

The Effect of Telenursing on the Quality of Life of Chronic Kidney Disease Patients Undergoing Hemodialysis

A Systematic Literature Review

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ARTICLE INFO

Article history

Received 9 February 2026

Revised 24 June 2026

Accepted 7 July 2026

Keywords

Chronic Kidney Disease

Hemodialysis

Quality of Life

Telenursing

ABSTRACT

Chronic Kidney Disease (CKD) is a growing global health issue that significantly impacts renal function and patients' quality of life, particularly those undergoing hemodialysis. Patients' quality of life is influenced by clinical, psychological, and environmental factors, where limited access to healthcare services often presents a barrier. Telenursing has emerged as a health technology innovation to provide remote nursing care to support disease management. This study aims to synthesize the effect of telenursing on the quality of life of CKD patients undergoing hemodialysis. The method used was a literature review searching articles via international databases Scopus, ProQuest, and PubMed. The search was limited to full-text English articles published between 2019 and 2024 using the keywords "hemodialysis", "telenursing", and "quality of life". The selection process yielded 9 articles meeting the inclusion criteria. The review results indicate that telenursing interventions significantly improved quality of life scores, self-efficacy, and medication adherence compared to standard care. In conclusion, telenursing is effective as a holistic intervention model to enhance the quality of life for hemodialysis patients, although its implementation still faces challenges regarding infrastructure and digital literacy.

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Introduction

Chronic Kidney Disease (CKD) is an increasingly concerning global health problem characterized by a gradual decline in renal function, and according to the latest World Health Organization (WHO) report, it ranks as one of the leading causes of death worldwide with an annually rising prevalence [1]. WHO survey results indicate that approximately one in ten people worldwide are identified as suffering from chronic kidney disease, with an estimated 5 to 10 million deaths each year attributed to this condition [2].

In Indonesia, the prevalence of chronic kidney disease also presents significant figures. The 2018 Basic Health Research (Riskesdas) report recorded a prevalence of 0.38% in the population aged ≥ 15 years, amounting to approximately 739,208 individuals, with 19.3% of these patients having a history of or currently undergoing dialysis [3]. Demographically, the disease is most prevalent in the 65–74 age group (0.82%) and is more dominant in males (0.42%) compared to females (0.35%) [4]. Of this affected population, national data indicate that around 2,850 patients are actively undergoing routine hemodialysis treatment [4]. The Special Region of Yogyakarta (DIY) ranks third with a proportion of 35.51%, following DKI Jakarta and Bali [3].

The quality of life of CKD patients undergoing hemodialysis is heavily influenced by various complex factors, including clinical, psychological, and environmental aspects. Clinical factors include medical complications such as anemia, malnutrition, and electrolyte imbalances that affect physical condition [5]. Meanwhile, psychological factors such as anxiety, depression, and body image disturbances pose major challenges for patients [5]. On the other hand, environmental factors, including family support, access to health facilities, and financial conditions, also play a crucial role [5]. Unfortunately, patients in remote areas or with economic limitations often face significant barriers in accessing adequate conventional health services.

In response to these accessibility challenges, telenursing has emerged as a relevant health technology innovation. Telenursing is viewed as an integral part of nursing technology that enables patients to receive professional assistance, self-care education, and information regarding signs and symptoms of complications without distance limitations [6]. This meaningful relationship facilitated by telenursing has the potential to maintain a good quality of life for patients through a holistic approach [6]. This aligns with the national health system transformation agenda by the Ministry of Health of the Republic of Indonesia, which focuses on utilizing digital technology to enhance efficiency and expand service access [7].

Despite its great potential, the implementation of telenursing in Indonesia still faces obstacles, such as uneven technological infrastructure in rural areas and the need for improved digital literacy [8]. Furthermore, while global implementation of telehealth is advancing

rapidly, comprehensive evidence regarding its multifaceted impact on CKD patients in developing contexts like Indonesia remains limited. Therefore, this study aims to fill this gap by not only synthesizing international evidence but also categorizing specific telenursing modalities to understand their tailored impacts on physical and psychological quality of life domains. This synthesis provides a foundational framework to adapt digital health interventions to regional infrastructure capabilities. This article is structured to include the literature search method, the synthesis results of selected articles, a discussion on the implications of the findings, and a conclusion.

