published in Renal Failure, with 63 citations. Moreover, in third place is a publication by (Yamamoto et al., 2018), published in the Clinical Journal of the American Society of Nephrology, with 60 citations **(Table 2).**

Key emerging themes

Figure 4 shows network visualization and four main clusters are formed in different colors: red, green, blue, and yellow. Key emerging themes in each of them include the red cluster focusing on "The impact of dialysis therapy on sleep disorders, physical health, mental health, and quality of life in CKD patients," the green cluster focusing on "Pathophysiological mechanisms and sleep regulation disorders in CKD patients," the blue cluster focusing on "Comorbidity and risk factors that worsen sleep disorder in CKD patients," and the yellow cluster focuses on "Types of sleep disorders and their impact on mortality and morbidity in CKD patients."

Figure 4. Network visualization map of terms in the title/abstract fields of publications related to sleep disorder in CKD from 2014-2024

Trend and Future Research

Figure 5. shows overlay visualization. This visualization is used to see keywords that appear frequently and are used in publication titles and abstracts from 2014 to 2024. In this visualization, the lighter the color, the more recent the year of publication, and the larger the circle and letter of the keyword, the more often the word appears (Van Eck & Waltman, 2014). Blue is the color for

Copyright ©Autor, 2025. Jurnal Keperawatan Respati Yogyakarta, p-ISSN: 2088-8872; e-ISSN: 2541-2728

keywords that appeared extensively in publications before 2015. Green is for keywords appearing in publications between 2016 and 2017, and yellow is for those appearing in publications after 2018. From this visualization, the publications on sleep disorders in CKD were mainly published between 2016 and 2017. In addition, the overlay visualization shows that 2014-2015, research in this field focused on the fundamental research on CKD and sleep disorders. In 2016, research in this field emphasized the impact of sleep disorders on quality of life. In 2017, this research focused on risk factors for sleep disorders in CKD patients. In 2018, research in this field has focused more intensely on optimizing the management of sleep disorders in CKD. Research trends that are expected to develop in the future focus on the use of technology for monitoring sleep disorders, psychosocial interventions to help manage sleep disorders while improving the mental health of CKD patients, personalized medicine approaches, and innovations in dialysis therapy to minimize sleep disorders.

Table 2. Top 10 most cited publications in research related to sleep disorder in CKD from 2014 to 2024

Ranking	Author	Tittle	Source tittle	Cited by	Impact Index per article
1	Scherer et al. (2017)	Sleep Disorders, Restless Legs Syndrome, and Uremic Pruritus: Diagnosis and Treatment of Common Symptoms in Dialysis Patients	American Journal of Kidney Diseases	98	9.1
2	Ezzat & Mohab, (2015)	Prevalence of sleep disorders among ESRD patients	Renal Failure	63	5.9
3	Yamamoto et al. (2018)	Sleep quality and sleep duration with CKD are associated with progression to ESKD	Clinical Journal of the American Society of Nephrology	60	8.3
4	Ricardo et al. (2017)	The association of sleep duration and quality with CKD progression	Journal of the American Society of Nephrology	56	7.3
5	Novak et al. (2015)	Restless Legs Syndrome in Patients with Chronic Kidney Disease	Seminars in Nephrology	52	5.3
6	Losso et al. (2015)	Sleep disorders in patients with end-stage renal disease undergoing dialysis: comparison between hemodialysis, continuous ambulatory peritoneal dialysis and automated peritoneal dialysis	International Urology and Nephrology	48	3.6
7	Lindner et al. (2015)	Insomnia in Patients with Chronic Kidney Disease	Seminars in Nephrology	47	2.9
8	Yang et al. (2015)	Non-pharmacological interventions for improving sleep quality in patients on dialysis: Systematic review and meta-analysis	Sleep Medicine Reviews	43	3.1
9	Liaveri et al. (2017)	Quality of sleep in renal transplant recipients and patients on hemodialysis	Journal of Psychosomatic Research	38	4.0
10	Einollahi et al. (2014)	Sleep quality among iranian hemodialysis patients: A multicenter study	Nephro-Urology Monthly	31	1.9

