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Duration of hemodialysis and quality of life among patients with chronic kidney disease

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Abstract

Patients with chronic kidney disease undergoing hemodialysis face significant changes in their daily lives, both physically and psychosocially. The process of adapting to this long-term therapy is not always easy and, in many cases, is an important factor affecting patients' quality of life. This study aims to examine the relationship between hemodialysis duration and quality of life in patients undergoing hemodialysis. The study used a cross-sectional correlational quantitative design involving 89 patients undergoing routine hemodialysis. Data collection was conducted using the World Health Organisation Quality of Life (WHOQOL) questionnaire, and the data were analyzed using Spearman's correlation test. The results showed a significant positive relationship between patient adaptation and quality of life. Patients with better adaptation abilities tended to report a higher quality of life. These findings emphasize the important role of nursing in supporting the patient's adaptation process through a holistic, continuous care approach. Efforts to strengthen patient adaptation can improve the well-being and quality of life of individuals with chronic kidney disease undergoing hemodialysis.

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1. Introduction

The kidneys play a vital role in maintaining the body's balance by filtering metabolic waste products and regulating fluid and electrolyte balance. When this function is progressively and permanently impaired, the body loses its ability to maintain homeostasis, a condition known as chronic kidney disease (Tio, 2021). In recent years, this disease has no longer limited to the elderly. A report by Media Indonesia (2024) shows that chronic kidney disease is increasingly found in productive age groups, including adolescents and young adults, thereby expanding its impact on quality of life across all ages.

Global data highlight the burden of chronic kidney disease. The World Health Organization notes that in 2019, patients with chronic kidney disease accounted for about 15% of the world's population. The number of deaths from this disease reached 254,028 cases in 2020 and increased significantly in 2021, with an estimated 843.6 million sufferers globally. In fact, the WHO estimates that deaths from chronic kidney disease will increase by 41.5% by 2040. In Indonesia, a similar trend is evident. The Ministry of Health reported an increase in cases from 1,322,780 in 2022 to 1,501,016 in 2023. The highest prevalence was recorded in the 75+ age group, followed by the 55–64 age group, while the most significant proportion of cases came from the 15–24 age group. According to Riskesdas (2018), Bali Province ranks fourth in terms of new cases, with an estimated 12,092 cases, or around 0.44% of the population.

Riskesdas (2018) shows that the highest prevalence of chronic kidney disease is found in the 55–64 age group, with differences in distribution between men and women. In Jembrana District, the prevalence is recorded at 0.4% of the total population. Local public hospital data also shows a significant increase in

the number of hemodialysis patients, from 197 patients in 2022 to 376 patients by the end of 2024. These figures not only reflect an increase in the need for health services but also illustrate the complexity of the challenges faced by patients undergoing long-term therapy.

Chronic kidney disease that is not adequately treated can develop into serious complications and even death. Therefore, renal replacement therapies such as kidney transplantation, continuous ambulatory peritoneal dialysis (CAPD), and hemodialysis are the main options in patient management. Among these modalities, hemodialysis is currently the most widely used therapy (Kusuma et al., 2019). This procedure functions as an artificial kidney, filtering metabolic waste through a dialyzer before returning the blood to the patient (Alam & Iwan Hadibroto, 2007). Despite technological advancements that have improved procedure safety, hemodialysis remains associated with various potential side effects, such as nausea, vomiting, muscle cramps, headaches, pruritus, hypoglycemia, fever, and hypotension. (Tjokoprawiro et al., 2015).

However, the challenges faced by hemodialysis patients are not only physical. The repetitive, prolonged therapy process often affects patients' psychological, social, and environmental conditions. Anxiety about uncertain health conditions, economic and work pressures, sexual dysfunction, feelings of frustration, guilt, depression, and fear of death are experiences that are not uncommon among patients with chronic kidney disease (Smeltzer et al., 2010; Siregar, 2020). The accumulation of these various pressures can significantly impact patients' quality of life.

One factor that shapes patients' quality of life is the duration of hemodialysis. The duration of this therapy is influenced by compliance, the patient's understanding of the disease, and the ability to adapt to lifestyle changes. Better adaptation can improve patients' quality of life, while suboptimal adaptation can worsen physical and psychosocial conditions. The duration of hemodialysis itself is influenced by various factors, including family support, education level, and patient status, which indirectly affect quality of life (Nurmalita, 2024). In addition, long-term hemodialysis can also pose physical, psychological, social, and environmental challenges (Zahroh & Bovi Amalia, 2019).

