



Knowledge and Self-care practice of Arteriovenous Fistula among Hemodialysis patients

Authors  **Haval Mohammed Qader¹;**  **Ali Taher Mohammedameen¹.**
Sideeq Sadir Ali¹ 

Affiliation Assistant Lecturer, Adult Nursing, Nursing Department, College of Nursing,
Hawler Medical University.

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Abstract

Backgrounds and objectives: Hemodialysis is a crucial therapy for patients with end-stage renal disease, with arteriovenous (AV) fistulas being commonly utilized due to their durability and lower infection risk. Proper care and maintenance of AV fistulas are essential for their long-term functionality and efficacy in facilitating hemodialysis. This study assessed the knowledge and self-care practices related to AV fistula among hemodialysis patients.

Methods: A quantitative, descriptive study design was adopted in Hawler Teaching Hospitals, Erbil City, Iraq. There were 112 patients interviewed from September 2023 to January 2024 by using a semi-structured questionnaire multiple-choice and three-point Likert scale to collect clinical and demographical data of patients to assess knowledge and practice, respectively.

Results: The results of the study showed that the majority (48.2%) of the patients had inadequate knowledge, 31.3% had moderately adequate knowledge, and 20.5% had adequate knowledge regarding self-care of AV fistula. Most (85.7%) of the patients had moderate self-reported practice, 14.3 % had poor self-reported self-care regarding AV fistula self-care, and none had good self-reported practice. A significant relationship was found between knowledge and practice of self-care of AV fistula with level of education, which was statistically significant at ($p < .05$).

Conclusion: The study findings highlight inadequate knowledge and suboptimal self-care practices among hemodialysis patients, particularly those undergoing dialysis for one to two years. This underscores the critical need for patient education and support improvements to enhance AV fistula care and optimize patient outcomes.

What is already known about the topic? An arteriovenous fistula (AVF) is crucial for hemodialysis, and its success depends on patients' knowledge and self-care practices. Proper care, such as cleanliness and monitoring for issues, helps prevent complications. However, many patients lack adequate knowledge, leading to problems like infection. Nurses play a key role in patient education to improve AVF outcomes.

* Corresponding author.

[Ali Taher Mohammedameen](mailto:Ali.Taher.Mohammedameen@mosuljournals.com)

E-mail address:

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INTRODUCTION

The kidneys are one of the most critical organs in the human body, they are responsible for the extracellular fluid equilibrium. (Iqbal et al., 2018) The best vascular access for operating hemodialysis for patients with kidney disease is an arteriovenous (AV) fistula. (Sousa et al., 2020) Creating an AV fistula involves a surgical procedure in which an artery and a vein are connected to facilitate dialysis access. (Marsh, et al., 2023)

Over 10% of the global population is affected by a degenerative disease which is chronic kidney disease (CKD), encompassing more than 800 million individuals. Predominantly prevalent in older adults, women, racial minorities, and those with diabetes and hypertension. (Hinkle et al., 2021) CKD poses a significant burden, particularly in low- and middle-income countries, which often lack adequate resources to address its implications. Alarming, CKD ranks among the leading causes of mortality worldwide, with a notable increase in associated deaths observed over the past two decades. (Muthusamy et al., 2021)

In Iran, the prevalence of end-stage renal disease (ESRD) was reported at 680 per million people in 2017, according to the Iran Consortium of Dialysis (ICD) report. ESRD, characterized by chronic and progressive kidney dysfunction leading to the accumulation of metabolic waste products, poses profound personal and national repercussions. (Institute for Health Metrics and Evaluation (IHME), 2018) Despite its incurable nature, life expectancy can be extended through treatments such as hemodialysis (HD), peritoneal dialysis, or kidney transplantation, with hemodialysis being the most prevalent method for managing advanced renal failure. (Xu et al., 2023)

Hemodialysis relies on various access points, including fistula, graft, and catheter, with AV fistula emerging as a preferred option. (Abd Alfatah et al., 2013) AV fistulas are susceptible to complications such as blood hypo-flow, edema, thrombosis, aneurysms, and infection (Marsh, et al., 2023) Self-care practices among patients were less focused on AV fistula infection and thrombosis prevention. (Sousa et al., 2020) Preventive measures, including proper care and patient education, play pivotal roles in mitigating these risks. (Pessoa and Linhares, 2015)

Patients' engagement in self-care practices is essential for maintaining AV fistula health and longevity. During the fistula maturation period, specific care strategies, such as arm elevation, daily exercises, and vigilant blood flow assessment, are imperative to enhance durability. Moreover, adherence to precautions such as adequate compression for hemostasis and blood pressure monitoring is crucial for optimizing fistula function. Knowledge dissemination regarding self-care practices significantly influences patients' attitudes and behaviors toward AV fistula management. (Iqbal et al., 2018)

Investigating the knowledge and self-care practices pertaining to AV fistulas in hemodialysis patients is instrumental in fostering patient empowerment and improving healthcare delivery. By identifying gaps in knowledge and their self-care practice, healthcare professionals can facilitate informed decision-making and promote proactive self-care behaviors among hemodialysis patients, ultimately leading to enhanced vascular access management and improved patient outcomes. This study aimed to assess the knowledge and self-

care practices related to AV fistula among hemodialysis patients.