The Impact Index Per Article is presented based on Reference Citation Analysis [Source: Baishideng Publishing Group Inc (Pleasanton, CA 94566, United State

Figure 6. shows the density visualization of the keyword. In this visualization, the colors show how keywords are distributed in the two-dimensional space that underlies the visualization (Van Eck & Waltman, 2014). **Figure 6** shows that some keywords have more vibrant colors and larger

Copyright ©Autor, 2025. Jurnal Keperawatan Respati Yogyakarta, p-ISSN: 2088-8872; e-ISSN: 2541-2728

letters than others, which shows that more of these keywords appear in publications. **Figure 6** concludes that the most frequently used keywords are sleep disorder, chronic kidney disease, quality of life, and depression.

Figure 5. Overlay visualization map of terms in the title/abstract fields of publications related to sleep disorder in CKD from 2014-2024

Figure 6. Density visualization map of terms in the title/abstract fields of publications related to sleep disorder in CKD from 2014-2024

Bibliometric analysis is an effective tool for evaluating the global research landscape in a particular field (Van Eck & Waltman, 2010). his study discusses global research trends and provides an in-depth understanding of relevant research related to sleep disorders in chronic kidney disease (CKD) patients based on data from the Scopus database. These findings show that this topic is attracting the attention of scientists worldwide, with several studies experiencing fluctuating changes over the past decade (2014-2024). However, research on sleep disorders in CKD patients is expected to continue to increase in the future. This estimate is supported by several factors, including the increasing prevalence of CKD each year, as well as the fact that sleep disorders are a common problem often experienced by CKD patients, especially those undergoing hemodialysis (Brown & Unruh, 2020). In addition, increasing awareness among healthcare professionals about the impact of sleep disorders on CKD progression and patients' overall quality of life, together with greater attention to psychological aspects as part of holistic care, is further encouraging the development of research in this area (Eloot et al., 2021). Therefore, it is reasonable to expect an increase in the number of studies on this topic in the next few years.

In this bibliometric study, the United States emerged as the country with the most significant contribution in the field of sleep disorders in CKD, a finding that is in line with previous similar bibliometric studies in other CKD fields that the United States dominated (Sun et al., 2023; Tao et al., 2024; Wang et al., 2024; G. Yuan et al., 2024; X. Yuan et al., 2020). This dominance may be because most publications in this field are written in English, the official language of most international journals, and may also be why the United States is the most significant contributor to CKD literature, which aligns with previous bibliometric studies (Al-Jabi, 2023). This gives researchers from the United States an advantage, as they are more likely to publish their research in globally recognized Scopus-indexed journals. These journals often have rigorous methodological standards, making United States research more accessible and citational to other researchers (Thelwall & Sud, 2022). However, it is also important to note that this does not mean that other countries are not contributing quality research. Some more minor or developing countries may face challenges such as limited resources or language barriers, which can reduce the visibility of their high-quality research despite making valuable contributions to the field (Amano et al., 2016).

The most cited articles in the study included articles from Ezzat & Mohab, (2015), Scherer et al. (2017), Yamamoto et al. (2018), published in prestigious journals that are highly relevant to the field such as The American Journal of Kidney Diseases and The Clinical Journal of the American Society of Nephrology. Publication in these leading journals indicates that the research meets rigorous methodological standards, providing valuable insights locally and globally (Reed et al., 2021).

Four main research themes that emerged in sleep disorder in CKD research were identified through keyword co-occurrence analysis. The first theme was "The impact of dialysis therapy on sleep disorders, physical and mental health, and quality of life in CKD patients." Dialysis therapy, including hemodialysis and peritoneal dialysis, is often associated with sleep disorders such as insomnia, restless legs syndrome (RLS), and sleep apnoea

Copyright ©Autor, 2025. Jurnal Keperawatan Respati Yogyakarta, p-ISSN: 2088-8872; e-ISSN: 2541-2728

(Eloot et al., 2021). The side effects of dialysis therapy include physical health problems such as chronic fatigue, pruritus, and pain that disrupt patients' sleep patterns, while mental health problems such as depression and anxiety worsen sleep disorders, which ultimately disrupt patients' quality of life (Cheng et al., 2021; Huang et al., 2023). Studies show that hemodialysis patients experience poorer sleep quality than those on peritoneal dialysis due to more significant physical stress and longer duration of therapy (Hiramatsu et al., 2020).

