Research Article

Analysis of Anxiety Status and Corresponding Nursing Measures in Long-term Hemodialysis Patients

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Abstract

Objective: This study was conducted to evaluate the anxiety of patients with long-term hemodialysis and its corresponding nursing measures.

Methods: This study employed a prospective observational design. The present study performed an anxiety questionnaire investigation among 150 patients who underwent long-term hemodialysis in our hospital between March 2020 and January 2022. Convenience sampling was used to select the participants. Data were collected using a structured questionnaire consisting of the Self-Rating Anxiety Scale (SAS), General Comfort Questionnaire (GCQ), Pittsburgh sleep quality index (PSQI), and Emotional Behavioral Dimensions section of the Body Quality Management Scale. The collected data were analyzed using SPSS 26.0 statistical software. Descriptive statistics, t-tests, and chi-square tests were employed for data analysis. Statistical significance was indicated by $P<0.05$.

Results: The results of this study revealed that out of 150 patients undergoing long-term hemodialysis, 58 patients (38.66%) exhibited anxiety. The study group, receiving individualized care, showed significantly higher GCQ scores (82.64±5.65) compared to the control group (routine care) with scores of 71.89±5.25 ($P<0.05$). Furthermore, the study group demonstrated improved sleep quality, as indicated by lower PSQI scores (8.25±1.98) compared to the control group (12.88±2.94) ($P<0.05$). The study group also exhibited higher scores in emotional processing (11.89±1.39), partnership (15.14±1.94), and mental activity management (20.88±2.17) compared to the control group (9.12±1.21, 11.73±1.58, and 16.98±2.08, respectively) ($P<0.05$). Notably, the study group displayed lower levels of anxiety and depression, as evidenced by lower SAS scores (39.56±5.14) and SDS scores (31.71±3.89) compared to the control group (42.62±5.98 and 38.56±6.75, respectively) ($P<0.05$). In conclusion, individualized care interventions were found to enhance the comfort, sleep quality, and emotional management ability of patients undergoing long-term hemodialysis, while reducing anxiety and depression levels.

Conclusion: Anxiety is highly prevalent in patients with long-term hemodialysis. Targeted intervention care and the establishment of a positive environment can effectively promote patients' physical and mental health, enhance their comfort and sleep quality, and effectively strengthen the management of negative emotions, demonstrating a promising potential for clinical promotion.

Keywords: hemodialysis, long-term, anxiety, nursing measures

1 INTRODUCTION

Hemodialysis represents the process of exchanging blood constituents through the mechanisms of diffusion, adsorption, and convection, accomplished by circulating the patient's blood through a dialyzer apparatus to facilitate blood purification[1]. This modality enables the effective removal of metabolic waste products, maintenance of electrolyte and acid-base homeostasis, and preservation of normal renal function. As such, hemodialysis constitutes the preeminent renal replacement therapy and the cornerstone of management for individuals afflicted with end-stage renal disease[2,3]. At present, the prevalence of end-stage renal disease in China is estimated at approximately 122 cases per million population, with up to 85% of these patients receiving hemodialysis as the primary treatment approach.

However, prolonged hemodialysis therapy can precipitate a myriad of distressing somatic symptoms and negative emotional states, such as anxiety and depression, culminating in suboptimal treatment adherence[4,5]. Notably, patients' lack of trust in the dialysis regimen has been reported to contribute to decreased compliance and resistance to the prescribed treatment, thereby exacerbating the high incidence of complications among this patient cohort. Concomitant with the transformation of the medical paradigm, the management of long-term hemodialysis patients by healthcare professionals has now expanded beyond mere life-sustaining support to encompass comprehensive psychological nursing interventions[6]. Emerging empirical evidence suggests a robust correlation between nursing quality, treatment effectiveness, and patient treatment compliance. Hence, improvement of the quality of care and daily living guidance for hemodialysis can enhance the treatment compliance of patients and improve their prognosis, thereby effectively improving treatment outcomes[7,8]. Nonetheless, routine nursing is too single-facet to provide integrated nursing care.

