

Original Articles: Quantitative Research**KNOWLEDGE AND CARE OF ARTERIAL VENOUS FISTULA ACCESS IN
HEMODIALYSIS PATIENTS: A CROSS-SECTIONAL STUDY**Lono Wijayanti^{1,2*}, Hesmi Fitria Dewi², Yurike Septianingrum², Riska Rohmawati², Tata Mahyuvi²¹ Center for Continuing Care Research (C3R), Universitas Nahdlatul Ulama Surabaya, 60243, Surabaya, East Java, Indonesia² Nursing Department, Faculty of Nursing and Midwifery, Universitas Nahdlatul Ulama Surabaya, 60243, Surabaya, East Java, Indonesia**Article history:**

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Email: lono@unusa.ac.id**Keywords:***Knowledge, Vascular Access
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Hemodialysis.***Page Number:** 211-221.**Abstract****Background:** Arteriovenous fistula (AVF) access is vital for patients undergoing hemodialysis therapy. Proper care of AVF greatly affects the continuity of fistula function and prevents complications such as infection and thrombosis.**Objective:** This study was to determine the relationship between knowledge and management of arteriovenous fistula access in hemodialysis patients.**Methods:** This study is a correlational analysis with a cross-sectional design. The study population included all dialysis patients, totaling 200 respondents. The sample size was 160 respondents who were randomly selected using the simple random sampling method. Questionnaires were used to collect information, which was then analyzed using Spearman's Rank correlation test.**Results:** The results showed that 57.5% of the 160 respondents had insufficient knowledge, and 60% lacked in arteriovenous fistula (cimino) care. The Spearman test results showed a p-value of 0.000 and a correlation of 0.709.**Conclusion:** Patients with good knowledge tend to perform AV fistula care more appropriately and consistently.**INTRODUCTION**

Hemodialysis is a process of cleansing the blood of metabolic waste and excess fluid through a dialyzer device that requires vascular access as a pathway for blood to enter and exit. The recommended and most widely used type of access is an arteriovenous fistula (AVF) (Besarab et al., 2024; Salih et al., 2025). However, despite the advantages of FVA, this access is still at risk of complications such as infection, thrombosis, or stenosis if not properly cared for. Therefore, proper care of FVA is very important to maintain its function. One factor that influences the success of FVA access care is patient knowledge. Good knowledge will encourage patients to perform care actions correctly, such as maintaining fistula area hygiene, avoiding pressure on the fistula arm, and recognizing early signs of

complications (Pinto et al., 2022; Satta et al., 2022; Stegmayr et al., 2021). Several studies suggest that 15 to 20% of hemodialysis patients experience problems with vascular access, including increased morbidity, mortality and costs of re-access creation. (Guo et al., 2025; Sousa et al., 2020).

According to the World Health Organization (WHO) in 2021, the number of people with chronic kidney disease was recorded at more than 843.6 million worldwide. It is estimated that the mortality rate from chronic kidney disease will increase by 41.5% by 2040. This high figure indicates that chronic kidney disease ranks 12th among all causes of death (ISN, 2022). Based on the Indonesian Health Survey (SKI, 2023), the number of patients diagnosed with chronic kidney disease (CKD) in Indonesia reached 21.1% of patients undergoing hemodialysis.

Medical record data from the Surabaya Jemursari Islamic Hospital shows data that from September to December 2022 there were 177 patients with details of 115 male patients and 62 female patients, 100 of whom had Cimino access installed. Based on initial observations, 3 out of 5 patients experienced swelling, thrombosis, and red rash around the vascular access area until the vibrations in the vascular access stopped. Several patients who experienced failure after arteriovenous fistula installation admitted that they did not understand access care, for example, not compressing post-insertion and never cleaning the AV shunt area with soap to minimize swelling of the access.

There are several factors that influence access care in hemodialysis patients, including age, education, occupation, and knowledge (Cahyanto et al., 2024; Hanafy et al., 2022; Salih et al., 2025). Individuals who understand the importance of self-care will always maintain vascular access independently to prevent complications or other health problems (Pinto et al., 2022). Good access care will increase the success rate of the hemodialysis process (Chen et al., 2022; Yolgösteren, 2020).

Objectives: The purpose of this study was to determine and analyze the extent to which the level of knowledge possessed by hemodialysis patients was related to their behavior in caring for their arteriovenous fistula access. This study was expected to provide a clearer picture of the influence of knowledge on the care actions taken by patients, so that it could be used as a basis for efforts to improve education and nursing interventions in order to maintain optimal vascular access function.