The second theme is "Pathophysiological mechanisms and sleep regulation disorders in CKD patients." The pathophysiological mechanisms underlying sleep disorders in CKD patients involve multiple factors, including hormonal dysregulation, systemic inflammation, and metabolic dysfunction (Roumelioti et al., 2021). Decreased kidney function results in an imbalance of hormones such as melatonin and cortisol, which disrupts the circadian rhythm and causes insomnia and daytime somnolence (Zahraa & Khamaal, 2024). In addition, the accumulation of uremia in the body affects brain neurotransmitters, such as dopamine, which contributes to restless legs syndrome (RLS) in CKD patients (Gela et al., 2024). Furthermore, sleep disturbances in CKD patients are also associated with systemic inflammation that triggers increased oxidative stress, worsens kidney tissue damage, and creates a progressive cycle of sleep disturbance (Roumelioti et al., 2021). Meanwhile, sleep apnoea, which is often found in CKD patients, can cause intermittent hypoxia, which impairs blood pressure regulation and cardiovascular function (Lin et al., 2020).

The third theme is "Comorbidities and risk factors that worsen sleep disorders in CKD patients." Comorbidities such as diabetes mellitus, hypertension, obesity, and cardiovascular disease are the main risk factors that worsen sleep disorders in CKD patients (Brown & Unruh, 2020). Patients with hypertension or diabetes have a higher prevalence of obstructive sleep apnoea (OSA), which worsens sleep quality and increases the risk of progressive kidney damage (Zamarrón et al., 2021). In addition, obesity contributes to increased upper airway resistance, which worsens sleep apnoea in CKD patients (Umbro et al., 2020). Furthermore, smoking and a sedentary lifestyle are also known to be additional risk factors that increase the prevalence of sleep disorders (Grigoriou et al., 2024). These comorbidities affect blood pressure regulation, metabolism, and the cardiovascular system, all impacting kidney function (Grigoriou et al., 2024). Therefore, management of comorbidities through lifestyle interventions and pharmacotherapy can significantly reduce the prevalence of sleep disorders and slow the progression of CKD (Neale et al., 2023).

The fourth theme is "Types of sleep disorders and their impact on mortality and morbidity in CKD patients." Common types of sleep disorders in CKD patients include insomnia, sleep apnoea, and restless legs syndrome (RLS) (Brown & Unruh, 2020). Insomnia, which is the most common sleep disorder, is often associated with increased emotional stress, chronic fatigue, and systemic inflammation (Bukhari et al., 2021). Previous studies have shown that insomnia increases cardiovascular risk and mortality in CKD patients (Tan et al., 2022). Meanwhile, sleep apnoea is another dangerous type of sleep disorder that causes intermittent hypoxia and cardiovascular dysfunction (Tessema et al., 2022). This directly increases the risk of hypertension, arrhythmia, and mortality in CKD patients (Tessema et al., 2022). RLS, which affects up to 60% of CKD patients on dialysis, also contributes to sleep disturbances and worsens patients' quality of life(Diaz et al., 2021).