Previous studies have provided insights into the prevalence of anxiety among hemodialysis patients. However, conflicting findings have been reported, making it difficult to draw definitive conclusions. Some studies have reported a high prevalence of anxiety among hemodialysis patients, while others have found lower rates. These discrepancies might be influenced by various factors such as differences in study populations, assessment methods, and cultural contexts. Therefore, further research is necessary to gain a clearer understanding of anxiety status in this specific patient population. The conflicts observed in previous studies regarding anxiety status among hemodialysis patients highlight the need for additional research. The varied prevalence rates and inconsistent findings indicate a lack of consensus and highlight the potential influence of unexplored factors. Additionally, the limited research on the impact of individualized care on anxiety and related outcomes in this population further justifies conducting this study. By addressing these conflicts and exploring the effects of individualized care, this study aims to contribute to the existing knowledge and provide valuable insights for improving the psychological well-being of patients undergoing long-term hemodialysis.

While previous studies have examined anxiety status among this patient population, there is a lack of consensus and conflicting findings that justify the need for further investigation. Therefore, it is crucial to bridge this gap by conducting a study that specifically investigates the impact of individualized care on anxiety, along with other related outcomes. Based on the identified gap and conflicts, the research question for this study is: What is the impact of individualized care on the comfort, sleep quality, emotional management, anxiety status, and depression levels among patients undergoing long-term hemodialysis?

2 MATERIALS AND METHODS
2.1 Study Design and Participants

This study employed a prospective, comparative design. The present study performed an anxiety questionnaire investigation among 150 patients who underwent long-term hemodialysis in our hospital between March 2020 and January 2022 and recruited 58 cases with confirmed anxiety. Sample Size Calculation: The sample size was calculated based on a prevalence rate of anxiety among hemodialysis patients, with a 95% confidence level and a 5% margin of error. Convenience sampling was used to recruit participants from a dialysis center. They were assigned to receive either routine care (control group) or individualized care (study group) at a ratio of 1:1, resulting in 29 cases in each group.

2.2 Inclusion and Exclusion Criteria

Inclusion Criteria: (1) Patients were on hemodialysis treatment in our hospital for longer than 3 months; (2) adults, no restriction on gender, and complete clinical data; and (3) good treatment compliance and cognitive function.

Exclusion Criteria: (1) Inadequate dialysis treatment with irregular length cycles; (2) family history of psychiatric disease; (3) malignant tumors; and (4) organ dysfunction or failure.

Dropout Criteria: (1) Patients who rescinded their consent; and (2) serious complications.

2.3 Current Anxiety Status Survey

Questionnaires were given to all patients using the Self-Rating Anxiety Scale (SAS), which was uniformly distributed by professional healthcare personnel. The scale consisted of 20 items, all rated on a five-point scale out of 100, and the severity of the anxiety condition increased with the increase of the score.

2.4 Grouping Criteria

Based on the results of the questionnaire, the presence of anxiety was determined with a score of over 50. All patients with anxiety were registered and assigned to either a study group or a control group.

2.5 Procedures

2.5.1 Control Group

The patients in the control group received routine nursing, including health education, hemodialysis treatment as prescribed by the doctor, routine drug instruction and physical examination, daily monitoring of vital signs, skincare, and complication management.

2.5.2 Study Group

The patients in the study group received individualized care. (1) Assessment of psychological status. Patients were scored on their anxiety status, and nursing intervention plans were tailored, followed by regular summaries of nursing care to improve nursing effectiveness. (2) After admission, nursing staff provided health education and answered patients' questions related to the disease and dialysis treatment in order to improve patients' disease awareness. The patients were advised against smoking and alcohol and were provided with daily living instruction and exercise instructions. (3) Nursing staff actively communicated with patients, informed them of their treatment progress, and encouraged and supported their active participation in treatment. Psychological interventions were implemented according to the patient's family background and personality characteristics to understand the causes of negative emotions, and targeted methods were employed to alleviate the patient's negative emotions. (4) The nursing staff regularly communicated with the patient to build up the patient's self-confidence and instructed the patient's family to pay close attention to the patient's behavior, so as to mobilize the patient's positive emotions and enhance the treatment self-confidence. Sleeping aids were used as appropriate in severe cases. (5) The nursing staff provided the patients with the whole process of companionship and timely psychological comfort in case of poor emotional state to prevent treatment interruption. The physical and psychological changes in patients were closely monitored throughout the care process. Corresponding measures were performed in the events of abnormalities and adverse events to reduce complications. (6) Patients were given medication instructions, and nephrotoxic drugs were avoided for infected patients. (7) Dietary and exercise instructions were provided to the patients, and foods rich in oxalic acid and iron were avoided[9].