Material and Methods

A. Study Design

This study employed a comprehensive literature review design to systematically synthesize research findings regarding the effectiveness of telenursing on the quality of life of patients with Chronic Kidney Disease (CKD) undergoing hemodialysis. A literature review is defined as a method used to gather, analyze, and synthesize data from various sources such as journals, books, and documentation relevant to a specific research topic [9]. This method involves a rigorous series of activities including collecting library data, reading, recording, and managing writing materials to answer specific research questions [10]. The study was conducted after identifying the research problem but before any field data collection, relying entirely on secondary data sources [11]. The review process adhered to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure the selection process was systematic, transparent, and reproducible. While a formal review protocol was not prospectively registered in a database such as PROSPERO, the systematic search and extraction strictly adhered to a predefined methodological framework and explicit eligibility criteria to minimize bias.

B. Data Sources and Search Strategy

To ensure access to high-quality, peer-reviewed medical and nursing literature, the data search was conducted using three primary international databases: Scopus, ProQuest, and PubMed. These databases were selected due to their comprehensive coverage of health and nursing sciences. The search strategy employed Boolean operators (AND, OR) to combine specific keywords, systematically applying automated database filters to restrict the initial results to full-text, English-language articles published between 2019 and 2024.

The specific keywords used were: "hemodialysis" OR "dialysis" AND "Telenursing" OR "telehealth" OR "E-health" AND "quality of life" OR "QOL". This search string was designed to broaden the search to include various terminologies used in different regions while maintaining focus on the core variables of the study. The search was conducted to identify relevant articles published within the last five years, specifically from 2019 to 2024. This

timeframe was chosen to capture the most recent technological advancements in telenursing and the latest trends in hemodialysis care.

C. Eligibility Criteria

Strict inclusion and exclusion criteria were established to ensure the relevance and quality of the reviewed articles. The inclusion criteria were: (1) original research articles utilizing quantitative, qualitative, or mixed-method designs; (2) articles available in full text; (3) articles written in the English language to ensure international applicability; and (4) studies explicitly focusing on telenursing interventions for hemodialysis patients. Articles were excluded if they were review articles (systematic reviews or meta-analyses without original data), book chapters, conference proceedings, or studies where the primary outcome was not related to quality of life.

Table 1. Search Strategy and Eligibility Criteria.

Component	Details
Database	Scopus, ProQuest, PubMed
Keywords	("hemodialysis" OR "dialysis") AND ("Telenursing" OR "telehealth" OR "E-health") AND ("quality of life" OR "QOL")
Publication Year	2019 – 2024 (Last 5 years)
Language	English
Article Type	Original Research (Full Text)
Exclusion Criteria	Review articles, book chapters, conference proceedings, or studies not focusing on QoL outcomes.

D. Data Selection and Extraction Process

The initial search across the selected databases yielded a total of 2,586 records, comprising 10 articles from Scopus, 137 from ProQuest, and 2,439 from PubMed. All identified records were imported into reference management software, and duplicates were removed. A total of 10 duplicate records were identified and excluded, leaving 2,576 articles for the screening phase. Specifically, each selected article was meticulously verified to ensure it involved an active telenursing intervention directly compared to standard care, with a clear, quantifiable measurement of quality of life outcomes.

The screening process involved a two-stage review. First, titles and abstracts were screened against the inclusion criteria. A total of 2,551 articles were excluded at this stage due to irrelevance (e.g., wrong population, unrelated intervention). Following the initial screening, 25 articles were sought for full-text retrieval. However, 16 reports could not be retrieved due to access limitations or incomplete data. The remaining 9 full-text articles were assessed for eligibility and met all inclusion criteria. These 9 studies were included in the final qualitative synthesis. The detailed flow of the article selection process is illustrated in the PRISMA flow diagram (Fig. 1).