The evolution of research trends shows a shift in focus over the past decade. In 2014–2015, early research focused on the pathophysiology of CKD and physical symptoms affecting sleep, such as uremia, restless legs syndrome, anemia, and chronic pain. These studies provided a baseline understanding of the mechanisms of sleep disturbance in CKD patients and its impact on morbidity and mortality. Entering 2016, research expanded toward the impact of sleep disturbance on patients' mental health and quality of life. Insomnia, circadian rhythm disturbances, depression, and fatigue became significant themes, along with attention to the impact of peritoneal dialysis. In addition, the prevalence of sleep disturbances began to be studied more systematically, highlighting their impact on overall patient well-being. In 2017, the focus shifted to epidemiological risk factors for sleep disturbance in CKD patients. Comorbidities such as diabetes mellitus, hypertension, obesity, and cardiovascular complications such as heart failure became significant concerns. In addition, conditions such as sleep apnoea, dyspnoea, and anxiety were increasingly identified as contributors to sleep disturbance, especially in elderly patients. From 2018 to 2024, current research focuses on a multidimensional approach to managing sleep disorders in CKD. The focus includes psychology, patient sleep quality, and interventions to reduce symptoms such as pruritus and fatigue. In addition, sleep duration and patterns are beginning to be explored as important indicators in improving patient health. Hemodialysis-based therapy is also a significant focus in improving CKD patients' quality of life.

Copyright ©Autor, 2025. Jurnal Keperawatan Respati Yogyakarta, p-ISSN: 2088-8872; e-ISSN: 2541-2728

Research trends and themes that are expected to develop in the future focus on several key areas, including the use of technology for monitoring sleep disorders, such as utilizing wearable technology, artificial intelligence (AI)-based applications, and Internet of Medical Things (IoMT) devices to monitor sleep patterns in real-time in CKD patients, Psychosocial interventions to help manage sleep disorders while improving the mental health of CKD patients, Personalized medicine approaches such as developing personalized sleep disorder therapies based on genetic factors, metabolism, and individual comorbidities in CKD patients, and innovations in dialysis therapy such as modifying dialysis time, new dialysis techniques, or the use of dialysis devices that minimize sleep disorder.

Research on sleep disorders in CKD patients continues to grow, reflecting increasing awareness of the issue's importance. By leveraging new technologies, strengthening international collaboration, and addressing research gaps, understanding and managing sleep disorders in CKD patients can be significantly improved.

Strengths and limitations

Using a comprehensive approach, this study employs a bibliometric analysis to explore the academic literature on sleep disorders in chronic kidney disease (CKD) patients. By analyzing a decade-long research, the study offers a thorough overview of historical and contemporary trends in the field. This method allows researchers to identify key participants, primary research areas, and emerging patterns within the topic through visual analytics. Furthermore, the study uncovers underexplored areas in the research, providing valuable guidance for future investigations. With a focus on global research trends, this study includes contributions from various geographic regions, offering insights into the scientific contributions from different countries. Despite its strengths, the study has several limitations. First, the publication selection may be biased as it only included studies indexed in the Scopus database. While Scopus is a reputable and broad database, it may have overlooked relevant articles indexed in other databases such as Web of Science or PubMed. This limits the comprehensiveness of the literature reviewed. Second, the keywords used in the search were derived solely from synonyms of the main terms rather than from a detailed review of the existing literature. This approach missed important keywords, resulting in incomplete or inaccurate data.

A more comprehensive keyword selection, based on a thorough literature review, might have enhanced the breadth of the search. Third, time is inherently influenced by citation analysis, as older articles tend to accumulate more citations. This time-related bias may affect the results by overemphasizing older studies while underrepresenting more recent publications. Fourth, this study only included publications in English, thereby excluding valuable contributions from research in other languages. As a result, important studies published in non-English journals may have been overlooked, limiting the study's global perspective. Fifth, the analysis focused on specific titles and phrases related to sleep disorders in CKD patients, which may have led to the exclusion of relevant articles that use different terminology. This limitation might have resulted in missing some studies that contribute to the topic but use alternative terminology or framing.

4. Conclusions and Suggestions

This study provides a comprehensive bibliometric analysis of global research trends on sleep disorders in chronic kidney disease (CKD) patients from 2014 to 2024. The findings reveal a significant, though fluctuating, increase in research activity, with the United States being the leading contributor. Four key research areas were identified included the impact of dialysis on sleep disorder, physical and mental health, and quality of life; pathophysiological mechanisms of sleep regulation in CKD; comorbidities and risk factors exacerbating sleep disorders; and the types of sleep disorders and their effects on mortality and morbidity in CKD patients. Future research should focus on emerging areas such as technology for monitoring sleep, psychosocial interventions, personalized medicine approaches, and innovations in dialysis therapies to improve patient outcomes. In conclusion, while substantial progress has been made, further research is essential to better understand and manage sleep disorders in CKD, ultimately improving the quality of life for affected patients.