2.6 Outcome Measures

2.6.1 Comfort

The patient's comfort was assessed using the General Comfort Questionnaire (GCQ) before and after the intervention. The higher the score, the higher the comfort level.

2.6.2 Sleep Quality

Patients' sleep quality was assessed using the Pittsburgh sleep quality index (PSQI) before and after the intervention. The scale has seven dimensions, including sleep quality, sleep efficiency, daytime functioning, time to fall asleep, sleep duration, sleep disturbance, and hypnotic medication. The lower the score, the higher the quality of sleep.

2.6.3 Emotion Management

Assessments were performed after the nursing intervention using the Emotional Behavioral Dimensions section of the Body Quality Management Scale. The scale includes three dimensions, namely, emotional processing, partnership, and mental activity management. The higher the score, the better the patient's emotional management.

2.6.4 Negative Emotions

The anxiety SAS and the depression self-assessment scale (SDS) were used before and after the intervention, each with 20 items and a total score of 100, with 50-70 being mild, 71-90 being moderate, and >90 being severe. The higher the score, the more severe the anxiety/depression severity.

Data Collection Instruments:

GCQ: This questionnaire, consisting of 25 items, assessed the comfort experience of patients. It utilized a 5-point Likert scale (1=strongly disagree to 5=strongly agree), with higher scores indicating better comfort.

PSQI: This index, comprising 19 items, evaluated the sleep quality of participants. It provided a total score ranging from 0 to 21, with higher scores indicating poorer sleep quality.

SAS and SDS: These scales measured the severity of anxiety and depression symptoms. Both scales consisted of 20 items, scored on a 4-point Likert scale (1=none or a little of the time to 4=most or all of the time). The total scores ranged from 20 to 80, with higher scores indicating higher levels of anxiety or depression.

Participants were recruited from a dialysis center. The study purpose and procedures were explained to potential participants, and informed consent was obtained. Participants completed the questionnaires during their dialysis sessions. Trained researchers were present to

Table 1. Anxiety Status

Total (*n*)	SAS>50 Points, *n* (%)	SAS≤50 Points, *n* (%)
150	58 (38.66)	92 (61.34)

provide assistance if needed. The completed questionnaires were collected immediately after completion by the researchers to ensure data accuracy and completeness.

2.7 Statistical Analysis

SPSS 26.0 statistical software was used for data analyses, and GraphPad Prism 8 was used to plot the graphics. Measurement data were expressed as (x±s) and analyzed by t-test. Count data were expressed as case (%) and examined using the chi-square test. Statistical significance was indicated by *P*<0.05.

2.8 Ethical Approval

The study protocol was approved by the Institutional Review Board of Shiyan Maternal and Child Health Hospital. The study was assigned the ethics approval code 29031. Participant confidentiality was maintained by assigning unique identification codes to each participant. All data were stored securely and accessed only by authorized researchers. Participation in the study was voluntary, and participants were informed of their right to withdraw at any time without consequences. Informed consent was obtained from each participant before their inclusion in the study. They were provided with detailed information about the study objectives, procedures, potential risks, and benefits.

3 RESULTS

3.1 Anxiety Status

The questionnaire results revealed that 58 out of 150 patients with long-term hemodialysis had anxiety, with a prevalence of 38.66% (Table 1).