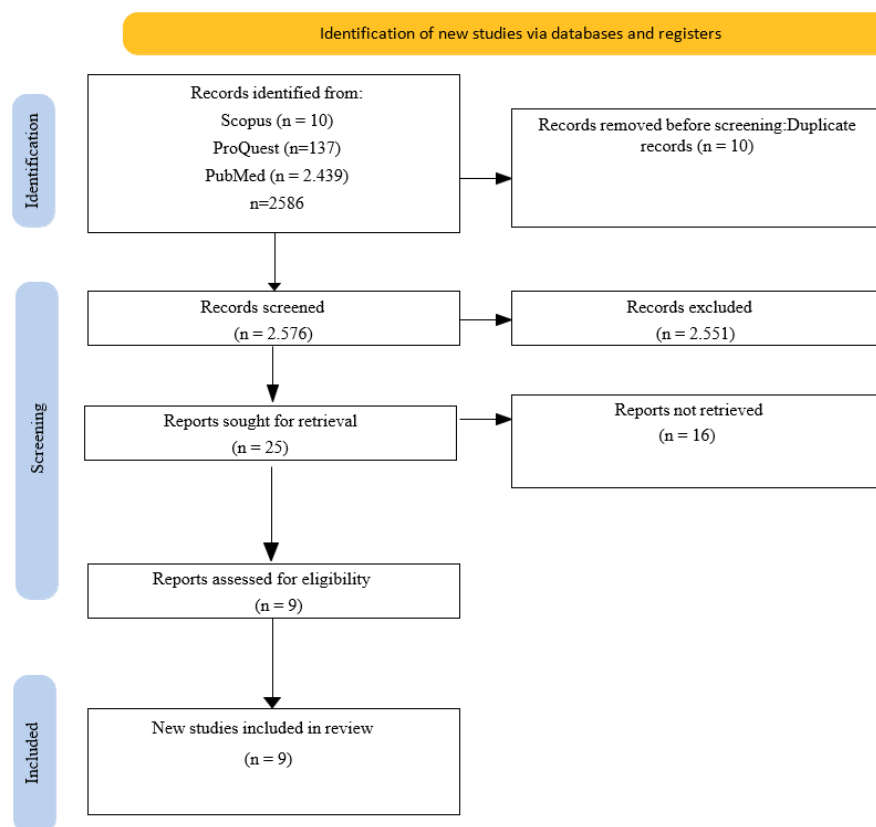


Fig. 1. PRISMA Flow Diagram.

E. Data Analysis

Data from the selected articles were extracted and synthesized using a narrative approach. The extraction focused on key information including author, year of publication, country of origin, study objectives, sample size, methodology, key findings, and conclusions. A meta-analysis was not performed due to the heterogeneity of the study designs (ranging from Randomized Controlled Trials to Quasi-Experimental and Pilot studies). Instead, a thematic analysis was conducted to identify common patterns and the effectiveness of telenursing interventions on physical, psychological, and social domains of quality of life.

Results and Discussions

A. Included Articles

A total of nine studies were included in the final review, originating from diverse geographical regions including Southeast Asia (Thailand, Indonesia), East Asia (China, Taiwan, South Korea), South Asia (Bangladesh), the Middle East (Egypt), and Europe (UK, Netherlands, Turkey), as illustrated in Fig. 2.