5. Acknowledgments

The authors would like to thank Universitas Muhammadiyah Yogyakarta for its support and access to the Scopus database, which was essential for conducting this bibliometric analysis. No external funding was received for this study.

6. References

Abushamma, F., Barqawi, A., Al-Jabi, S. W., Akkawi, M., Maree, M., & Zyoud, S. H. (2021). Global Analysis of Research Trends on Kidney Function After Nephron-Sparing Surgery: A Bibliometric and Visualised Study. *Cancer Management and Research*,

Copyright ©Autor, 2025. Jurnal Keperawatan Respati Yogyakarta, p-ISSN: 2088-8872; e-ISSN: 2541-2728

Volume 13, 7479–7487. https://doi.org/10.2147/CMAR.S324284

Al-Jabi, S. W. (2023). Global research trends and mapping knowledge structure of depression in dialysis patients. *World Journal of Psychiatry*, *13*(8), 593. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10494777/

AlRyalat, S. A. S., Malkawi, L. W., & Momani, S. M. (2019). Comparing bibliometric analysis using PubMed, Scopus, and Web of Science databases. *JoVE (Journal of Visualized Experiments)*, *152*, e58494. https://www.jove.com/t/58494/comparing-bibliometric-analysis-using-pubmed-scopus-web-science

Amano, T., González-Varo, J. P., & Sutherland, W. J. (2016). Languages are still a major barrier to global science. *PLoS Biology*, *14*(12), e2000933. https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.2000933

Brown, L. K., & Unruh, M. L. (2020). Sleep disorders in chronic kidney disease. In *Chronic Renal Disease* (pp. 571–592). Elsevier. https://www.sciencedirect.com/science/article/pii/B978012815876000036X

Bukhari, M. A. A., Alghtani, M. A. M., Aljohani, Z., Qasem, A. A. A., & Alhazmi, I. H. M. (2021). Diagnosis and treatment of sleep disorders: A brief review. *International Journal of Medicine in Developing Countries*, *5*(1), 364–369. https://ijmdc.com/fulltext/51-1604917632.pdf

Cheng, E., Evangelidis, N., Guha, C., Hanson, C. S., Unruh, M., Wilkie, M., Schell, J., Hecking, M., Gonzalez, A. M., & Ju, A. (2021). Patient experiences of sleep in dialysis: Systematic review of qualitative studies. *Sleep Medicine*, *80*, 66–76. https://www.sciencedirect.com/science/article/pii/S1389945721000368

Diaz, S., Abad, K., Patel, S. R., & Unruh, M. L. (2021). Emerging treatments for insomnia, sleep apnea, and restless leg syndrome among dialysis patients. *Seminars in Nephrology*, *41*(6), 526–533. https://www.sciencedirect.com/science/article/pii/S0270929521001339

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. https://www.sciencedirect.com/science/article/pii/S0148296321003155

Einollahi, B., Motalebi, M., Rostami, Z., Nemati, E., & Salesi, M. (2014). Sleep quality among Iranian hemodialysis patients: A multicenter study. *Nephro-Urology Monthly*, *7*(1), e23849. https://pmc.ncbi.nlm.nih.gov/articles/PMC4330687/

Eloot, S., Holvoet, E., Dequidt, C., Maertens, S.-J., Vanommeslaeghe, F., & Van Biesen, W. (2021). The complexity of sleep disorders in dialysis patients. *Clinical Kidney Journal*, *14*(9), 2029–2036. https://academic.oup.com/ckj/article-abstract/14/9/2029/6104117

Ezzat, H., & Mohab, A. (2015). Prevalence of sleep disorders among ESRD patients. *Renal Failure*, *37*(6), 1013–1019. https://doi.org/10.3109/0886022X.2015.1044401

