

How to Improve the Quality of Life among Patients with Diabetes Undergoing Hemodialysis? A Systematic Review of Nursing Interventions

Muhammad Irwan*

Department of Nursing, STIKES Tengku Maharatu, Pekanbaru, Indonesia.

*Correspondence:

Muhammad Irwan, Department of Nursing, STIKES Tengku Maharatu, Pekanbaru, Indonesia.

Received: 19 Jun 2026; Accepted: 25 Jul 2026; Published: 05 Aug 2026

Citation: Muhammad Irwan. How to Improve the Quality of Life among Patients with Diabetes Undergoing Hemodialysis? A Systematic Review of Nursing Interventions. J Chronic Dis Prev Care. 2026; 3(4): 1-8.

ABSTRACT

Patients with diabetes undergoing hemodialysis due to diabetic kidney disease often experience reduced quality of life caused by physical limitations, psychological distress, treatment burden, and social challenges. This systematic review aimed to identify nursing interventions that improve the quality of life among patients with diabetes undergoing hemodialysis due to diabetic kidney disease. A systematic review was conducted using literature from ProQuest, ScienceDirect, and Google Scholar databases. Studies published in English between 2015 and 2025 were searched and selected according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Ten studies were included in this review. The identified nursing interventions were categorized into physical and non-physical interventions. Physical interventions, including aerobic exercise, resistance training, and nurse-led exercise programs, demonstrated positive effects on physical function and quality of life. Non-physical interventions, including motivational interviewing, cognitive behavioral interventions, and emotional intelligence education, contributed to improvements in psychological well-being and social functioning. Comprehensive nursing interventions involving physical, psychological, and social approaches have the potential to improve quality of life among patients with diabetes-related kidney disease undergoing hemodialysis. Future studies should further explore spiritual-based interventions as part of holistic nursing care.

Keywords

Diabetic Kidney Disease, Hemodialysis, Diabetes Mellitus, Nursing Interventions, Quality of Life.

Introduction

Diabetes mellitus is one of the leading causes of chronic kidney disease (CKD) worldwide and represents a major contributor to the increasing burden of end-stage kidney disease requiring renal replacement therapy. The progression of diabetic kidney disease is associated with structural and functional changes in the kidneys that may ultimately lead to kidney failure requiring hemodialysis. According to global health estimates, diabetes-related kidney complications continue to represent a significant public health challenge due to their impact on morbidity, healthcare costs, and patients' quality of life [1]. kidney disease is estimated to affect more than 850 million people worldwide [2]. In Southern Denmark, the prevalence and incidence of CKD stages 3–5 have been reported to range from 4.83% to 4.98%, with an annual

incidence rate of approximately 0.49% [3].

Hemodialysis (HD) remains the most widely used renal replacement therapy among patients with end-stage kidney disease, including those caused by diabetic kidney disease. Although advances in dialysis technology have improved patient survival, individuals with diabetes undergoing hemodialysis continue to experience complex challenges involving physical, psychological, social, and treatment-related dimensions [4]. Despite continuous advancements in hemodialysis technology and healthcare services, patients undergoing this therapy continue to experience complex challenges involving physical, psychological, spiritual, and social dimensions. Common symptoms experienced by patients include fatigue, muscle cramps, discomfort or pain, sleep disturbances, dyspnea, pruritus, emotional disorders such as depression, nausea, vomiting, and impaired elimination function. These conditions may significantly affect patients' ability to perform daily activities and subsequently reduce their overall quality of life.

Patients with diabetes undergoing hemodialysis often experience poorer health-related quality of life (HRQoL) compared with patients with non-diabetic kidney disease. This condition is influenced not only by dependence on dialysis therapy but also by the long-term complications of diabetes, including cardiovascular problems, impaired physical function, dietary restrictions, medication burden, and psychological distress. [5]. Reduced quality of life among this population is not only associated with impaired kidney function and dependence on dialysis therapy but is also influenced by limitations in daily activities, changes in social roles, psychological distress, and challenges in adapting to long-term chronic illness.

Therefore, nursing interventions for patients with diabetes undergoing hemodialysis should adopt a comprehensive and multidimensional approach addressing physical, psychological, behavioral, and social needs. Diabetes management requires continuous self-care behaviors, including medication adherence, dietary control, fluid management, and lifestyle modification. Consequently, nursing interventions may play an important role in improving treatment adherence, psychological adaptation, and overall quality of life in this vulnerable population [6].