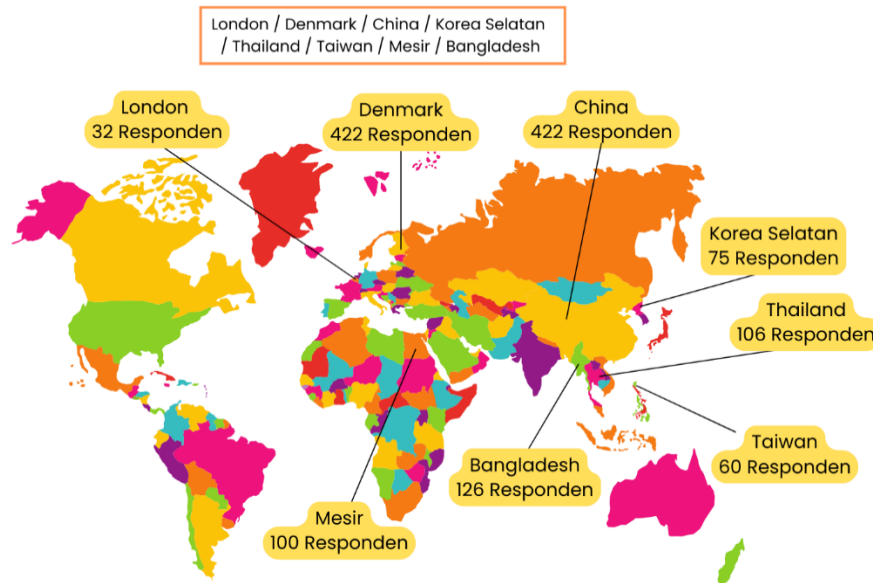


Fig. 2. Geographical Distribution of the Included Studies.

Fig. 2. Geographical Distribution of the Included Studies. This map shows the countries where the primary studies were conducted, based on the extracted data. (Map generated by the authors). The studies employed various research designs, including Randomized Controlled Trials (RCTs), Quasi-Experimental designs, and Mixed Methods. The interventions varied from mobile applications and WhatsApp-based education to comprehensive telehealth management systems. A summary of the characteristics and key findings of the included studies is presented in Table 2.

Table 2. Summary of Included Studies.

No	Author	Year	Country	Study Design	Sample	Intervention / Instrument	Key Findings
1	Parker et al. [13]	2024	United Kingdom	Pilot RCT	32 HD patients	E-health Self-Acupressure	Significant improvement in Quality of Life (EQ-5D-5L Index: +0.053) and reduced symptom burden. Adherence to protocol was 82%.
2	Duman & Karadakovan [8]	2024	Turkey	Clustered RCT	48 HD patients	Video training (e-health)	Significant decrease in symptom burden and improvement in comfort level and quality of life ($p < 0.05$).
3	Pungchompoo et al. [14]	2024	Thailand	Mixed Methods	54 elderly HD patients	Home Telehealth Model	Significant improvement in mental health scores ($P < 0.05$) after 3 months. Feasible holistic care approach for the elderly.
4	Li et al. [16]	2020	Taiwan	Prospective Experimental	60 CKD patients	Wearable Device & Health Platform	Intervention group showed significantly higher self-efficacy and quality of life (KDQOL-

No	Author	Year	Country	Study Design	Sample	Intervention / Instrument	Key Findings
5	Selima et al. [17]	2023	Egypt	Quasi-experimental	100 HD patients	Tele-nursing Education (WhatsApp)	SF) scores compared to control ($P < 0.001$). QoL scores increased significantly from 52.1 ± 4.9 (pre) to 80.6 ± 5.4 (post) ($p < 0.0001$). Effective for self-efficacy.
6	Kitrenu et al. [18]	2023	Thailand	Quasi-experimental	52 PD patients	Community Health Nurse Telehealth Care (CHNTC)	Significant improvement in self-management ($p < 0.05$) and specific QoL domains ($p < 0.01$) compared to control.
7	Pack & Lee [19]	2021	South Korea	RCT	75 HD patients	Smartphone-based Diet Management	QoL scores improved in the experimental group (53.22 to 62.00) compared to the control after 8 weeks.
8	Nadort et al. [20]	2022	Netherlands	Cluster RCT	190 HD patients	Guided internet-based self-help therapy	Evaluated internet-based therapy for depressive symptoms. While highly engaging, it highlights the need for tailored digital accessibility to significantly impact specific psychological outcomes.
9	Sarker et al. [21]	2022	Bangladesh	RCT	126 CKD patients	Mobile Health Education	Significant improvement in CKD knowledge ($P < 0.001$) and BP control. QoL difference was not statistically significant in this study.