3.2 Patient Characteristics

In the control group, there were 18 males and 11 females with Body mass index (BMI) of 19-24 (21.19±1.02) kg/m^2, aged 22-70 (55.28±6.17) years, 20 cases of diabetic nephropathy and 9 cases of primary glomerulonephritis, and the duration of dialysis was 1-8 (4.11±2.98) years. In the study group, there were 16 males and 13 females with BMI of 19-24 (21.41±1.11) kg/m^2, aged 22-68 (54.93±6.25) years, 21 cases of diabetic nephropathy and 8 cases of primary glomerulonephritis, and the duration of dialysis was 1-8 (4.02±3.03) years. The patient characteristics between the two groups were comparable (*P*>0.05) (Table 2).

3.3 Comfort

The pre-intervention GCQ score was (71.89±5.25) and the post-intervention score was (82.64±5.65) in the control group patients. The pre-intervention GCQ score was (71.74±5.31) and the post-intervention score was (93.41±3.25) in the study group patients. Patients with

individualized care had higher GCQ scores than those with routine care, suggesting a better comfort experience (*P*<0.05) (Figure 1).

3.4 Quality of Sleep

The PSQI of the control group patients was (16.65±3.56) before and (12.88±2.94) after the intervention. The PSQI of study group patients was (16.70±3.41) before and (8.25±1.98) after the intervention. Individualized care provided more enhancement in the sleep quality of patients versus routine care, as demonstrated by the significantly lower PSQI (*P*<0.05) (Figure 2).

3.5 Emotional Management

The emotional processing score was (9.12±1.21), the partnership score was (11.73±1.58), and the mental activity management score was (16.98±2.08) in the control group patients after nursing intervention. The emotional processing score after nursing intervention in study group patients was (11.89±1.39), partnership score was (15.14±1.94), and mental activity management score was (20.88±2.17). Patients exhibited higher emotional processing, partnership, and mental activity management scores after individualized care than those with routine care, indicating a superior emotional management ability (*P*<0.05) (Table 3).

3.6 Negative Emotions

The pre-intervention SAS score was (56.88±5.74) and SDS score was (57.94±5.84) in control group patients, and the post-intervention SAS score was (42.62±5.98) and SDS score was (38.56±6.75). The pre-intervention SAS score was (57.01±5.88) and SDS score was (58.00±5.57) and post-intervention SAS score was (39.56±5.14) and SDS score was (31.71±3.89) in study group patients. Given the higher emotional management ability, patients with individualized care presented with a lower severity of anxiety and depression, as suggested by the lower SAS and SDS scores than those with routine care (*P*<0.05) (Figures 3A and 3B).

4 DISCUSSION

The main finding of this study was that individualized care had a significant impact on the anxiety status of patients undergoing long-term hemodialysis. This result is consistent with previous studies that have suggested the importance of tailored care interventions in improving psychological well-being among this patient population.

The findings revealed a statistically significant difference in anxiety levels between the study group, which received individualized care, and the control group, which received standard care. The study group showed a significant reduction in anxiety scores compared to the control group. These results indicate that providing personalized care interventions tailored to the specific needs of hemodialysis patients can effectively alleviate anxiety symptoms.