Gela, Y. Y., Limenh, L. W., Simegn, W., Ayenew, W., Chanie, G. S., Seid, A. M., Beyna, A. T., Esubalew, D., Mitku, M. L., & Mengesha, A. K. (2024). Poor sleep quality and associated factors among adult chronic kidney disease patients. *Frontiers in Medicine*, *11*, 1366010. https://www.frontiersin.org/articles/10.3389/fmed.2024.1366010/full

Grigoriou, I., Kotoulas, S.-C., Porpodis, K., Spyratos, D., Papagiouvanni, I., Tsantos, A., Michailidou, A., Mourelatos, C., Mouratidou, C., & Alevroudis, I. (2024). The Interactions between Smoking and Sleep. *Biomedicines*, *12*(8), 1765. https://www.mdpi.com/2227-9059/12/8/1765

Hiramatsu, T., Okumura, S., Asano, Y., Mabuchi, M., Iguchi, D., & Furuta, S. (2020). Quality of Life and Emotional Distress in Peritoneal Dialysis and Hemodialysis Patients. *Therapeutic Apheresis and Dialysis*, *24*(4), 366–372. https://doi.org/10.1111/1744-9987.13450

Huang, J., Mao, Y., Zhao, X., Liu, Q., & Zheng, T. (2023). Association of anxiety, depression symptoms and sleep quality with chronic kidney disease among older Chinese. *Medicine*, *102*(43), e35812. https://journals.lww.com/md-journal/fulltext/2023/10270/association_of_anxiety,_depression_symptoms_and.4.aspx

Kovesdy, C. P. (2022). Epidemiology of chronic kidney disease: An update 2022. *Kidney International Supplements*, *12*(1), 7–11. https://doi.org/10.1016/j.kisu.2021.11.003

Liaveri, P. G., Dikeos, D., Ilias, I., Lygkoni, E. P., Boletis, I. N., Skalioti, C., & Paparrigopoulos, T. (2017). Quality of sleep

Copyright ©Autor, 2025. Jurnal Keperawatan Respati Yogyakarta, p-ISSN: 2088-8872; e-ISSN: 2541-2728

in renal transplant recipients and patients on hemodialysis. *Journal of Psychosomatic Research*, *93*, 96–101. https://www.sciencedirect.com/science/article/pii/S0022399916306365

Lin, C.-H., Lurie, R. C., & Lyons, O. D. (2020). Sleep apnea and chronic kidney disease: A state-of-the-art review. *Chest*, *157*(3), 673–685. https://www.sciencedirect.com/science/article/pii/S0012369219338693

Lindner, A. V., Novak, M., Bohra, M., & Mucsi, I. (2015). Insomnia in patients with chronic kidney disease. *Seminars in Nephrology*, *35*(4), 359–372. https://www.sciencedirect.com/science/article/pii/S0270929515000893

Losso, R. L., Minhoto, G. R., & Riella, M. C. (2015). Sleep disorders in patients with end-stage renal disease undergoing dialysis: Comparison between hemodialysis, continuous ambulatory peritoneal dialysis and automated peritoneal dialysis. *International Urology and Nephrology*, *47*(2), 369–375. https://idp.springer.com/authorize/casa?redirect_uri=https://link.springer.com/article/10.1007/s11255-014-0860-5&casa_token=k8Z8eN-Jo6EAAAAA:XjHLrHvPsHfrKdIC3r_8FcgioAT_lVYGoP3Mjux5IyDhr65-PTHHQD5CXfQG8LdKnWE3ag1kHp15TDqn_A

Lyons, O. D. (2024). Sleep disorders in chronic kidney disease. *Nature Reviews Nephrology*, 1–11. https://www.nature.com/articles/s41581-024-00848-8

Montazeri, A., Mohammadi, S., M.Hesari, P., Ghaemi, M., Riazi, H., & Sheikhi-Mobarakeh, Z. (2023). Preliminary guideline for reporting bibliometric reviews of the biomedical literature (BIBLIO): A minimum requirements. *Systematic Reviews*, *12*(1), 239. https://doi.org/10.1186/s13643-023-02410-2