B. Demographic Characteristics and Telenursing Modalities

The analysis of the included studies reveals that the majority of participants were male (54.80%) compared to females (45.20%). This finding aligns with broader epidemiological data suggesting a higher prevalence of lifestyle-related risk factors, such as hypertension and smoking, among men, which contributes to the progression of chronic kidney disease [12]. In terms of age distribution, the respondents were predominantly adults aged 45–54 years (55.55%) and the elderly aged 60 years and above (33.33%). Age is a critical determinant of quality of life; elderly patients undergoing hemodialysis are particularly vulnerable to declining physical function, anxiety, and depression. Pungchompoo et al. [14] highlighted that elderly patients face unique challenges, including limited mobility and social support, which telenursing aims to address through remote monitoring. The detailed demographic characteristics of the participants are presented in Fig. 3.

Rather than a uniform approach, the telenursing modalities identified can be categorized into distinct themes: (1) Teleconsultation and Education (interventions utilizing platforms like WhatsApp or video calls for direct communication); (2) Mobile Health (mHealth) Applications

(smartphone-based apps for self-care monitoring); and (3) Integrated Telehealth Management Systems & Wearables (systems providing continuous physiological data monitoring).

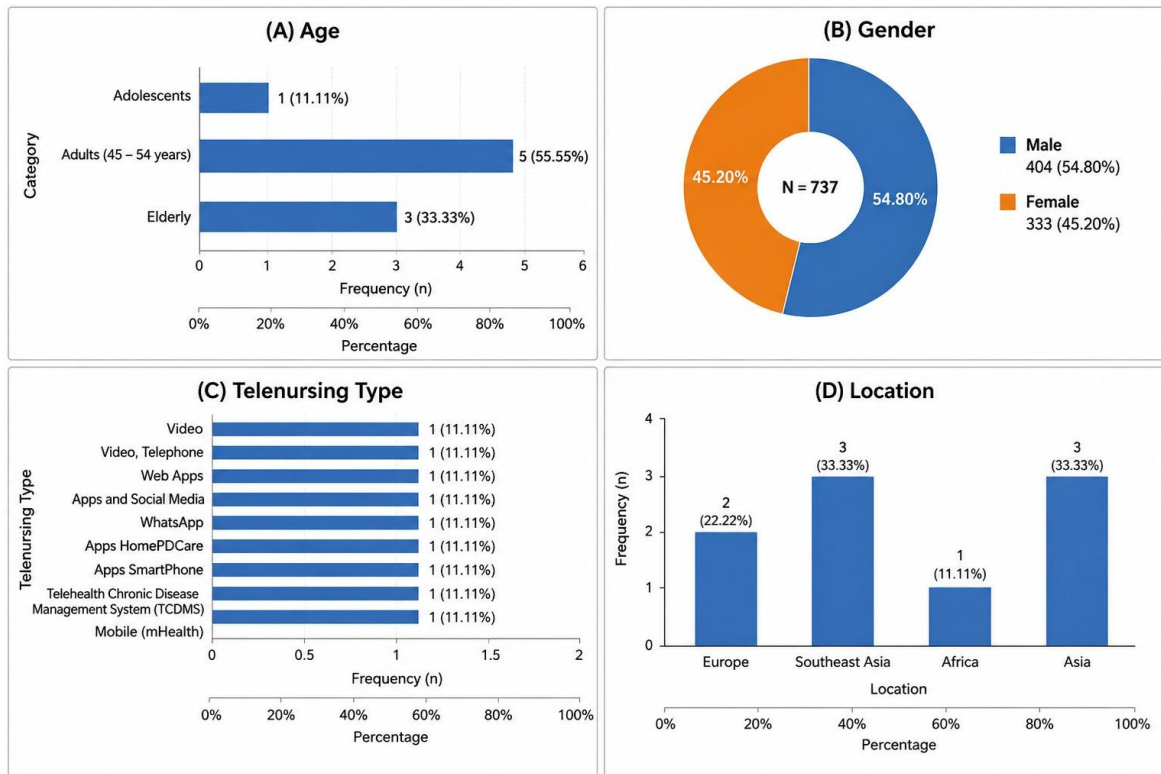


Fig. 3. Demographic Characteristics of Participants.