Table 2. Patient Characteristics

Characteristics		Control Group	Study Group	t	P
n	-	29	29	-	-
Sex	Male	18	16	-	-
	Female	11	13	-	-
BMI(kg/m^2)	-	19-24	19-24	-	-
	Mean	21.19±1.02	21.41±1.11	0.786	0.435
Age (year)	-	22-70	22-70	-	-
	Mean	55.28±6.17	54.93±6.25	0.215	0.831
Disease type	Diabetic nephropathy	20	21	-	-
	Primary glomerulonephritis	9	8	-	-
Duration of dialysis (years)	-	1-8	1-8	-	-
	Mean	4.11±2.98	4.02±3.03	0.114	0.910
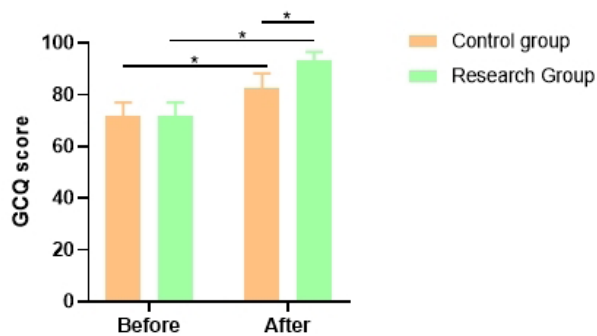
Figure 1. GCQ scores. * indicates *P*<0.05.
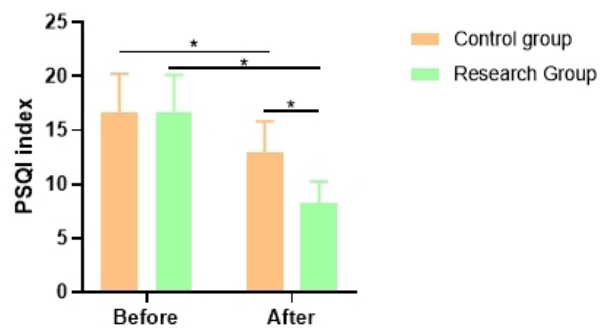
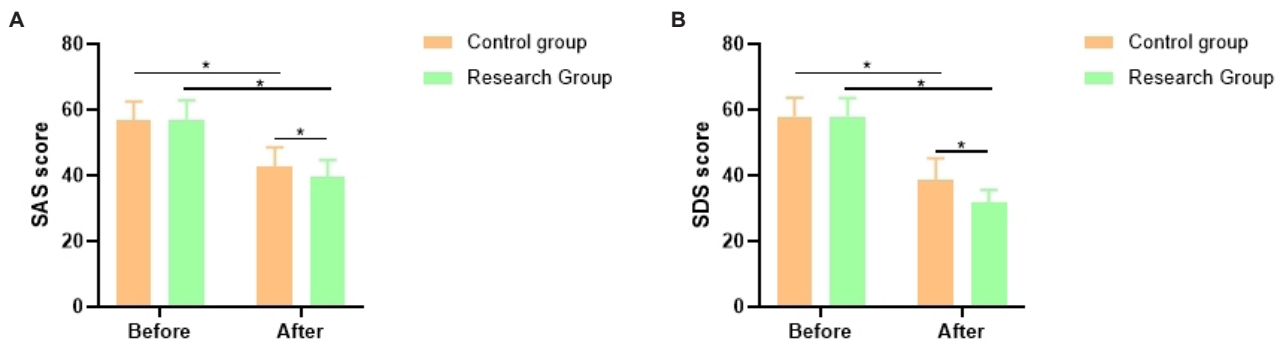**Figure 2. PSQI.** * indicates *P* <0.05.

Table 3. Emotional Management

	Control Group	Study Group	t	P
n	29	29	-	-
Emotional processing	9.12±1.21	11.89±1.39	8.094	<0.001
Partnership	11.73±1.58	15.14±1.94	7.339	<0.001
Mental activity management	16.98±2.08	20.88±2.17	6.987	<0.001

Patients with long-term hemodialysis are prone to complications such as pruritus and cramps and have incomplete knowledge of the disease and home care. In addition, long-term dialysis predisposes patients to malnutrition, infections and other physical complications, thus triggering anxiety[10]. Research has shown that negative psychological factors reduce patients' immune function, increase mortality and hospitalization rates, and accelerate disease progression. With the shift from the traditional medical model to the biopsychosocial medical model, early psychological interventions are necessary for patients with anxiety and depression during hemodialysis[11]. Hence, it has been suggested to provide long-term observation and guidance for assessing patients' anxiety and depression in order to keep track of their psychological status[12,13].