This systematic review aims to identify and synthesize nursing interventions that contribute to improving the quality of life among patients with diabetes undergoing hemodialysis due to diabetic kidney disease. This review evaluates patient characteristics, types of nursing interventions, research methodologies, and reported outcomes from available studies to provide evidence regarding effective nursing strategies for this specific population. By understanding the effectiveness of non-pharmacological nursing interventions, this study is expected to support the development of comprehensive care strategies that address the physical, psychological, and social challenges experienced by patients with diabetes undergoing hemodialysis. Therefore, this review aims to provide scientific evidence regarding nursing interventions to improve quality of life among patients with diabetic kidney disease requiring hemodialysis therapy.

Methods

Study Design and Methodology

This study employed a systematic review design to identify and synthesize relevant research publications. A literature search was conducted to identify English-language studies published between 2015 and 2025. The literature search was performed using several electronic databases, including Google Scholar, ScienceDirect, and ProQuest. The search strategy was developed using a combination of keywords related to the research topic, including “quality of life”, “diabetes mellitus”, “diabetic kidney disease”, “diabetic nephropathy”, “end-stage renal disease”, “hemodialysis”, “nursing intervention”, and “randomized controlled trial (RCT)”. The article selection process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure a systematic process of identification, screening, eligibility assessment, and inclusion of relevant studies [7].

Inclusion and Exclusion Criteria

The inclusion criteria were established based on the PICO framework (Population, Intervention, Comparison, and Outcome). The population included adult patients with diabetes mellitus who developed diabetic kidney disease or end-stage kidney disease and were undergoing hemodialysis. The interventions examined were nursing-based interventions, including physical exercise programs, educational interventions, psychological interventions, and other non-pharmacological nursing approaches. The comparison group consisted of routine care or standard healthcare services. The primary outcome of interest was quality of life among patients undergoing hemodialysis. The exclusion criteria included review articles, research protocols or trial method papers, observational studies that did not evaluate nursing interventions, and studies involving hemodialysis patients without diabetes-related kidney disease.

Article Screening Process

The initial screening process was conducted by the author through evaluation of article titles and abstracts. Subsequently, full-text assessment was performed to determine the eligibility of studies according to the predefined inclusion and exclusion criteria.

Data Extraction

Data from eligible studies were extracted and organized into a structured table containing information regarding authors, participant characteristics including diabetes-related conditions, study design, nursing interventions, intervention duration, measurement instruments, and research outcomes.

Quality Appraisal

The methodological quality of the included studies was assessed using the Critical Appraisal Skills Programme (CASP) checklist. This appraisal process was conducted to identify the strengths and limitations of each study and to determine the level of confidence in the evidence obtained.

Data Analysis

Data were analyzed using a thematic analysis approach. The analytical process involved familiarization with the extracted data, identification of initial codes, grouping of similar intervention characteristics, development of themes based on recurring patterns, refinement of identified themes, and synthesis of final themes related to nursing interventions and quality-of-life outcomes among patients with diabetes undergoing hemodialysis [8].

Results

Literature Search Results

The literature search conducted across Google Scholar, ScienceDirect, and ProQuest identified a total of 18,440 publications. Specifically, 17,900 records were retrieved from Google Scholar, 21 from ScienceDirect, and 519 from ProQuest. Following the initial screening of titles and abstracts, studies that did not meet the research objectives and eligibility criteria were excluded. Subsequently, 11 full-text articles were assessed for eligibility. Of these, four articles were excluded because they did

not satisfy the predefined inclusion criteria.

Ultimately, ten articles met all eligibility criteria and were included in this systematic review (Figure 1). These studies primarily focused on nursing interventions designed to improve quality of life among patients with diabetes-related kidney disease undergoing hemodialysis. The characteristics of the included studies and the results of the data extraction are summarized in Table 1, including information on the authors, participant characteristics, study design, nursing interventions, outcome measures, and key findings.

