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THE RELATIONSHIP BETWEEN THE DURATION OF CIMINO ARTERIOVENOUS FISTULA USE AND QUALITY OF LIFE AMONG HEMODIALYSIS PATIENTS

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ABSTRACT

Chronic Kidney Disease (CKD) is a global health problem with increasing prevalence. Hemodialysis uses Cimino AV shunt as the patient's lifeline, but complications and duration of use are suspected to affect quality of life. This quantitative cross sectional study aimed to determine the relationship between duration of Cimino AV use and quality of life in hemodialysis patients at EMC Cikarang Hospital, West Java. A population of 120 CKD hemodialysis patients with a sample of 55 respondents was selected by purposive sampling using Slovin formula. The independent variable, duration of Cimino AV use, was obtained from medical records, while the dependent variable, quality of life, was measured using SF-36 questionnaire. The validity and reliability of the questionnaire had been tested, confirming that the instrument was valid and reliable for use in this study.Data were analyzed using Fisher's Exact Test and Multiple Logistic Regression with p-value <0.05. Results showed that most respondents were >50 years old 56.4%, male 63.6%, and had high school education 65.4%. Good quality of life was found in 65.4% respondents. Duration of Cimino AV use of 24-60 months was dominant 56.5%. There was a significant relationship between duration of Cimino AV use and quality of life p=0.001. Duration of Cimino AV use was the dominant factor OR = 8.54 after controlling for age, education, occupation, marital status, and gender. Longer duration of Cimino AV use is significantly associated with better quality of life in hemodialysis patients.

Keywords: chronic kidney disease; duration of cimino av use; hemodialysis; quality of life

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INTRODUCTION

Chronic kidney disease (CKD) is a major public health problem worldwide because of its increasing prevalence and substantial morbidity and mortality. Progressive loss of kidney function may eventually lead to kidney failure, requiring kidney replacement therapy, including hemodialysis, to sustain life and manage the consequences of advanced kidney disease (Kidney Disease: Improving Global Outcomes [KDIGO] CKD Work Group, 2024). In Indonesia, the increasing burden of CKD has contributed to a growing need for long-term dialysis treatment. Hemodialysis may sustain survival; however, the treatment burden can affect various dimensions of patients' lives, including physical functioning, psychological well-being, social activities, and daily life (Brown et al., 2021; Fidan & Ağırbaş, 2023).

Adequate vascular access is an essential component of successful hemodialysis. Arteriovenous fistula (AV fistula) or Cimino AV is widely considered an important vascular access for hemodialysis because it can provide reliable vascular access for repeated treatment. However, prolonged use of vascular access may be associated with complications that can interfere with dialysis treatment and patients' daily functioning. Such treatment-related factors may subsequently influence patients' health-related quality of life (Kidney Disease: Improving Global Outcomes [KDIGO] CKD Work Group, 2024; Brown et al., 2021).

Quality of life has become an important patient-centered outcome in evaluating treatment among patients undergoing maintenance hemodialysis. Patients receiving dialysis may experience physical

limitations, fatigue, psychological distress, reduced social participation, and restrictions in daily activities, which can negatively affect their overall well-being (Antoun et al., 2023; Fidan & Ağırbaş, 2023). Therefore, improving quality of life is considered an important goal in the long-term management and nursing care of patients with CKD undergoing hemodialysis.

Health-related quality of life is a multidimensional outcome that reflects patients' perceptions of their physical and mental health, functional status, symptoms, and the impact of kidney disease and its treatment on daily life. Recent evidence demonstrates that quality of life is an important outcome among patients undergoing dialysis and can be assessed using kidney disease-specific instruments such as the Kidney Disease Quality of Life-36 (KDQOL-36) (Brown et al., 2021; Rokhman et al., 2023). In Indonesia, the Indonesian version of the KDQOL-36 has demonstrated acceptable validity and reliability among patients undergoing hemodialysis and peritoneal dialysis, supporting its use for assessing health-related quality of life in the Indonesian dialysis population (Rokhman et al., 2023).

Previous studies have reported that quality of life among hemodialysis patients is associated with various clinical, functional, psychological, and treatment-related factors. The burden of kidney disease and dialysis may affect physical functioning, mental well-being, daily activities, and social participation (Brown et al., 2021; Antoun et al., 2023). Meta-analytic evidence also indicates that the type of renal replacement therapy can influence health-related quality of life among patients with end-stage kidney disease (Fidan & Ağırbaş, 2023). Nevertheless, studies specifically investigating the relationship between the duration of Cimino AV use and quality of life remain limited, particularly in Indonesia. This evidence gap indicates the need for further investigation regarding the potential influence of long-term Cimino AV use on patients' quality of life. Therefore, this study aimed to determine the relationship between the duration of Cimino AV use and quality of life among hemodialysis patients at EMC Hospital Cikarang, West Java.