Empirical findings support the association between hemodialysis duration and quality of life. Bellasari's (2020) study of patients with chronic kidney disease at the Madiun Regional General Hospital found that most patients with low quality of life had undergone hemodialysis for less than 12 months. Conversely, no patients with poor quality of life were found in the group undergoing hemodialysis for more than 24 months. It suggests that adaptation over time may improve quality of life.

Preliminary studies conducted on ten patients with chronic kidney disease also describe similar adaptation dynamics. In the early stages of hemodialysis, patients often report limited activity due to fatigue, dissatisfaction with their physical condition, and feelings of hopelessness. Dependence on a routine hemodialysis schedule limits their ability to work and participate in social activities as they did before becoming ill. The ability of patients to undergo therapy is greatly influenced by family support, hemodialysis compliance, and fluid intake restrictions, all of which contribute to the patient's quality of life. This study was conducted to analyze the relationship between hemodialysis duration and the quality of life of patients with chronic kidney disease undergoing hemodialysis in a general hospital. A deeper understanding of this relationship can form the basis for developing nursing interventions that are more responsive to patients' adaptation needs and for continuously improving their quality of life.

2. Method

2.1 Research Design and Participants

This study used a correlational, quantitative, cross-sectional design to examine the relationship between hemodialysis duration and quality of life at a single measurement point, without providing any intervention to respondents (Mufid, 2017). The study was conducted in the hemodialysis unit of Negara General Hospital from November 2024 to January 2025. The study population comprised all patients with chronic kidney disease undergoing hemodialysis, totalling 113. Respondents were selected using purposive sampling, based on the suitability of their patient characteristics to the study objectives. The sample size was calculated using the Slovin formula with a 5% error rate (Subhaktiyasa, 2024), resulting in 89 respondents who met the study criteria. The inclusion criteria included chronic kidney disease patients undergoing hemodialysis in the research unit, aged at least 17 years, able to communicate well, able to complete the questionnaire independently, and willing to participate as respondents. Meanwhile, patients with unstable or acute clinical conditions, severe cognitive or communication disorders, and incomplete medical records or questionnaires were excluded from this study.

2.2 Instruments and Data Collection

Data were collected using two complementary sources. The independent variable, namely hemodialysis duration, was obtained from patient medical records and recorded on the researcher's observation sheet. The data were then categorized as ordinal in accordance with the analysis requirements. The dependent variable, quality of life, was measured using the World Health Organization Quality of Life (WHOQOL) questionnaire. This instrument has been widely used and reported to have good validity and reliability across various cross-cultural studies and international contexts. This study refers to the official translation of the WHOQOL-BREF provided by the World Health Organization.

2.3 Data Analysis

Data collected through the stages of editing, coding, entry, and cleaning to ensure the completeness and consistency of information. The research variables of hemodialysis duration and quality of life were compiled and summarised using descriptive statistics, including frequency distributions and percentages, to describe the characteristics of the respondents and the data patterns for each variable (Subhaktiyasaa et al., 2025). Meanwhile, to address the objectives, inferential analysis was performed using Spearman's rank correlation test at $\alpha = 0.05$ (Subhaktiyasa et al., 2025). The entire data analysis process was performed using IBM SPSS Statistics software version 25.

2.4 Ethical Considerations

Ethical approval was obtained from the Health Research Ethics Committee of STIKES Wira Medika Bali with Ethical Clearance number 476/E1.STIKESWIKA/EC/IV/2025. All prospective respondents were informed of the study's purpose and procedures, potential benefits and risks, data confidentiality guarantees, and the right to refuse or withdraw without affecting the health services received. Written consent was obtained from each respondent. Confidentiality was maintained by using respondent identification codes and limiting data access to the research team only.

3. Results and Discussion

3.1 Results

This section describes the characteristics of respondents, the distribution of hemodialysis duration and quality of life, and the results of the analysis of the relationship between hemodialysis duration and quality of life in 89 patients with chronic kidney disease undergoing hemodialysis therapy. Table 1 presents the frequency distribution of the demographic and clinical characteristics of respondents.

Table 1. Respondent characteristics

Characteristics	Frequency (f)	Percentage (%)
Age		
17-25 years old	3	3.4
26-45 years old	16	18.0
46-65 years old	56	62.9
>65 years old	14	15.7
Gender:		
Female	44	49.4
Male	45	50.6
Marital Status		
Unmarried	6	6.7
Divorced (widowed)	9	10.1
Married	74	83.1
Education		
No schooling	3	3.4
Elementary school	44	49.4
Junior high school	10	11.2
Senior high school	22	24.7
Higher education	10	11.2

Characteristics	Frequency (f)	Percentage (%)
Occupation		
Unemployed	39	43.8
Farmer	31	3.8
Private sector	8	9.0
Civil	3	3.4
Retired	8	9.0
Hypertension History		
Yes	80	89.9
No	9	10.1