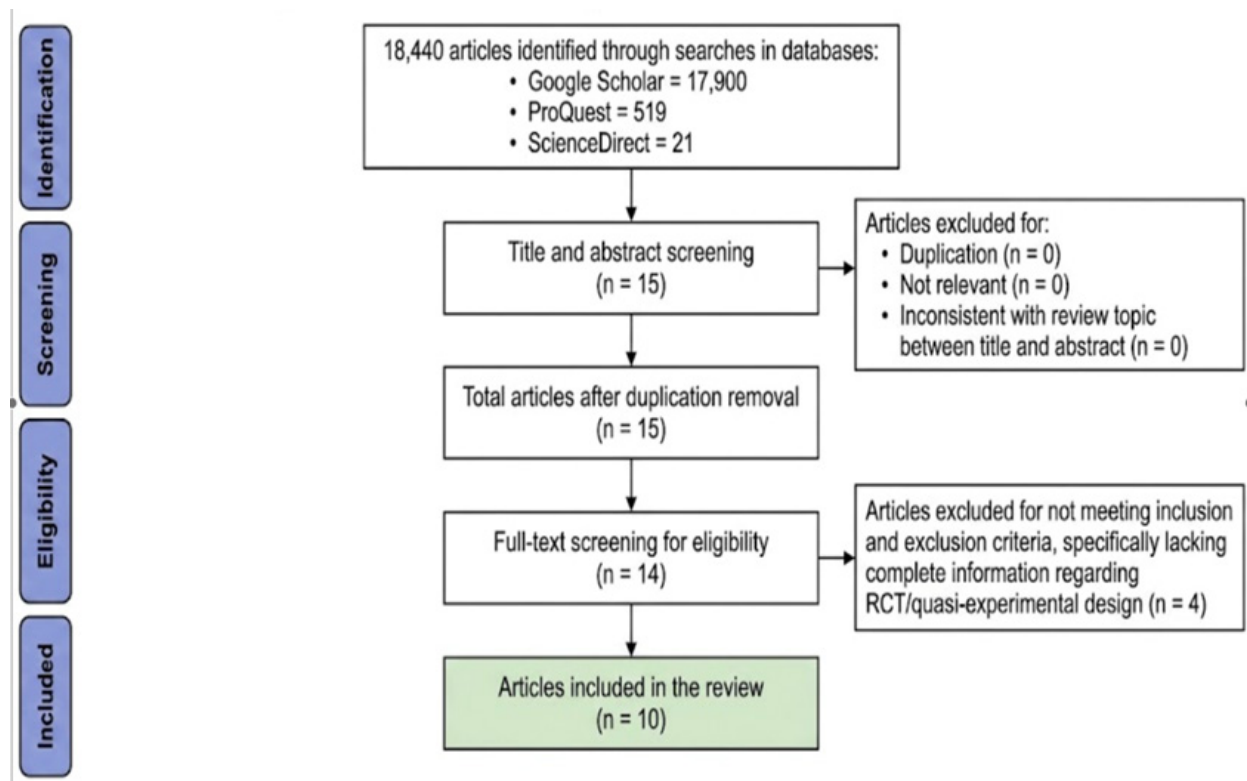


Figure 1: PRISMA Flow Diagram of Article Selections (PRISMA).

Table 1: Characteristics of Studies Included in the Systematic Review.

No.	Author	Study Design	Participants	Sample Size	Intervention	Duration	Control Group	Instrument	Main Findings
1	Tao et al., 2015	RCT	Group 1: Nurse-led home exercise case management (n = 57); Group 2: Center-based group exercise (n = 56); Control (n = 56)	113	Nurse-led home exercise case management	12 weeks	Center-based group exercise	KDQOL-36™	Statistical analysis demonstrated significant differences in quality of life between the intervention and control groups. The physical component showed a significant improvement (F(1,111)=7.251; p=0.027), whereas improvement in the mental component was not statistically significant (F(1,111)=4.291; p=0.117).
2	Shirazian et al., 2018	RCT	Cognitive behavioral therapy (n = 20); Education (n = 20); Control (n = 20)	40	Cognitive behavioral therapy	12 weeks	Dialysis education	KDQOL-36	Significant improvements in health-related quality of life (HRQoL) were observed at Weeks 8 and 16 compared with the control group. Statistical analysis indicated an 85% probability of detecting an 8-point improvement in KDQOL-36 scores.