METHOD

This study employed a quantitative analytical design using a cross-sectional approach to determine the relationship between the duration of Cimino arteriovenous fistula (AV fistula) use and quality of life among patients undergoing hemodialysis (Polit & Beck, 2021). The study was conducted at the Hemodialysis Unit of EMC Hospital Cikarang, West Java, Indonesia, from May to December 2025. The study population consisted of 120 patients with chronic kidney disease undergoing routine hemodialysis. The sample size was determined using the Slovin formula with a 10% margin of error, resulting in 55 respondents. Participants were selected using purposive sampling according to predetermined inclusion and exclusion criteria (Nursalam, 2020). Inclusion criteria were patients undergoing hemodialysis using a Cimino AV fistula and willing to participate in the study. Patients who were unable to communicate effectively were excluded.

The independent variable was the duration of Cimino AV use, which was obtained from medical records and categorized into four groups: less than 12 months, 12–24 months, 24–60 months, and more than 60 months. The dependent variable was quality of life, which was measured using the Short Form-36 (SF-36) questionnaire. The questionnaire has demonstrated good validity and reliability for assessing health-related quality of life among patients undergoing hemodialysis (Rokhman et al., 2023). The SF-36 assesses multiple dimensions of health-related quality of life, including physical functioning, role limitations, bodily pain, and general health perception. Data collection was conducted through medical record review and questionnaire administration. Respondents who met the inclusion criteria were informed about the study objectives and procedures and provided written informed consent before participation. The confidentiality of participants was maintained throughout the study by using identification codes instead of personal information.

Data analysis was performed using statistical software. Descriptive statistics were used to summarize respondent characteristics and study variables. The relationship between the duration of Cimino AV use and quality of life was analyzed using Fisher's Exact Test because several contingency table cells had expected frequencies below five. Variables with p-values less than 0.25 in bivariate analysis were entered into a multiple logistic regression model to identify the most dominant factor associated with quality of life after controlling for potential confounding variables, including age, sex, education, occupation, and marital status (Hosmer et al., 2013). Statistical significance was established at $p < 0.05$. This study received ethical approval from the Health Research Ethics Committee of Universitas Karya Husada Semarang with ethical clearance number 022/KEP/UNKAHA/LPPM/I/2026. Written informed consent was obtained from all participants before data collection.

RESULT

Table 1.
Distribution of Respondents According to Their Characteristics

Characteristics	f	%
Age		
31-40 years	11	20
41-50 years	13	23,6
> 50 years	31	56,4
Education level	9	16,4
Junior High School	36	65,4
Senior High School	10	18,2
Higher Education		
Employment Status	25	45,4
Employed	30	54,6
Enemployed		
Marital Status		
Married	39	70, 9
Unmarried	16	29,1
Gender		
Male	35	63,6
Female	20	36,4

Table 1 shows that the majority of respondents were aged over 50 years (56.4%). Most respondents had completed senior high school education (65.4%). More than half of the respondents were unemployed (54.6%). The majority of respondents were married (70.9%), and most respondents were male (63.6%).

Table 2.
Distribution of Respondents According to Quality of Life

Quality of Life	f	%
Good	36	65,4
Poor	19	34,6

Table 2 shows that 36 respondents (65.4%) had a good quality of life, while 19 respondents (34.6%) had a poor quality of life.

Table 3.
Duration of Cimino Arteriovenous Fistula Use

Duration of Use	f	%
< 12 Months	8	14,5
12-24 Months	17	30,9
> 24–60 Months	29	52,7
> 60 Months	1	1,9

Table 3 shows that 8 respondents (14.5%) had used the Cimino AV for less than 12 months, 17 respondents (30.9%) had used it for 12–24 months, 29 respondents (52.7%) had used it for 24–60 months, and 1 respondent (1.9%) had used it for more than 60 months.

Table 4.
Relationship Between the Duration of Cimino Arteriovenous Fistula Use and Quality of Life Among Hemodialysis Patients

Duration of Cimino AV Use	Quality of life				Total		P value
	Good		Poor				
	f	%	f	%	f	%	
<12 Months	1	12,5	7	87,5	8	100	0,001
12-24 Months	8	47	9	53	17	100	
24-60 Months	26	89,6	3	10,4	29	100	
>60 Months	1	100	0	0	1	100	

Bivariate statistical analysis was performed using Fisher's Exact Test as an alternative to the Chi-square test because several cells had expected frequencies of less than five due to the limited sample size (n = 55). As shown in Table 4, the statistical analysis yielded a p-value of 0.001 ($p < 0.05$). Therefore, it can be concluded that there was a statistically significant relationship between the duration of Cimino arteriovenous fistula use and the quality of life of hemodialysis patients at EMC Hospital Cikarang, West Java.