Table 1 shows that most respondents were in the middle-aged group (46–65 years old), totalling 56 people (62.9%). The gender distribution was relatively balanced, with slightly more male respondents than female respondents: 45 people (50.6%) and 44 people (49.4%), respectively. The majority of respondents were married, namely 74 people (83.1%). Nearly half of the respondents had elementary school as their last level of education, namely 44 people (49.4%), followed by secondary and higher education in smaller proportions. Most respondents were unemployed, numbering 39 (43.8%), and the majority of respondents had a history of hypertension, as reported by 80 respondents (89.9%). It indicates that hypertension is a dominant comorbidity in chronic kidney disease patients undergoing hemodialysis.

Table 2. Duration of Hemodialysis among Patients with Chronic Kidney Failure

Duration of Hemodialysis	Frequency (f)	Percentage (%)
< 12 months	20	22.5
12 – 24 months	23	25.8
> 24 months	46	51.7

Table 2 shows that more than half of the respondents had undergone hemodialysis for more than 24 months, with a total of 46 people (51.7%). Respondents who had undergone hemodialysis for 12–24 months numbered 23 (25.8%). Meanwhile, 20 respondents (22.5%) had undergone hemodialysis for less than 12 months. It indicates that the majority of participants in this study were patients who had undergone hemodialysis therapy for a relatively long period of time. The distribution of respondents' quality of life is presented in Table 3.

Table 3. Quality of Life of Patients with Chronic Kidney Failure

Quality of Life	Frequency (f)	Percentage (%)
Very poor	0	0
Poor	0	0
Moderate	11	12.4
Good	63	70.8
Very good	15	16.9

Table 3 shows that most respondents had a good quality of life, namely 63 people (70.8%). 15 respondents (16.9%) reported very good quality of life, while 11 respondents (12.4%) reported moderate quality of life. There were no respondents in the low-income or inferior quality-of-life categories. Furthermore, the results of the analysis of the relationship between hemodialysis duration and quality of life are presented in Table 4.

Table 4 Relationship between Duration of Hemodialysis and Quality of Life

Duration of Hemodialysis	Quality of Life						Total		P *value*	Correlation Coefficient
	Moderate		Good		Very good					
	f	%	f	%	f	%	f	%		
<12 months	7	7.9	13	14.6	0	0	20	22.5	0,000	0,486
12-24 months	3	3.4	19	21.3	1	1.1	23	25.8		
>24 months	1	1.1	31	34.8	14	15.8	46	51.7		

Table 4 shows that among respondents who had undergone hemodialysis for more than 24 months, most reported a good quality of life (31 people, 34.8%). In addition, 14 respondents (15.8%) in this group reported a very good quality of life, and only one respondent (1.1%) was in the moderate quality of life category. In the group with a hemodialysis duration of 12–24 months, the majority of respondents also reported a good quality of life, namely 19 people (21.3%). A small number of respondents were in the moderate quality-of-life category (3 people; 3.4%) and the very good category (1 person; 1.1%). Conversely, among respondents with less than 12 months of hemodialysis, most were in the sound quality-of-life category (13 people; 14.6%), while the rest were in the moderate quality-of-life category (7 people; 7.9%). No respondents in this group reported an excellent quality of life. A Spearman's rank correlation test showed a significant relationship between hemodialysis duration and quality of life ($p = 0.000$). A correlation coefficient value of $r = 0.486$ indicates a moderate positive relationship between the two variables.

3.2 Discussion

Duration of Hemodialysis in Patients with Chronic Kidney Disease

The results of this study indicate that most respondents have undergone hemodialysis for more than 24 months. This finding is in line with the study by Azzahra et al. (2024), which found that patients tend to continue hemodialysis in the long term after experiencing the benefits of this therapy in controlling uremic symptoms and maintaining a relatively stable physical condition. Hemodialysis is not curative but is a life-supporting therapy that must be undergone continuously to prevent fatal complications and maintain bodily functions (Brunner & Suddarth, 2002).

Interestingly, the duration of hemodialysis is not only determined by medical needs but also by the process of accepting the disease condition. Patients who have undergone hemodialysis for more than 24 months generally show better adaptability to physical limitations, changes in daily activities, and the therapeutic routine that must be followed continuously. It is in line with the explanation by Lolowang et al. (2020), who stated that long-term hemodialysis patients have experienced therapeutic benefits, including reduced complaints, allowing them to resume certain activities according to their physical capacity.