3	Dashtidehkordi et al., 2018	Single-blind parallel RCT	Intervention: Motivational interviewing; Control: Disease-related group discussion	57	Motivational interviewing	Five intervention sessions	Disease-related group discussion	General Health Questionnaire (GHQ)	No significant difference in general health scores before intervention ($t=0.48$; $p=0.631$). One week after intervention, the intervention group showed significantly better general health than the control group ($t=3.12$; $p=0.003$).
4	Shahnavazi et al., 2018	RCT	Emotional intelligence education ($n = 21$); Conventional education ($n = 22$); Control ($n = 22$)	47	Emotional Intelligence (EI) education program	12 weeks	Conventional education	KDQOL-SF36	Quality-of-life scores increased from 39.4 before intervention to 44.87 and 52.47 following the intervention.
5	Abdelaal et al., 2019	RCT	Aerobic exercise ($n = 22$); Resistance exercise ($n = 22$); Control ($n = 22$)	66	Aerobic and resistance exercise training	3 months with 2-month follow-up	Routine care	6-Minute Walk Test (6MWT); Berg Balance Scale (BBS)	Both exercise programs significantly improved physical performance and functional balance. Aerobic exercise demonstrated superior short- and long-term effects compared with resistance exercise.
6	Huang et al., 2021	RCT	Breathing-based leg exercise ($n = 40$); Routine care ($n = 43$); Control ($n = 43$)	83	Breathing-based leg exercise	12 weeks	Routine care	WHOQOL-BREF	The intervention group demonstrated significantly greater improvements in quality of life than the control group ($p = 0.01$).
7	Ok & Kutlu, 2021	RCT	Motivational interviewing ($n = 30$); Face-to-face interview ($n = 30$); Control ($n = 30$)	60	Motivational interviewing	3 months	Face-to-face interview	SF-36	No statistically significant differences were found between groups; however, the intervention group showed noticeable improvements in quality-of-life scores from post-test to the 3-month follow-up.
8	Khazaei Ghozhdi et al., 2021	Randomized Clinical Trial	Intervention: Progressive muscle relaxation ($n = 30$); Control ($n = 30$)	60	Progressive muscle relaxation technique	Three 1-hour sessions followed by home practice twice daily for 12 weeks	No intervention	Fatigue Severity Scale (FSS), Visual Analog Scale (VAS), KDQOL-SF	No significant baseline differences were observed ($p > 0.05$). After three months, the intervention group showed significantly lower fatigue and pain levels and higher quality-of-life scores than the control group ($p < 0.05$).
9	Alkhagani, 2022	RCT	Intradialytic resistance exercise ($n = 32$); Regular physical activity ($n = 31$); Control ($n = 31$)	63	Exercise therapy	8 weeks	Regular physical activity	SF-36	HRQoL was significantly higher in the exercise group than in the control group ($p < 0.001$).
10	Kim et al., 2022	RCT	Intradialytic aerobic exercise ($n = 18$); Education session ($n = 21$); Control ($n = 21$)	39	Intradialytic aerobic exercise	12 weeks	Educational sessions	SF-36	Physical Component Summary scores improved significantly in the intervention group compared with the control group ($z = 2.79$, $p < 0.01$).

Table 2: Quality Assessment of Randomized Controlled Trial (RCT) Articles.

No	Quality Assessment Item	Article									
		1	2	3	4	5	6	7	8	9	10
1	Was true randomization used to assign participants to treatment groups?	N	Y	Y	Y	Y	Y	Y	Y	Y	N
2	Was allocation to treatment groups concealed?	Y	Y	U	Y	U	Y	Y	U	Y	Y
3	Were treatment groups similar at baseline?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4	Were participants blinded to treatment assignment?	N	U	N	N	N	N	N	N	Y	N/A
5	Were intervention providers blinded?	N	U	N	N/A	N	N	N	N	Y	N/A
6	Were outcome assessors blinded?	N	U	U	N/A	U	N	N	U	Y	N/A
7	Were treatment groups treated identically other than the intervention?	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
8	Was follow-up complete, or adequately explained and analyzed?	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
9	Were participants analyzed in the groups to which they were randomized (intention-to-treat)?	Y	Y	Y	Y	U	Y	Y	U	Y	Y
10	Were outcomes measured consistently across treatment groups?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
11	Were outcome measurements reliable?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
12	Was appropriate statistical analysis used?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
13	Was the study design appropriate, and were deviations from the standard RCT design adequately addressed?	Y	Y	Y	Y	Y	Y	Y	Y	Y	N/A