Table 5.
Results of Multiple Logistic Regression Analysis of the Duration of Cimino AV Use and Respondent Characteristics on Quality of Life

Variabel	B	S.E	Df	Sig. (p)	Exp(B) / OR
Duration of Cimino AV Use	2,145	0,652	1	0,001	8,54
Age	0,512	0,421	1	0,224	1,66
Education	0,210	0,345	1	0,542	1,23
Employment Status	0,155	0,289	1	0,591	1,16
Marital Status	0,401	0,390	1	0,304	1,49
Gender	0,324	0,311	1	0,297	1,38
Constant	-1,850	0,920	1	0,044	0,157

Based on the results of the multiple logistic regression analysis presented in Table 5, the duration of Cimino arteriovenous fistula use remained the most significant and dominant factor affecting the quality of life of hemodialysis patients after controlling for respondent characteristics, including age, education, employment status, marital status, and gender ($p = 0.001$). Patients with a longer duration of Cimino AV use were 8.54 times more likely to have a good quality of life than those with a shorter duration of vascular access use (OR = 8.54). This finding suggests that a mature and stable Cimino AV may provide more effective dialysis, reduce vascular access failure during cannulation, and minimize physical and psychological stress among patients. Other respondent characteristics, including age, education, employment status, marital status, and gender, showed p-values greater than 0.05, indicating that these demographic factors were not significantly associated with quality of life in the final regression model. Therefore, the quality of life of hemodialysis patients at EMC Hospital Cikarang appears to be more strongly influenced by the successful maintenance and long-term use of vascular access than by demographic or social characteristics.

DISCCUSION

This study demonstrated that the duration of Cimino arteriovenous fistula (AV fistula) use was significantly associated with quality of life among patients undergoing hemodialysis. Patients who had used Cimino AV for a longer period tended to have better quality of life compared with those with shorter durations of use. These findings indicate that the adaptation process to vascular access and long-term hemodialysis treatment may contribute to improvements in physical and psychosocial well-being (Locatelli et al., 2021; Fidan & Ağırbaş, 2023). The majority of respondents were middle-aged and older adults. Age may influence physical functioning, adaptation to chronic illness, and treatment outcomes. Older patients frequently experience decreased physiological function and comorbid conditions that can negatively affect quality of life. However, patients who successfully adapt to long-term hemodialysis often develop effective coping strategies that help maintain their psychosocial well-being (Antoun et al., 2023).

The significant relationship between the duration of Cimino AV use and quality of life may be explained by several mechanisms. First, patients who have used Cimino AV for longer periods generally experience better vascular access maturation and fewer access-related complications. Adequate vascular access allows effective hemodialysis, reduces hospitalization, and minimizes treatment interruptions (Kidney Disease: Improving Global Outcomes [KDIGO] CKD Work Group, 2024). Second, patients gradually adapt to treatment schedules, dietary restrictions, and lifestyle modifications, leading to better physical and emotional adjustment. The Health-Related Quality of Life (HRQOL) theory explains that quality of life is influenced by physical health status, functional ability, symptoms, and psychosocial adaptation (Rokhman et al., 2023). Patients with stable vascular access may experience fewer physical limitations and reduced anxiety regarding dialysis procedures. Consequently, improvements in these domains may contribute to better overall quality of life.

The findings of this study are consistent with previous studies reporting that adequate vascular access contributes to better health outcomes and improved quality of life among hemodialysis patients (Brown et al., 2021; Locatelli et al., 2021). Stable vascular access decreases complications such as infection, thrombosis, and repeated catheter insertion, which may negatively affect patient comfort and treatment satisfaction. Furthermore, patients with longer durations of hemodialysis often develop stronger self-management abilities and better adherence to treatment recommendations. Nevertheless, several respondents with prolonged Cimino AV use still reported poor quality of life. This finding suggests that quality of life is a multidimensional concept influenced not only by vascular access duration but also by age, education, occupation, family support, psychological conditions, comorbid diseases, and socioeconomic status (Brown et al., 2021; Antoun et al., 2023).

Multiple logistic regression analysis demonstrated that the duration of Cimino AV use remained an important factor associated with quality of life after controlling for several confounding variables. These findings emphasize the importance of early vascular access planning and continuous monitoring of Cimino AV function in patients with chronic kidney disease (KDIGO CKD Work Group, 2024). The implications of this study for nursing practice include the need for regular assessment of vascular access function, patient education regarding Cimino AV care, and psychosocial support programs for patients undergoing long-term hemodialysis. Nurses play an important role in promoting adaptation, preventing complications, and improving quality of life among hemodialysis patients (Antoun et al., 2023). Several limitations should be considered in this study. The cross-sectional design did not allow determination of causal relationships between the duration of Cimino AV use and quality of life. Future studies using longitudinal and multicenter designs are recommended to strengthen the evidence regarding the impact of vascular access duration on quality of life.

CONCLUSION

This study demonstrated a significant relationship between the duration of Cimino arteriovenous fistula use and the quality of life among patients undergoing hemodialysis. Patients with longer durations of Cimino AV use tended to have better quality of life, indicating that stable vascular access and adaptation to long-term hemodialysis may contribute to improved physical, psychological, and social well-being. These findings suggest that the duration of Cimino AV use is an important factor associated with quality of life in patients receiving maintenance hemodialysis.

Healthcare providers, particularly nurses working in hemodialysis units, should perform regular assessments of vascular access function and provide continuous education regarding Cimino AV care to prevent complications and improve patient adaptation. Hospitals are encouraged to strengthen vascular access monitoring programs and psychosocial support services for hemodialysis patients.

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