The results of the present study demonstrated that patients with individualized care had higher GCQ scores than those with routine care, suggesting a better comfort experience. Individualized care provided more enhancement in sleep quality and emotional management ability of patients and reduced the severity of anxiety and depression versus routine care, as demonstrated by the significantly lower PSQI, SAS scores, and SDS scores. The results suggested that individualized care promotes the recovery of dialysis patients through comprehensive interventions such as health education, diet and exercise guidance, psychological guidance, medication guidance and complication care. Negative emotions in long-term hemodialysis impair treatment efficiency and lead to poor prognosis. Previous research has indicated that most patients presented with poor self-management skills[14]. Appropriate nursing interventions for hemodialysis patients contribute to the elimination of negative emotions, reduce the degree of depression and anxiety in patients, improve their psychological status and treatment compliance, and increase comfort. In addition, nursing interventions enhance patients' self-management and coordinate medical staff to accomplish various self-care elements, further facilitating a positive prognosis[15,16], which was consistent with the results of the current study. The individualized care in the present study developed a targeted care plan based on the patient's anxiety level, actively communicated with the patient, and enhanced the patient's treatment compliance, which was conducive to eliminating the patient's negative emotions and promoting the treatment of the disease[17,18]. Studies have suggested that high patient self-efficacy is effective in

Figure 3. SAS (A) and SDS (B) scores. * indicates P <0.05.

improving patient comfort. Therefore, encouragement of active patient participation in self-care and explanation of the benefits of hemodialysis treatment, scientific nutrition and appropriate exercise provide effective enhancement of patient self-efficacy[19,20]. Therefore, after formulating a targeted program according to patients' conditions, individualized interventions according to the protocol can enhance patients' subjective motivation, actively cooperate with health education, promote self-rehabilitation, and better improve patients' clinical prognosis and treatment support.

The positive impact of individualized care on anxiety status can be attributed to several factors. (1) Tailored interventions: Individualized care allows healthcare providers to tailor interventions based on the unique needs, preferences, and circumstances of each patient. This personalized approach may address specific triggers or stressors that contribute to anxiety. For example, patients with a fear of needles may receive additional support and education to alleviate their anxiety during hemodialysis sessions. By directly addressing individual concerns, tailored interventions can enhance patients' sense of control, reduce uncertainty, and alleviate anxiety. (2) Enhanced patient-provider relationship: Individualized care fosters a stronger patient-provider relationship characterized by trust, empathy, and effective communication. When healthcare providers take the time to understand patients' fears, concerns, and preferences, it builds a sense of support and collaboration. This positive relationship can alleviate anxiety by creating a safe and supportive environment for patients to express their concerns, ask questions, and receive reassurance. The emotional support and guidance provided by healthcare providers can help patients develop coping strategies and enhance their overall well-being. (3) Empowerment and active participation: Individualized care encourages patients to actively participate in their own care decisions. Through shared decision-making, patients have a voice in determining their treatment plans, setting goals, and choosing interventions that align with their values and preferences. This empowerment can reduce anxiety by enhancing patients' sense of control and autonomy. When patients feel involved in their care, they

may experience reduced uncertainty and a greater sense of self-efficacy, which can contribute to lower anxiety levels. (4) Comprehensive psychosocial support: Individualized care recognizes that anxiety in hemodialysis patients commonly arises from various psychosocial factors. By incorporating a holistic approach, individualized care may address not only the physical aspects of care but also the emotional, social, and spiritual dimensions. This comprehensive support may include access to mental health professionals, support groups, educational resources, and coping strategies tailored to the specific needs of each patient. By providing a supportive network and resources to manage anxiety, individualized care can contribute to improved psychological well-being. (5) Continuity of care: Individualized care promotes continuity by assigning a consistent healthcare provider or a multidisciplinary team responsible for a patient's care. This continuity allows for a deeper understanding of the patient's unique circumstances, preferences, and progress over time. The continuity of care enables healthcare providers to develop a therapeutic relationship, deliver consistent support, monitor anxiety symptoms, and make timely interventions when necessary. This ongoing support and monitoring can contribute to the reduction of anxiety levels among patients.