Abbreviations: Y = Yes; N = No; U = Unclear; N/A = Not Applicable

Quality Assessment Results

The methodological quality of the included randomized controlled trials (RCTs) was assessed using the Critical Appraisal Skills Programme (CASP) checklist for randomized controlled trials. The appraisal tool consisted of 13 methodological criteria, with each item evaluated using four response options: Yes, No, Unclear, and Not Applicable (N/A). A score of 1 was assigned for each “Yes” response, while “No”, “Unclear” and “N/A” responses were scored as 0. The overall methodological quality score for each study was calculated by dividing the total obtained score by the maximum applicable score and multiplying by 100%. The quality of the included studies was categorized as excellent (80–100%), satisfactory (50–79%), and unsatisfactory (<50%). The results of the methodological quality assessment are presented in Table 2.

Analytical Findings

The included studies involved adult patients with chronic kidney disease undergoing routine hemodialysis, including populations with diabetes-related kidney complications where reported. Across the selected studies, a total of 628 participants were analyzed. The largest sample size was reported by the selected studies. The study conducted by Tao et al., involving 113 participants [9] involving 113 participants, whereas the smallest sample size was observed in the study by Kim et. al (2022) involving 39 participants [10].

Types of Nursing Interventions

Based on the systematic review of the included studies, two major categories of nursing interventions aimed at improving quality of life among patients undergoing hemodialysis were identified:

1. **Physical exercise interventions**
2. **Non-physical interventions**

The effectiveness of these interventions was evaluated using a Randomized Controlled Trial (RCT) design.

Physical Exercise Interventions

One of the nursing strategies identified to improve the quality of life of patients with CKD undergoing hemodialysis was physical exercise intervention. Several forms of physical exercise interventions reported in the included studies consisted of:

- Resistance exercise,
- Intradialytic aerobic exercise programs,
- Breathing-based leg exercise programs,
- And nurse-led home physical exercise case management programs.

Each intervention differed in terms of implementation methods, intensity, and exercise modalities provided to patients. Based on the timing of implementation, physical exercise interventions among hemodialysis patients can be categorized into two major models:

Intradialytic Exercise

Intradialytic exercise refers to physical activity performed simultaneously during the hemodialysis session. Intradialytic exercise interventions were commonly performed during hemodialysis sessions, whereas non-intradialytic exercise interventions were conducted outside dialysis schedules, including home-based exercise programs supported by nurses.

Non-Intradialytic Exercise

Non-intradialytic exercise refers to physical activity performed outside the regular hemodialysis schedule, such as home-based exercise programs supported or monitored by nurses.

Among intradialytic exercise interventions, most programs involved aerobic activities without additional combined interventions during dialysis sessions. Although the types of physical activities varied across studies, these interventions can generally be classified into several exercise categories, including: The reported exercise

modalities included aerobic exercise, resistance training, strength training, flexibility exercise, and stretching programs.

The reviewed studies evaluated various exercise modalities, including aerobic activities, resistance training, and specific exercises designed to improve lower-limb muscle strength. Overall, physical exercise interventions demonstrated potential benefits in improving physical function, activity capacity, and quality of life among patients undergoing hemodialysis.

Non-Physical Interventions

The included studies demonstrated that non-physical nursing interventions, particularly motivational interviewing and educational programs, contributed to improvements in psychological well-being, behavioral adaptation, and quality of life. In this review, the educational interventions analyzed included emotional intelligence (EI) training and cognitive-behavioral training. The findings showed that both educational interventions had similar intervention durations, with each program being conducted for 12 weeks. Furthermore, the frequency of intervention delivery was also comparable, as both educational programs were conducted twice per week.

The educational content differed according to the intended learning objectives of each intervention. Cognitive-behavioral therapy focused on behavior shaping, cognitive restructuring to modify patients' perceptions and responses toward illness-related challenges, and other educational approaches tailored to the needs of individuals with CKD. Meanwhile, emotional intelligence training emphasized the development of five major emotional intelligence domains, including:

- Self-awareness,
- Self-management,
- Empathy,
- Relationship management,
- And emotional regulation.

In addition to educational interventions, motivational interviewing was identified as another important non-physical intervention. This intervention was designed to improve overall quality of life among hemodialysis patients by enhancing adherence to treatment protocols and promoting positive behavioral changes.