C. Effectiveness of Telenursing on Quality of Life

The synthesis of evidence strongly supports the positive impact of telenursing on the quality of life (QoL) of hemodialysis patients. The most frequently used instruments to measure QoL were the EQ-5D-5L and the Kidney Disease Quality of Life (KDQOL-SF), as shown in Fig. 3.

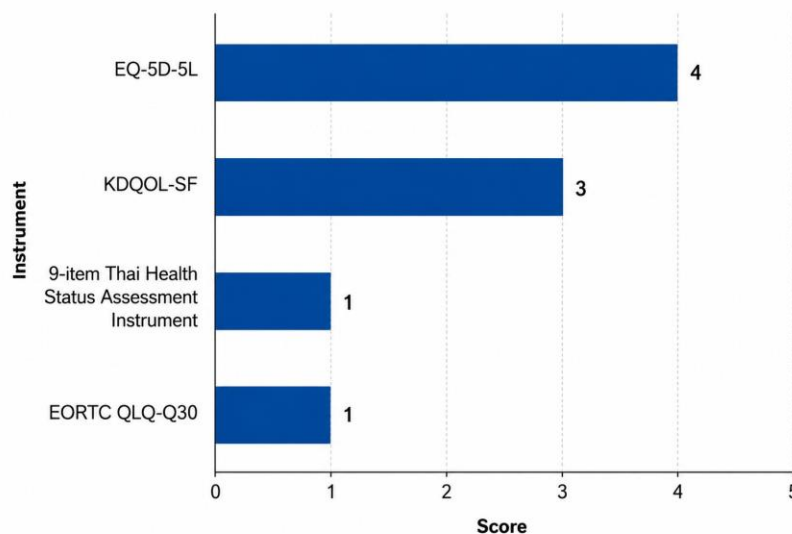


Fig. 4. Frequency of QoL Instruments Used in Selected Studies.

The data represent the absolute count of specific Quality of Life measurement tools utilized across the included primary studies. Telenursing interventions proved effective in enhancing both physical and mental domains of QoL. For instance, Selima et al. [17] reported a substantial increase in QoL scores among patients receiving WhatsApp-based education, with mean scores rising from 52.1 ± 4.9 at baseline to 80.6 ± 5.4 after the intervention ($p < 0.0001$). This improvement is attributed to increased patient knowledge and self-efficacy in managing their condition. Similarly, Parker et al. [13] demonstrated that an e-health intervention combined with self-acupressure led to a statistically significant improvement in the EQ-5D-5L index ($+0.053$) and a reduction in symptom burden.

Furthermore, Li et al. [16] found that the use of wearable devices integrated with a health management platform significantly improved self-efficacy and slowed the decline of glomerular filtration rates. This suggests that real-time monitoring and feedback mechanisms provided by telenursing empower patients to take an active role in their care, leading to better psychological well-being and clinical outcomes. Corroborating these findings, an original clustered randomized controlled trial by Duman & Karadakovan [8] demonstrated that video-based e-health training significantly decreased symptom burden and improved the overall comfort level and quality of life for hemodialysis patients. Furthermore, guided internet-based interventions, such as those evaluated by Nadort et al. [19], underscore the ongoing clinical efforts to address depressive symptoms through digital platforms. This emphasizes the critical shift toward integrating continuous e-health support to alleviate both the physical and psychological burdens experienced by patients across diverse populations.