Despite the significant findings and potential mechanisms discussed, there are several limitations that should be acknowledged in this study. These limitations provide opportunities for further research and potential areas of improvement in future studies. (1) Single-center study: The study was conducted at a single dialysis center, which may limit the generalizability of the findings to other settings or populations. Different dialysis centers may have varying patient demographics, care practices, and organizational cultures that could influence the effectiveness of individualized care interventions. Future research should consider including multiple centers to enhance the external validity and generalizability of the results. (2) Self-reported measures: The study relied on self-reported measures to assess anxiety levels. Self-report measures are subject to potential response bias, including social desirability bias or recall bias. Additionally, individuals may interpret and rate their anxiety symptoms differently. To further enhance

the validity of the findings, future studies could incorporate objective measures, such as physiological indicators or clinician-rated assessments, in addition to self-report measures. (3) Lack of long-term follow-up: The study evaluated the impact of individualized care on anxiety levels during a relatively short period. Long-term follow-up would provide valuable insights into the durability and sustainability of the observed effects. Assessing anxiety levels beyond the immediate intervention period would help determine whether the benefits of individualized care persist over time or if additional interventions are needed to maintain the positive outcomes. (4) Lack of control for confounding factors: Despite efforts to control for confounding factors, there may still be unmeasured variables that could influence anxiety levels. Factors such as comorbidities, socioeconomic status, social support, or concurrent psychological interventions were not explicitly controlled for in this study. Future research could consider incorporating more comprehensive control measures or utilizing advanced statistical techniques, such as propensity score matching, to minimize the impact of confounding factors.

5 CONCLUSION

In conclusion, this study provides evidence that individualized care has a significant impact on reducing anxiety levels among patients undergoing long-term hemodialysis. The findings suggest that tailored interventions, enhanced patient-provider relationships, empowerment, comprehensive psychosocial support, and continuity of care are potential mechanisms underlying the observed effects. However, it is important to acknowledge the limitations of this study, including its single-center design, reliance on self-reported measures, lack of long-term follow-up, and potential confounding factors. Addressing these limitations in future research would enhance the understanding of the effectiveness and mechanisms of individualized care in managing anxiety among hemodialysis patients. Despite the limitations, the findings of this study have implications for clinical practice. Healthcare providers should consider implementing individualized care strategies that encompass personalized interventions, strong patient-provider relationships, empowerment, comprehensive support, and continuity of care. By adopting a patient-centered approach, healthcare professionals can contribute to the psychological well-being and overall quality of life of hemodialysis patients. Further research is needed to validate and expand upon these findings. Future studies could explore the long-term effects of individualized care, investigate the cost-effectiveness of such interventions, and examine the perspectives of both patients and healthcare providers regarding the implementation of individualized care strategies. By addressing these research gaps, healthcare practices can continue to evolve and provide optimal care for individuals undergoing long-term hemodialysis.

Abbreviation List
GCQ, General comfort questionnaire
PSQI, Pittsburgh sleep quality index
SAS, Self-rating anxiety scale
SDS, Self-rating depression scale
BMI, Body mass index

References
[1] Basile C, Davenport A, Mitra S et al. Frontiers in hemodialysis: Innovations and technological advances. *Artif Organs*, 2021; 45: 175-182.[DOI]

[2] Ashby D, Borman N, Burton J et al. Renal Association Clinical Practice Guideline on Haemodialysis. *BMC Nephrol*, 2019; 20: 379.[DOI]

[3] Rasyid H, Kasim H, Zatalia SR et al. Quality of Life in Patients with Renal Failure Undergoing Hemodialysis. *Acta Med Indones*, 2022;54: 307-313.