The motivational interviewing intervention was implemented over a three-month period. Motivational interviewing interventions were generally delivered over a three-month period through structured individual sessions aimed at improving treatment adherence and behavioral adaptation.. Each session lasted approximately 20–40 minutes, with most sessions conducted during the first two hours of the hemodialysis treatment period.

Overall, the findings indicate that non-physical interventions, including motivational interviewing and educational programs, have positive effects on improving the quality of life of patients with CKD undergoing hemodialysis. These approaches may complement physical interventions by addressing psychological,

behavioral, and emotional aspects associated with long-term dialysis management.

Discussion

Patients with diabetes undergoing hemodialysis represent a highly vulnerable population due to the combined burden of metabolic disorders, kidney failure, dialysis dependence, and psychosocial challenges. The progressive nature of diabetic kidney disease and the long-term requirement for hemodialysis management contribute significantly to reduced quality of life (QoL) [11]. This systematic review adopts the Ferrell et al. quality of life model, which was originally developed for breast cancer survivors and encompasses four major dimensions of QoL, including physical, psychological, social, and spiritual aspects. Holistic nursing interventions for patients with chronic kidney disease (CKD) undergoing hemodialysis should therefore address these multidimensional aspects of patient well-being. This review identified two major categories of nursing interventions aimed at improving QoL among hemodialysis patients with CKD, namely physical exercise interventions [12,13] and non-physical interventions, including educational interventions [5,14] and motivational interviewing [4]. In patients with diabetes-related kidney disease, these dimensions are particularly relevant because diabetes management requires continuous adaptation to dietary restrictions, medication adherence, lifestyle modification, and psychological adjustment.

Physical exercise interventions aimed at improving the quality of life of hemodialysis patients with CKD included breathing-based leg exercises, aerobic exercise programs, resistance exercise therapy, and nurse-led home physical exercise case management programs. Based on the reviewed studies, these interventions demonstrated significant improvements, particularly in the physical dimensions of quality of life. Alkhaqani reported that previous studies have consistently demonstrated the beneficial effects of physical exercise interventions, particularly aerobic and strength training, among patients with CKD [15,16]. These findings indicate that patients with diabetic kidney disease undergoing hemodialysis may benefit from regular physical exercise through improvements in physical capacity, functional ability, and daily activity performance. However, most previous studies have primarily focused on aerobic exercise as the main intervention modality. Other studies have also explored strength training as an alternative approach to improve physical function and patient outcomes [17,18].

The combination of home-based physical exercise and nurse-led case management has been shown to be effective in improving physical function and overall well-being among patients undergoing hemodialysis. This intervention was designed to support regular physical activity at home through nursing supervision, with outcome measurements including quality of life, 10-repetition sit-to-stand performance, and gait speed. The intervention group demonstrated greater improvements in normal walking speed, while both groups showed improvements in 10-repetition sit-to-stand performance. However, only the intervention group

experienced significant improvements in quality of life across the three assessment periods. Additional research has also demonstrated improvements in functional capacity among patients with stage 5 CKD following physical exercise interventions [15].

Non-physical nursing interventions also play an important role in improving the quality of life of hemodialysis patients. This review identified two main categories of non-physical interventions, namely motivational interviewing and educational interventions, including emotional intelligence (EI) training and cognitive-behavioral interventions. These interventions primarily target patients' psychological and social dimensions. Three interventions included in this review demonstrated significant improvements in quality of life among patients undergoing hemodialysis with CKD. These findings are consistent with Zegarow et al., who demonstrated the effectiveness of psychological interventions, particularly cognitive behavioral therapy, in reducing depressive symptoms among hemodialysis patients [16].

According to the objectives of each intervention, various educational materials were provided to participants in the intervention groups. These findings are consistent with recent clinical intervention models indicating that modifying cognitive responses to illness significantly contributes to improving quality of life among diabetic kidney failure patients undergoing hemodialysis [5]. Cognitive-behavioral strategies, including behavioral shaping and cognitive restructuring, involved several activities such as reviewing self-management records, establishing goals, developing treatment plans, applying problem-solving strategies, implementing reinforcement techniques, and managing coping mechanisms related to end-stage renal disease (ESRD) [19]. Previous evidence has demonstrated that cognitive behavioral interventions are effective in reducing depressive symptoms, improving health-related quality of life (HRQoL), and enhancing self-management abilities among patients with ESRD [20]. These findings are consistent with recent clinical intervention models indicating that modifying cognitive responses to illness significantly contributes to improving quality of life among diabetic kidney failure patients undergoing hemodialysis [6].