Age is also a factor in determining the duration of hemodialysis. Butar et al. (2013) explain that age affects how individuals view life, their expectations for the future, and their health-related decision-making. Patients of productive age tend to be more motivated to continue therapy because they still have social and family responsibilities, while older patients often involve family members in medical decision-making. These findings are consistent with those of a study by Fitriyana and Sulistiowati (2025), which found that chronic kidney disease is common in middle age, when the ageing process begins to affect kidney structure and function, including a decrease in nephron number after age 40. This condition is reflected in this study, where the majority of respondents were in the 46–65 age group and had undergone hemodialysis for more than 24 months.

The length of time patients undergo hemodialysis also reflects a continuous learning process. Patients generally develop a better understanding of their disease, demonstrate more stable adherence to their treatment schedule, and can accept their chronic condition. In middle-aged to elderly patients with comorbidities such as hypertension, direct experience of the benefits of hemodialysis tends to be a motivating factor for maintaining consistent therapy in the long term.

Quality of Life of Chronic Kidney Disease Patients Undergoing Hemodialysis

Most respondents in this study reported a good quality of life. These findings indicate that, despite undergoing regular hemodialysis therapy, patients can still maintain a positive perception of their lives. The social relations domain emerged as the highest-scoring aspect, indicating the strong role of social support in patients' lives. These results align with the study by Wulandari et al. (2024), which emphasizes that the quality of life of hemodialysis patients is influenced by interpersonal relationships, family support, and social acceptance of the patient's condition. WHOQOL views quality of life as a multidimensional concept that includes physical health, psychological condition, social relationships, and environment (Ekasari et al., 2018). In hemodialysis patients, these four dimensions are interrelated. Physical limitations due to chronic illness can be offset by adequate psychological and social support, while a supportive environment allows patients to feel safe, valued, and in control of their lives**.**

The level of education is often cited as a factor that affects quality of life, as stated by Butar et al. (2013), who argue that education shapes a person's mindset and health behaviours. Wulandari et al. (2024)

also reported that patients with upper secondary education were better able to access and understand information related to their condition. However, the findings of this study indicate that formal education level is not significantly associated with the quality of life of hemodialysis patients.

This condition can be explained by the active role of health workers in accompanying patients during therapy. Repeated education from doctors and nurses, whether related to fluid restrictions, diet management, adherence to hemodialysis schedules, or symptom management, serves as a bridge for patients with limited educational backgrounds. These findings align with Sisilia's (2023) research, which found that low education is not always an obstacle when patients receive strong support from their families and healthcare workers. It is also consistent with the concept of health behaviour proposed by Notoatmodjo (2012), which holds that behavioural change is not determined solely by formal education but also by experience, motivation, interpersonal communication, and the social environment. Although most respondents had only an elementary school education, they still maintained a good quality of life.

Long-Term Relationship between Hemodialysis Duration and Quality of Life

The analysis shows a significant relationship between hemodialysis duration and patients' quality of life. Patients who have undergone hemodialysis for an extended period tend to report a better quality of life. This pattern shows that adaptation to hemodialysis therapy is gradual and takes time. These findings are not entirely consistent with Devi's (2020) study, which reported a predominance of poor quality of life in hemodialysis patients due to disease progression and therapy stressors. However, Devi and Rahman (2022) emphasize that quality of life is an individual's subjective perception of their position in life, influenced by physical and psychological conditions, level of independence, social relationships, and environment. Patients who receive ongoing education and support from healthcare professionals tend to adapt to therapy demands, thereby improving their quality of life over time.

The results show that hemodialysis significantly improves patients' lives, both physically and psychosocially. Each patient requires a different amount of time to adapt to the symptoms, complications, and the reality that the therapy must be undergone for life. Acceptance of the condition is important in this process. Patients who can accept their chronic condition well generally show a more positive quality of life, even after undergoing hemodialysis for more than 24 months.

4. Conclusion

This study shows that hemodialysis duration is significantly associated with patients' quality of life in chronic kidney disease. Patients who undergo longer-term therapy tend to show better quality of life. These findings confirm that the process of adaptation to long-term therapy, characterized by acceptance of the disease condition, adherence to therapy, and ongoing support from health workers and the social environment, plays an important role in shaping patients' quality of life. Hemodialysis services need to be viewed as a technical process and as a long-term support system that requires the educational, psychosocial, and holistic roles of nurses. It indicates the importance of developing nursing services oriented towards patient-centred care and continuous monitoring of quality of life. However, these findings need to consider the limitations of the cross-sectional design, the study's location, which was limited to one service unit, and the fact that other factors that could affect patients' quality of life have not been analyzed. Further research is recommended using a longitudinal design, controlling for confounding variables, and combining quantitative and qualitative approaches to understand the patient adaptation process better and develop comprehensive nursing interventions.

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Conflict of Interest

The authors declare no conflict of interest.

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