METHODS

Study Design

This research is a quantitative study with a cross-sectional design, which is a type of research where observational data from research respondents is only measured in one observation. The independent variable in this study is knowledge, while the dependent variable is management of arteriovenous fistula access.

Settings

This research was conducted at Jemursari Islamic Hospital, Surabaya, East Java Province, which was conducted in 2023.

Research Subject

The population in this study was all patients undergoing hemodialysis therapy at the Surabaya Islamic Hospital, Jemursari, totaling 200 people. Sample selection using a simple random sampling technique. The sample size in this study was 160 respondents. Determination of samples based on inclusion criteria, namely: 1) cooperative, 2) can communicate well, 3) can read and write, and 4) installed Arterial Venous Fistula (Cimino). Exclusion criteria include: 1) had a decrease in consciousness, 2) had complications of stroke.

Instruments

The research instrument used in this study adopted the research conducted by Aisah (2022), which consisted of 10 questions and had undergone validity and reliability tests. Based on the validity test, the calculated r value (0.361-0.463) was $> r$ table (0.361), so it was declared valid. Meanwhile, the reliability test results showed a Cronbach's Alpha value of 0.861 for the knowledge instrument and 0.837 for the arteriovenous fistula access care ability instrument, so this questionnaire was declared reliable for use.

Data collection

This study was conducted after obtaining permission from the university and hospital. The study focused on patients with chronic kidney disease undergoing hemodialysis at the hemodialysis unit of Surabaya Jemursari Islamic Hospital. Data collection was carried out after the researchers coordinated with the head of the hemodialysis unit regarding the data collection schedule, number of patients, and procedures that would not interfere with the dialysis process. The researchers then verbally explained the purpose of the study, its benefits, the questionnaire completion procedure, and data confidentiality guarantees to prospective respondents. Prospective respondents were allowed to ask questions about the study. Respondents who were willing to participate were asked to sign an informed consent form as proof of their voluntary participation.

The questionnaire was distributed directly to 160 respondents after undergoing hemodialysis for approximately two hours, when the patients' conditions were relatively stable. Respondents filled out questionnaires regarding their knowledge and care of arteriovenous fistula access independently, while the researcher and two research assistants were on hand to provide assistance or clarification if there were any questions that were not understood. Each respondent was accompanied to ensure that all questions were completed in full to minimize invalid data. After completion, the questionnaires were collected by the researcher and two research assistants. The researcher conducted an initial check to ensure that no parts of the questionnaire were blank or unclear. The completed data was recorded and prepared for further analysis.

Data Analysis

This study was analyzed using SPSS for Windows version 22. The Spearman rank correlation test was used to analyze the relationship between two variables with ordinal scale data that were not

normally distributed. The results of the study are presented in tables and narratives to describe the relationship between knowledge and care of arteriovenous fistula access.

Ethical Consideration

This research has obtained permission and ethical feasibility at Jemusari Islamic Hospital Surabaya with No. 042/KEPK-RSISJS/IV/2023. Ethical principles need to be upheld to maintain the integrity of researchers and protect respondents from human rights violations. In this study, researchers used ethical aspects of research, namely informed consent, anonymity, confidentiality, non-maleficency, truth, and justice.

RESULTS

This section focuses on the question, “What is the knowledge of arterial venous fistula access care in hemodialysis patients?” To answer this question, the authors provide the following findings.

Table 1. Frequency Distribution Based on Respondent Characteristics.

No.	Characteristics	Frequency(f)	Percentage (%)
1.	Age (years)		
	17 - 25	4	2.5
	26 - 35	20	12.5
	36 - 45	38	23.8
	46 - 55	44	27.5
	56 - 65	54	33.8
2.	Gender		
	Male	94	58.8
	Female	66	41.2
3.	Education		
	Base	32	20
	Intermediate	74	46.2
	College	54	33.8
4.	Long time undergoing hemodialysis		
	≤ 1 year	38	23.7
	2 - 5 years	76	47.5
	> 5 years	46	23.7

Sources: Primary Data Questionnaire

Based on Table 1, it can be seen that out of the 160 respondents, almost half (33.8%) were aged between 56 and 65 years, the majority (58.8%) were male, almost half (46.2%) had secondary education, and the majority (47.5%) had been undergoing hemodialysis for 2-5 years.