D. Barriers and Challenges in Implementation

Despite the demonstrated benefits, the implementation of telenursing is not without challenges. The review identified infrastructure limitations, such as unstable internet connections in rural areas, as a significant barrier to effective service delivery. Additionally, digital literacy remains a concern, particularly among older adult populations who may struggle with operating smartphone applications or telehealth platforms.

Similarly, evaluating internet-based treatments, Nadort et al. [19] emphasized that successful patient participation in eHealth relies heavily on tailored digital accessibility. Without user-friendly interfaces and adequate digital health literacy training, the potential benefits of telenursing may not be fully realized, leading to high dropout rates in digital interventions. Sarker et al. [21] noted that while mobile health education improved knowledge, it did not immediately translate to significant QoL improvements in their specific setting, potentially due to these implementation barriers or short follow-up periods. Therefore, future implementations must prioritize user-centric design and infrastructure support to ensure equitable access for all patients.

Conclusion

Based on the synthesis of the reviewed literature, telenursing interventions have a significant positive impact on the quality of life of patients with Chronic Kidney Disease (CKD) undergoing hemodialysis. The implementation of various telenursing modalities—ranging from simple WhatsApp-based education to integrated telehealth systems—has been shown to improve physical health, mental well-being, self-efficacy, and medication adherence.

The review highlights that demographic factors play a crucial role globally. While telenursing offers a universally promising solution, its successful adaptation in developing contexts like Indonesia requires contextualization. Applying these global findings locally is contingent upon systematically improving rural technological infrastructure and adapting applications to the digital literacy levels of patients and healthcare providers.

Limitation and Suggestions

This study has several limitations. First, as a literature review, the analysis relies on secondary data from published articles, which may have their own biases. Second, the search was limited to articles published in English between 2019 and 2024, potentially missing relevant studies published in other languages or outside this timeframe. Lastly, the heterogeneity of the interventions and measurement instruments across the included studies prevented a statistical meta-analysis.

Conflict of Interest

The authors declare no conflict of interest regarding the publication of this article.

References

- [1] World Health Organization, *Chronic Kidney Disease: Global Report on Health*. Geneva, Switzerland: World Health Organization, 2023.
- [2] Harwadi, H., Fajriani, R., Yurnalisa, M., Aryetmi, A., & Efianti, Y. (2025). Gagal Ginjal Kronis dan Faktor Risiko pada Kelompok Usia Remaja Akhir hingga Usia Dewasa Awal: Studi Kasus. *Jurnal Keperawatan*, 17(3), 643-652.
- [3] Kementerian Kesehatan Republik Indonesia, *Laporan Nasional Riset Kesehatan Dasar (Riskesdas) 2018*. Jakarta, Indonesia: Badan Penelitian dan Pengembangan Kesehatan, 2018.
- [4] Kementerian Kesehatan Republik Indonesia, *Profil Kesehatan Indonesia Tahun 2019*. Jakarta, Indonesia: Kementerian Kesehatan Republik Indonesia, 2019.
- [5] J. Himmelfarb and T. A. Ikizler, "Chronic kidney disease," *The New England Journal of Medicine*, vol. 363, no. 19, pp. 1833–1845, 2010, doi: 10.1056/NEJMra1000677
- [6] W. Kongsuwan, J. Borvornluck, and R. C. Locsin, "Enhancing caring in nursing practice through technological competency as caring in nursing theory," *Nursing Science Quarterly*, vol. 31, no. 3, pp. 271–276, 2018.
- [7] Kementerian Kesehatan Republik Indonesia, *Cetak Biru Strategi Transformasi Digital Kesehatan 2024*. Jakarta, Indonesia: Kementerian Kesehatan Republik Indonesia, 2021.
- [8] H. T. Duman and A. Karadakovan, "The effect of video training on symptom burden, comfort level, and quality of life in hemodialysis patients: Clustered randomized controlled trial," *Patient Education and Counseling*, vol. 126, Art. no. 108314, 2024.
- [9] M. Zed, *Metode Penelitian Kepustakaan*. Jakarta, Indonesia: Yayasan Obor Indonesia, 2008.
- [10] Nursalam, *Metodologi Penelitian Ilmu Keperawatan: Pendekatan Praktis*. Jakarta, Indonesia: Salemba Medika, 2016.