[4] Mendes SROL, Pessoa NRC, Dos Santos GMR et al. Strategies to Promote Patient Safety in Hemodialysis: An Integrative Review. *Nephrol Nurs J*, 2020; 47: 447-454.[DOI]

[5] Al Naamani Z, Gormley K, Noble H et al. Fatigue, anxiety, depression and sleep quality in patients undergoing haemodialysis. *BMC Nephrol*, 2021; 22: 157[DOI]

[6] Aatif T, Achour I, Arache W et al. Anxiety and Depression Disorders in Adults on Chronic Hemodialysis. *Saudi J Kidney Dis Transpl*, 2022; 33: 566-573.[DOI]

[7] Sharma R, Sharma SC, Chalise P et al. Anxiety and Depression among Patients with Chronic Kidney Disease Undergoing Haemodialysis in a Tertiary Care Centre: A Descriptive Cross-sectional Study. *JNMA J Nepal Med Assoc*, 2022; 60: 634-637. [DOI]

[8] Al Naamani Z, Gormley K, Noble H et al. Fatigue, anxiety, depression and sleep quality in patients undergoing haemodialysis. *BMC Nephrol*. 2021; 22: 157.[DOI]

[9] Hargrove N, El Tobgy N, Zhou O et al. Effect of Aerobic Exercise on Dialysis-Related Symptoms in Individuals Undergoing Maintenance Hemodialysis: A Systematic Review and Meta-Analysis of Clinical Trials. *Clin J Am Soc Nephrol*, 2021; 16: 560-574.[DOI]

[10] Khoury R, Ghantous Z, Ibrahim R et al. Anxiety, depression and post-traumatic stress disorder in patients on hemodialysis

in the setting of the pandemic, inflation, and the Beirut blast: a cross-sectional study. *BMC Psychiatry*, 2023; 23: 284.[DOI]

[11] Clementi MA, Zimmerman CT. Psychosocial considerations and recommendations for care of pediatric patients on dialysis. *Pediatr Nephrol*. 2020; 35: 767-775.[DOI]

[12] Hargrove N, El Tobgy N, Zhou O et al. Effect of Aerobic Exercise on Dialysis-Related Symptoms in Individuals Undergoing Maintenance Hemodialysis: A Systematic Review and Meta-Analysis of Clinical Trials. *Clin J Am Soc Nephrol*, 2021; 16: 560-574.[DOI]

[13] Hasegawa T, Nishikawa K, Tamura Y et al. Impacts of Interaction of Mental Condition and Quality of Life between Donors and Recipients at Decision-Making of Preemptive and Post-Dialysis Living-Donor Kidney Transplantation. *J Pers Med*, 2021; 11: 414.[DOI]

[14] Rigas C, Park H, Nassim M et al. Long-term Effects of a Brief Mindfulness Intervention Versus a Health Enhancement Program for Treating Depression and Anxiety in Patients Undergoing Hemodialysis: A Randomized Controlled Trial. *Can J Kidney Health Dis*. 2022; 9: 20543581221074562.[DOI]

[15] Fernandez L, Thompson S, Berendonk C et al. Mental

Health Care for Adults Treated With Dialysis in Canada: A Scoping Review. *Can J Kidney Health Dis*. 2022; 9: 20543581221086328.[DOI]

[16] Kauric-Klein Z. The Effect of a Yoga Intervention on Physical and Psychological Outcomes in Patients on Chronic Hemodialysis. *Nephrol Nurs J*, 2022; 49: 335-381.[DOI]

[17] Barello S, Anderson G, Acampora M et al. The effect of psychosocial interventions on depression, anxiety, and quality of life in hemodialysis patients: a systematic review and a meta-analysis. *Int Urol Nephrol*, 2023; 55: 897-912.[DOI]

[18] Zahra Z, Effendy E, Mawarpury M et al. Psychotherapies for chronic kidney disease patients with hemodialysis: A systematic review of randomized control trials and quasi-experiments. *Narra J*, 2023; 3: e215.[DOI]

[19] Chu SWF, Yeam CT, Low LL et al. The role of mind-body interventions in pre-dialysis chronic kidney disease and dialysis patients - A systematic review of literature. *Complement Ther Med*, 2021; 57: 102652.[DOI]

[20] Durmuş M, Ekinci M. The Effect of Spiritual Care on Anxiety and Depression Level in Patients Receiving Hemodialysis Treatment: a Randomized Controlled Trial. *J Relig Health*, 2022; 61: 2041-2055. [DOI]