Table 2. Cross-tabulation based on Specific Variables.

Variable		Vascular Access Treatment						Total	%	<i>p-value</i>
		Bad		Currently		Good				
		N	%	N	%	N	%			
Knowledge	Not enough	90	56.2	0	0	2	1.3	92	57.5	<i>P</i> =0,003 <i>r</i> =0,709
	Enough	4	2.5	0	0	4	2.5	8	5	
	Good	2	1.3	52	32.5	6	3,7	60	37.5	

Sources: Primary Data Questionnaire

Based on the test results, the value obtained was $p = 0.000$; $r = 0.709$, indicating that there is a significant and fairly strong relationship between the level of knowledge and vascular access care, so that the better the respondents' knowledge, the better the quality of care received.

DISCUSSION

The research aimed to find out how knowledge relates to taking care of arteriovenous fistula installations. The study results are explained below.

The study found that 57.5% of participants, or 92 people, did not have sufficient knowledge about arteriovenous fistula access care. Based on the questionnaire responses, many respondents did not have a complete understanding of vascular access. Individuals undergoing hemodialysis had difficulty caring for their arteriovenous fistula access properly. This study is in line with previous research conducted in Nepal, which found that the majority of patients undergoing hemodialysis who were scheduled for AVF at tertiary care facilities showed a positive attitude toward fistula care, but their knowledge was poor (98.8%) (Dev et al., 2025). Various factors, such as basic skills, experience, flexibility, creativity, and adaptability, play an important role in shaping knowledge. Therefore, structured health education is needed to improve understanding and application of arteriovenous fistula care (Pinto et al., 2022).

Based on age, it was found that almost half (33.8%) were between 56 and 65 years old, supported by previous studies that the elderly are the group of hemodialysis patients with the highest prevalence increase in recent years. Due to comorbidities, the risk of complications, and the high rate of AVF failure, many elderly patients use central venous catheters as vascular access (Dias et al., 2025). In addition, age also affects cognition and causes a decline in memory function, so that when providing information and education, respondents are not very responsive to the information provided. This is consistent with previous studies showing that cognitive impairment affects more than half of patients undergoing long-term dialysis (Golenia et al., 2023). These impairments may stem from age-related neurodegeneration, cerebral hypoperfusion due to hemodialysis, and the accumulation of uremic toxins (Dias et al., 2025; Zhang et al., 2024). A study conducted by Suci & Joelya (2023) also showed that older adults are at higher risk than younger people due to functional decline.

The next factor that influences a person's level of knowledge is education. The findings show that the majority of the respondents (46.2%) had secondary education. The study found that the majority of the respondents with a high school education did not understand the knowledge of arterial venous fistula access, as evident from the questionnaire responses. The higher the level of education, the easier it is to understand how to perform access maintenance to perform the maintenance better. The level of education mediates the knowledge one must possess (Sajjadi et al., 2024; Wijayanti et al., 2024). The higher the level of education, the higher the self-testimony capacity of a person to seek advantages in carrying out the care and processing process, which guarantees a better understanding of treatment. High education will reflect a person's ability to do well. People with higher education have a higher

level of experience and more mature thinking, which allows them to differentiate between right and wrong (Yolgösteren, 2020). The findings of this study are supported by a study conducted by (Damayanti & Sofyan, 2022) Majority of the respondents who had secondary education (high school or equivalent), i.e., 13 respondents, had insufficient knowledge.

According to the study results, out of 160 respondents, the majority (60%) of arterial venous fistula access procedures had poor outcomes. The lack of vascular access care among respondents can be seen in the respondents' responses to the statement, namely, never having regular check-ups with a doctor to ensure there are no problems with vascular access. The statement that the respondent had never been trained to use a rubber ball and therefore the pressure to access was great is followed by a statement that the respondent often forgot that a vascular access arm was attached and that it was being used to lift weights in excess of 10 Kg. In order for respondents to maintain physical and psychological health, independent care for blood vessels is very important. Self-consumption of blood vessels is an important treatment for maintaining access to blood vessels and maintaining physical and psychological health (Chen et al., 2022; Ng et al., 2021). Care is an individual's ability to motivate themselves to carry out self-care independently to improve and maintain their health status and overcome their illness (Guo et al., 2025; Hanafy et al., 2022)

Knowledge is a factor that influences arterial venous fistula access care. Knowledge about access to care influences personal hygiene. However, this is not enough because self-motivation is an important key to implementing personal hygiene. Interior difficulties that affect access to personal hygiene practices are the lack of knowledge due to lack of knowledge, even if many personal decisions are made to form a lifestyle, social environment, and physical environment (Zaky Mubarak¹, Faradisa Yuanita Fahmi, 2022). His study is in line with previous researchers who stated that 66% of respondents had adequate knowledge and more than half of the respondents were efficient and self-care regarding vascular access, 66% (Shintia & Khadafi, 2021).