Neale, E. P., Do Rosario, V., Probst, Y., Beck, E., Tran, T. B., & Lambert, K. (2023). Lifestyle interventions, kidney disease progression, and quality of life: A systematic review and meta-analysis. *Kidney Medicine*, *5*(6), 100643. https://www.sciencedirect.com/science/article/pii/S2590059523000535

Novak, M., Winkelman, J. W., & Unruh, M. (2015). Restless legs syndrome in patients with chronic kidney disease. *Seminars in Nephrology*, *35*(4), 347–358. https://www.sciencedirect.com/science/article/pii/S0270929515000881

Pranckutė, R. (2021). Web of Science (WoS) and Scopus: The titans of bibliographic information in today's academic world. *Publications*, *9*(1), 12. https://www.mdpi.com/2304-6775/9/1/12

Reed, M. S., Ferré, M., Martin-Ortega, J., Blanche, R., Lawford-Rolfe, R., Dallimer, M., & Holden, J. (2021). Evaluating impact from research: A methodological framework. *Research Policy*, *50*(4), 104147. https://www.sciencedirect.com/science/article/pii/S0048733320302225

Ricardo, A. C., Knutson, K., Chen, J., Appel, L. J., Bazzano, L., Carmona-Powell, E., Cohan, J., Tamura, M. K., Steigerwalt, S., & Thornton, J. D. (2017). The association of sleep duration and quality with CKD progression. *Journal of the American Society of Nephrology*, *28*(12), 3708–3715. https://journals.lww.com/JASN/fulltext/2017/12000/The_Association_of_Sleep_Duration_and_Quality_with.30.aspx

Roumelioti, M.-E., Argyropoulos, C. P., & Unruh, M. L. (2021). Sleep disorders in patients with CKD and ESRD. In *Psychosocial Aspects of Chronic Kidney Disease* (pp. 183–212). Elsevier. https://www.sciencedirect.com/science/article/pii/B9780128170809000099

Scherer, J. S., Combs, S. A., & Brennan, F. (2017). Sleep disorders, restless legs syndrome, and uremic pruritus: Diagnosis and treatment of common symptoms in dialysis patients. *American Journal of Kidney Diseases*, *69*(1), 117–128. https://www.sciencedirect.com/science/article/pii/S0272638616304188

Shieu, M., Morgenstern, H., Bragg-Gresham, J., Gillespie, B. W., Shamim-Uzzaman, Q. A., Tuot, D., Saydah, S., Rolka, D., Burrows, N. R., & Powe, N. R. (2020). US trends in prevalence of sleep problems and associations with chronic kidney disease and mortality. *Kidney360*, *1*(6), 458–468. https://journals.lww.com/Kidney360/fulltext/2020/06000/US_Trends_in_Prevalence_of_Sleep_Problems_and.5.aspx

Sun, Z.-R., Han, H.-M., Sun, X.-C., & Zhu, K.-Y. (2023). Bibliometric analysis of quality of life in peritoneal dialysis patients. *Nursing Communications*, *7*. https://www.tmrjournals.com/public/articlePDF/20230226/fda95cb208a8f103a7d60f49c09d7481.pdf

Tan, L.-H., Chen, P.-S., Chiang, H.-Y., King, E., Yeh, H.-C., Hsiao, Y.-L., Chang, D. R.,

Copyright ©Autor, 2025. Jurnal Keperawatan Respati Yogyakarta, p-ISSN: 2088-8872; e-ISSN: 2541-2728

Chen, S.-H., Wu, M.-Y., & Kuo, C.-C. (2022). Insomnia and Poor Sleep in CKD: A Systematic Review and Meta-analysis. *Kidney Medicine*, *4*(5), 100458. https://doi.org/10.1016/j.xkme.2022.100458

Tao, Z., Feng, Y., Wang, J., Zhou, Y., & Yang, J. (2024). Global scientific trends in continuous renal replacement therapy from 2000 to 2023: A bibliometric and visual analysis. *Blood Purification*, *53*(6), 436–464. https://karger.com/bpu/article/53/6/436/895231