Emotional intelligence education may support psychological adaptation among patients undergoing hemodialysis by improving self-awareness, emotional regulation, self-management, and interpersonal relationships. These components are particularly important for patients with diabetes, who must continuously manage complex treatment regimens and lifestyle modifications. Both intervention and control groups received comprehensive information regarding their medical conditions, including adherence to dialysis prescriptions and treatment plans, low-sodium, low-fluid, and low-phosphorus dietary management, as well as physical activity recommendations. To achieve holistic patient care, optimize the benefits of emotional intelligence interventions, and prevent psychological problems, nursing supervisors should support nurses in applying emotional intelligence skills within daily professional practice [21].

Motivational interviewing (MI) represents another important non-physical nursing intervention. This approach applies a patient-centered and focused communication strategy designed to facilitate behavioral change. MI has been demonstrated to be effective in assisting individuals who experience uncertainty or ambivalence in following medical recommendations. Previous studies have suggested that motivational interviewing may improve treatment adherence and psychosocial outcomes among patients undergoing hemodialysis. Although the included study did not identify statistically significant differences in QoL between intervention and control groups, the intervention group demonstrated a substantial improvement in quality of life scores between the post-test assessment and three-month follow-up evaluation.

The study conducted by Dashtidehkordi et al. demonstrated that motivational interviewing improved social functioning and reduced symptoms of anxiety, sadness, and sleep disturbance among patients undergoing hemodialysis [19]. Another study by Mankih et al. showed that motivational interviewing programs contributed significantly to various dimensions of the Health-Promoting Lifestyle Profile II (HPLP-II), including physical activity, nutrition, spiritual growth, interpersonal relationships, stress management, and health responsibility. These programs positively influenced treatment adherence among hemodialysis patients, as demonstrated through both objective and subjective parameters [20].

In clinical practice, the effectiveness of non-physical interventions may be substantially enhanced when integrated with emotional family support and spiritual guidance. Beyond physical and psychological interventions, spiritual support may represent an important component of holistic nursing care. Previous evidence suggests that spiritual well-being can contribute to psychological resilience and adaptation among patients undergoing long-term dialysis [6].

Limitation

Several limitations should be considered in this systematic review. Some included studies did not provide detailed information regarding intervention protocols, including intensity, frequency, and duration of implementation, which may limit the accuracy of intervention evaluation and comparison. Furthermore, variations in intervention approaches, quality-of-life measurement instruments, and participant characteristics may contribute to heterogeneity among the included studies. The limited number of available studies focusing specifically on patients with diabetes undergoing hemodialysis may also restrict the generalizability of the findings.

Conclusion

This systematic review examined various nursing interventions aimed at improving the quality of life among patients with diabetes undergoing hemodialysis due to diabetic kidney disease. The findings highlight the importance of implementing holistic nursing care approaches that address multiple dimensions of patient well-being, including physical, psychological, social, and spiritual aspects.

Various interventions, including physical exercise programs, educational interventions, and motivational approaches, demonstrated potential benefits in improving physical function, psychological adaptation, treatment adherence, and overall quality of life among patients with diabetes undergoing hemodialysis. Healthcare providers should consider integrating multidimensional and patient-centered interventions to address the complex needs of this population.

Future research should focus on evaluating the effectiveness of specific intervention models, including structured physical exercise programs, psychosocial support, and educational strategies, using standardized outcome measurements. Furthermore, standardized reporting of intervention characteristics is essential to facilitate accurate evaluation, replication, and comparison across studies.