The survey found that of the 160 respondents, the majority (58.8%) were men. The drive to survive is the most fundamental thought process when someone is about to start dialysis therapy. In the early stages, fear is often the main factor that influences how individuals assess risks and make decisions. Once this fear has been managed, various other physical, social, practical, and emotional challenges arise that need to be considered rationally. However, treatment options can only be optimally considered if the decision-making process is carried out collaboratively between the patient and medical staff.

The difference between men and women is evident in their hopes and expectations regarding treatment. In general, men are more focused on achieving physical goals, while women place greater emphasis on the desire to feel healthy overall. Both genders report significantly higher levels of symptoms compared to healthcare professionals' assessments, with a more pronounced difference in women (Beckwith et al., 2022). Vascular access care can be performed by anyone, regardless of gender (García et al., 2022).

Based on the duration of hemodialysis, the study results showed that of the 160 respondents, almost half (47.5%) had undergone hemodialysis for 2 to 5 years. A person who has just undergone hemodialysis still has to adjust to their emotions and daily behavior and depends on others to help them take care of their vascular access. Patients with chronic kidney disease undergoing hemodialysis experience a variety of physical, psychological, and social changes related to the progression of the disease and the patient's ability to adapt to changes. The longer patients undergo hemodialysis, the more accustomed they become to the access and the more able they are to complete the dialysis process (Gupta et al., 2022; Pinto et al., 2022; Sousa et al., 2020).

The results based on Table 2 show that 92 respondents had no knowledge, and most of them (56.2%) had no knowledge about arterial venous fistula access. The results of the Spearman rank test gave a p-value of 0.000 and the value $\alpha = 0.05$, meaning $p < \alpha$, with a correlation coefficient of 0.709, which means that there is a significant and unidirectional correlation between knowledge and access to care for hemodialysis patients. Vascular access self-care is the process of managing health through activities that can improve health, monitoring vascular access care, and managing vascular access care. Patients with end-stage renal disease undergoing hemodialysis, especially those with arteriovenous shunts, require self-monitoring to avoid the development of complications (Stegmayr et al., 2021). This is in line with research conducted by Ningsih *et al.* (2022), which stated that self-care of hemodialysis patients with AVF access is very important to reduce the risk of complications. Self-care of vascular access is the action of assessing for tenderness and preventing signs of infection at the access site (Chen et al., 2022). The goal of vascular access independent treatment is for the vascular access to function well. The better the knowledge of arterial venous fistula access, the better the treatment of arterial venous fistula access. Because arterial venous fistula access is mainly an access for hemodialysis procedures to achieve effective hemodialysis and quality.

LIMITATION

This study has limitations, namely that the research was conducted in only one hospital, so the results may not be generalizable to hemodialysis patients in other hospitals with different characteristics, facilities, or service policies. Most respondents were elderly patients who had limitations in reading, understanding questions, or remembering information well. This condition may affect the accuracy of the answers provided, even though the researchers provided assistance during the questionnaire completion. The assessment of arteriovenous fistula access care behavior was based entirely on the patients' answers to the questionnaire. This may have led to discrepancies between the answers provided and the actual care practices carried out at home.

CONCLUSION

This study shows that patients who have better knowledge about the importance of maintaining hygiene, avoiding excessive pressure, and recognizing the signs of complications are proven to be more

consistent in performing arterial-venous fistula care independently and correctly. These findings confirm that patient knowledge is an important factor influencing the success of self-care in hemodialysis, particularly in maintaining the function of the arteriovenous fistula as the primary vascular access. Therefore, nursing practice needs to emphasize the role of nurses as educators through structured, continuous, and tailored educational activities that align with patients' level of understanding.

AUTHOR CONTRIBUTION

Lono Wijayanti : Writing original article draft, conception, and methodology
Hesmi Fitria Dewi : Writing collection and assembly of data
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CONFLICT OF INTEREST

There is no conflict of interest in this research.

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