- [11] H. Darmadi, *Metode Penelitian Pendidikan*. Bandung, Indonesia: Alfabeta, 2011.
- [12] A. Vignesh *et al.*, "Effects of dietary approaches to prevent hypertension and enhance cardiovascular health," *Discover Food*, vol. 5, no. 1, Art. no. 9, 2025.
- [13] K. Parker, S. Raugust, B. Vink, K. Parmar, and A. Fradsham, "Effects of self-acupressure on symptom burden and quality of life in hemodialysis patients," *International Journal of Nursing Studies*, 2024, doi: 10.1016/j.ijnurstu.2024.112140.
- [14] W. Pungchompoo, S. Parinyachitta, S. Pungchompoo, W. Udomkhwamsuk, and P. Suwan, "The feasibility of integrating a home telehealth model for older persons living with hemodialysis," *BMC Geriatrics*, vol. 24, no. 1, Art. no. 378, 2024, doi: 10.1186/s12877-024-04949-2.
- [15] Z. Li, B. He, Y. Li, B. F. Liu, G. Zhang, S. Liu, *et al.*, "Synergizing nanosensor-enhanced wearable devices with machine learning for precision health management benefiting older adult populations," *ACS Nano*, vol. 19, no. 29, pp. 26273–26295, 2025, doi: 10.1021/acsnano.5c07084.
- [16] W. Y. Li, F. C. Chiu, J. K. Zeng, Y. W. Li, S. H. Huang, H. C. Yeh, *et al.*, "Mobile health app with social media to support self-management for patients with chronic kidney disease: Prospective randomized controlled study," *Journal of Medical Internet Research*, vol. 22, no. 12, Art. no. e19452, 2020, doi: 10.2196/19452.
- [17] E. M. Selima, N. A. Safaan, and S. A. El-Nagar, "Tele-nursing for hemodialysis patients: An interventional study," *International Journal of Nursing Studies*, vol. 138, Art. no. 113274, 2023.
- [18] P. Kitrenu, P. Jittanoon, and U. Boonyasopun, "Effectiveness of community health nurse telehealth care on self-management and quality of life in peritoneal dialysis patients," *Thailand Journal of Nursing*, vol. 42, no. 3, 2023.
- [19] S. Pack and J. Lee, "Randomised controlled trial of a smartphone application-based dietary self-management program on haemodialysis patients," *Journal of Clinical Nursing*, vol. 30, nos. 5–6, pp. 840–848, 2021, doi: 10.1111/jocn.15627
- [20] E. Nadort, R. W. Schouten, *et al.*, "Internet-based treatment for depressive symptoms in hemodialysis patients: A cluster randomized controlled trial," *General Hospital Psychiatry*, vol. 75, pp. 46–53, 2022.
- [21] M. H. R. Sarker, M. Moriyama, H. U. Rashid, M. M. Rahman, M. J. Chisti, S. K. Das, *et al.*, "Chronic kidney disease awareness campaign and mobile health education to improve knowledge, quality of life, and motivation for a healthy lifestyle among patients with chronic kidney disease in Bangladesh: Randomized controlled trial," *Journal of Medical Internet Research*, vol. 24, no. 8, Art. no. e37314, 2022, doi: 10.2196/37314.
- [22] Z. Zakariyati, N. S. Alhidayat, and D. E. Handayani, "Karakteristik pasien gagal ginjal kronik dengan *continuous ambulatory peritoneal dialysis* di RS TK II Pelamonia," *Garuda Pelamonia Jurnal Keperawatan*, vol. 4, no. 1, pp. 14–28, 2022.

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