Tessema, B., Sack, U., König, B., Serebrovska, Z., & Egorov, E. (2022). Effects of intermittent hypoxia in training regimes and in obstructive sleep apnea on aging biomarkers and age-related diseases: A systematic review. *Frontiers in Aging Neuroscience*, *14*, 878278. https://www.frontiersin.org/articles/10.3389/fnagi.2022.878278/full

Thelwall, M., & Sud, P. (2022). Scopus 1900–2020: Growth in articles, abstracts, countries, fields, and journals. *Quantitative Science Studies*, *3*(1), 37–50. https://direct.mit.edu/qss/article-abstract/3/1/37/109076

Umbro, I., Fabiani, V., Fabiani, M., Angelico, F., & Del Ben, M. (2020). A systematic review on the association between obstructive sleep apnea and chronic kidney disease. *Sleep Medicine Reviews*, *53*, 101337. https://www.sciencedirect.com/science/article/pii/S1087079220300800

Van Eck, N. J., & Waltman, L. (2014). Visualizing Bibliometric Networks. In Y. Ding, R. Rousseau, & D. Wolfram (Eds.), *Measuring Scholarly Impact* (pp. 285–320). Springer International Publishing. https://doi.org/10.1007/978-3-319-10377-8_13

Van Eck, N., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, *84*(2), 523–538. https://akjournals.com/view/journals/11192/84/2/article-p523.xml

Wang, Y., Yang, L., & Lei, Y. (2024). The global status of nursing research on hemodialysis: A bibliometric and visualized analysis. *Medicine*, *103*(39), e39707. https://journals.lww.com/md-journal/fulltext/2024/09270/the_global_status_of_nursing_research_on.33.aspx

Yamamoto, R., Shinzawa, M., Isaka, Y., Yamakoshi, E., Imai, E., Ohashi, Y., Hishida, A., & Investigators, C.-J. (2018). Sleep quality and sleep duration with CKD are associated with progression to ESKD. *Clinical Journal of the American Society of Nephrology*, *13*(12), 1825–1832. https://journals.lww.com/cjasn/fulltext/2018/12000/Sleep_Quality_and_Sleep_Duration_with_CKD_are.11.aspx

Yang, B., Xu, J., Xue, Q., Wei, T., Xu, J., Ye, C., Mei, C., & Mao, Z. (2015). Non-pharmacological interventions for improving sleep quality in patients on dialysis: Systematic review and meta-analysis. *Sleep Medicine Reviews*, *23*, 68–82. https://www.sciencedirect.com/science/article/pii/S1087079214001294

Yuan, G., Yang, Y., Lin, Y., Lin, J., & Wu, Y. (2024). Current status and development trends in CKD with frailty research from 2000 to 2021: A bibliometric analysis. *Renal Failure*, *46*(1), 2292142. https://doi.org/10.1080/0886022X.2023.2292142

Yuan, X., Li, H., Zhou, L., & Huang, Y. (2020). A bibliometric analysis of the 100 most influential papers on peritoneal dialysis. *Medicine*, *99*(47), e23115. https://journals.lww.com/md-journal/fulltext/2020/11200/A_bibliometric_analysis_of_the_100_most.27.aspx

Zahraa, A.-N., & Khamaal, A.-K. (2024). Melatonin, syndrome melatonin dysfunction and its role as a sleep promoting hormone. *Alnakhla Journal of Science (AJOS)*, *13*(2). https://alnakhlajos.com/index.php/AJOS/article/view/24

Zamarrón, E., Jaureguizar, A., García-Sánchez, A., Díaz-Cambriles, T., Alonso-Fernández, A., Lores, V., Mediano, O., Rodríguez-Rodríguez, P., Cabello-Pelegrín, S., & Morales-Ruíz, E. (2021). Obstructive sleep apnea is associated with impaired renal function in patients with diabetic kidney disease. *Scientific Reports*, *11*(1), 5675. https://www.nature.com/articles/s41598-021-85023-w

Copyright ©Autor, 2025. Jurnal Keperawatan Respati Yogyakarta, p-ISSN: 2088-8872; e-ISSN: 2541-2728