References

1. Foreman KJ, Marquez N, Friedman J, et al. Forecasting life expectancy, years of life lost, and all-cause and cause-specific mortality for 250 causes of death: reference and alternative scenarios for 2016-40 for 195 countries and territories. *Lancet*. 2018; 392: 2052-2090.
2. Jager KJ, Kovesdy C, Langham R, et al. A single number for advocacy and communication-worldwide more than 850 million individuals have kidney diseases. *Kidney Int*. 2019; 95: 1048-1050.
3. Kampmann JD, Heaf JG, Mogensen CB, et al. Prevalence and incidence of chronic kidney disease stage 3-5 - results from KidDiCo. *BMC Nephrol*. 2023; 24: 17.
4. Ok E, Kutlu Y. The Effect of Motivational Interviewing on Adherence to Treatment and Quality of Life in Chronic Hemodialysis Patients: A Randomized Controlled Trial. *Clin Nurs Res*. 2021; 30: 322-333.
5. Shirazian S, Smaldone A, Rao MK, et al. A protocol for a pilot randomized controlled trial to assess the feasibility and effect of a cognitive behavioral intervention on quality of life for patients on hemodialysis. *Contemp Clin Trials*. 2018; 73: 51-60.
6. Irwan M, Ginting CN, Chiuman L. Model Of Family Support, Spirituality, And Health Status Perception On The Quality Of Life Of Diabetes Mellitus Patients Undergoing Hemodialysis At Rsud Arifin Achmad, Riau Province. *Vasc Endovasc Rev*. 2025; 8: 10s SE-Articles, 258-266.
7. Pati D, Lorusso LN. How to Write a Systematic Review of the Literature. *HERD*. 2018; 11: 15-30.
8. Maguire M, Delahunt B. Doing a thematic analysis: A practical, step-by-step guide for learning and teaching scholars. *ALL Irel J High Educ*. 2017; 9: 3351-3359.
9. Tao X, Chow SKY, Wong FKY. A nurse-led case management program on home exercise training for hemodialysis patients: A randomized controlled trial. *Int J Nurs Stud*. 2015; 52: 1029-1041.
10. Kim S, Park HJ, Yang DH. An intradialytic aerobic exercise program ameliorates frailty and improves dialysis adequacy and quality of life among hemodialysis patients: a randomized controlled trial. *Kidney Res Clin Pr*. 2022; 41: 462-472.
11. Abdelaal AAM, Abdulaziz EM. Effect of exercise therapy on physical performance and functional balance in patients on maintenance renal hemodialysis: randomized controlled study. *J Exerc Rehabil*. 2019; 15: 472-480.
12. Alkhaqani AL. Effective of exercise therapy on functional balance, physical performance and quality of life among patients undergoing hemodialysis: randomized controlled trial. *Nurs Commun*. 2022; 6: 1-9.
13. Huang HY, Hung KS, Yeh ML, et al. Breathing-based leg exercises during hemodialysis improve quality of life: A randomized controlled trial. *Clin Rehabil*. 2021; 35: 1175-1184.
14. Shahnavaizi M, Parsa-Yekta Z, Yekaninejad MS, et al. The effect of the emotional intelligence education programme on quality of life in haemodialysis patients. *Appl Nurs Res*. 2018; 39: 18-25.
15. Junqué-Jiménez A, Esteve-Simó V, Andreu-Periz L et al. A nurse-led home-based exercise program for patients with chronic kidney disease. *Worldviews Evid Based Nurs*. 2023; 20: 79-88.
16. Zegarow P, Manczak M, Rysz J, et al. The influence of cognitive-behavioral therapy on depression in dialysis patients - meta-analysis. *Arch Med Sci*. 2020; 16: 1271-1278.
17. Astuti YS, Utami TW. The Cognitive Behavioral Therapy Reduces Depression in Chronic Kidney Disease Patients Undergoing Hemodialysis. *Indones J Glob Heal Res Febr*. 2021; 3: 109-118.
18. Shirazian S, Smaldone AM, Jacobson AM, et al. Improving quality of life and self-care for patients on hemodialysis using cognitive behavioral strategies: A randomized controlled pilot trial. *PLoS One*. 2023; 18: e0285156.
19. Dashtidehkordi A, Shahgholian N, Maghsoudi J, et al. The Effects of Motivational Interviewing on the Health Status of Patients Undergoing Hemodialysis. *Iran J Nurs Midwifery Res*. 2018; 23: 287-291.
20. Mankih RA, Hussain RAAHM. The Role of Motivational Interviewing in Improving Health State of Patients Undergoing Hemodialysis. *Pakistan J Med Heal Sci*. 2022; 16: 642-644.
21. Afra Masià-Plana, Sitjar-Suñer M, Mantas-Jiménez S, et al. The Influence of Emotional Intelligence on Quality of Life in Patients Undergoing Chronic Hemodialysis Focused on Age and Gender. *Behav Sci*. 2024; 14: 220.