PATIENTS AND METHODS

A quantitative, descriptive study designed to assess the knowledge and practice regarding self-care of AV fistula among hemodialysis patients in Hawler Teaching Hospitals, Erbil city, Iraq. The study population comprised 112 patients undergoing hemodialysis with an AV fistula in the selected setting from September 2023 to January 2024. Inclusion criteria encompassed patients aged 14 and older, of both genders, undergoing hemodialysis for a period of six months to two years with AV fistula, and proficient in either Kurdish or Arabic. Patients classified as critically or mentally ill were excluded from the study. Non-probability convenient sampling was employed to select participants meeting the specified criteria.

Data were collected using a semi-structured questionnaire designed to gather clinical and demographic information. The questionnaire included 20 structured multiple-choice items to assess knowledge. Each correct response was assigned a score of '1', while each incorrect response received a score of '0'. The total knowledge score ranged from 0 to 20. The percentage was calculated based on the total score obtained by each participant, with interpretations categorized as follows: Adequate (>75% correct responses), Moderately adequate (51% to 75% correct responses), and Inadequate (≤50% correct responses).

Additionally, a three-point Likert scale with 30 statements was utilized to

RESULTS

Table 1 Shows that the majority of patients age were between (53 to 65 years old) which presented (%32.1) with mean age and standard deviation of 53.79 ± 16.923, and most of them were female 60

evaluate self-reported practices. For positive statements, responses were scored as follows: Never (0), Sometimes (1), Always (2). For negative statements, responses were scored inversely: Never (2), Sometimes (1), Always (0). The total practice score ranged from 0 to 60. The percentage was calculated based on the total score obtained by each participant, with interpretations categorized as follows: Good (>75% of maximum possible score), Moderate (51% to 75% of maximum possible score), and Poor (≤50% of maximum possible score).

The questionnaire was validated by two nephrologists and three medical-surgical nursing experts. Test-retest reliability analysis yielded scores of 0.83 and 0.87 for the knowledge and practice tools, respectively.

Ethical approval was obtained from the Hawler Medical University College of Nursing ethical committee, and verbal informed consent was obtained from all participants. Confidentiality and anonymity of participants were maintained throughout the data collection process.

Data were analyzed using SPSS software version 27. Descriptive statistics, including frequency and percentage distribution, were employed to assess the level of knowledge and practice regarding self-care of AV fistula among patients receiving hemodialysis. The chi-square test was utilized to explore associations between knowledge and self-care practice regarding AV fistula among hemodialysis patients.

(%53.6). The majority of the participants in this study were residents of urban (%77.7). Moreover, (%44.6) of them were illiterate. More than half of the participants were married (%63.4). All samples that enrolled in this study were

Muslim (99.1%) except only one patient (0.9%) was Christian. The majority of females were housewives (42.9%) and males were Unemployed (25%).

Table 1 presents the sociodemographic characteristics of the study participants. The majority of patients fell within the age range of 53 to 65 years old, constituting 32.1% of the total sample. The mean age was 53.79 years with a standard deviation of 16.923. Gender distribution showed that 53.6% of the participants were female, while 46.4% were male.

Regarding the area of residence, the majority of participants (77.7%) resided in urban areas. In terms of educational levels, 44.6% of participants were illiterate, while 25.0% had completed secondary school. Marital status analysis revealed that 63.4% of participants were married, followed by 21.4% who were single and 13.4% who were widowed.

Religiously, almost all participants (99.1%) identified as Muslim, with only one participant (0.9%) identifying as Christian. The occupational distribution showed that the largest proportion of females (42.9%) were housewives, while the largest proportion of males (25.0%) were unemployed. Other occupations included government employees (5.4%), students (6.3%), retired individuals (10.7%), and those working in various other sectors (5.4%).

Table 2 provides an overview of the clinical variables among the study participants. The majority of participants (41.1%) were diagnosed with chronic kidney disease between the ages of 53 to 65 years. Regarding the duration of undergoing hemodialysis, a significant proportion (39.3%) had been undergoing hemodialysis for more than 2 years. Similarly, 41.1% of participants had been

living with an AV fistula for more than 2 years.

Regarding comorbid diseases, a substantial majority of participants reported having hypertension (80.4%), followed by diabetes mellitus (40.2%) and cardiac disease (32.1%). In terms of the frequency of receiving hemodialysis, the majority of participants (61.6%) received treatment twice per week.

The location of the AV fistula was predominantly in the elbow of the non-dominant arm (75.9%). Most participants (75.9%) reported no history of AV fistula failure and were aware of its care. Additionally, a majority of participants (69.6%) obtained information about AV fistula care from healthcare providers.

Table 3 shows that the majority of patients (48.2%) demonstrated inadequate knowledge, while 31.3% exhibited moderately adequate knowledge. Additionally, 20.5% of patients demonstrated adequate knowledge regarding self-care of AV fistula.

Table 4 illustrates the distribution of self-reported practice levels among the study participants regarding the self-care of AV fistula. The assessment of practice levels was based on a scale ranging from poor to good.

The findings reveal that a significant majority of patients (85.7%) reported having moderate levels of practice in self-care of AV fistula. Conversely, a smaller proportion (14.3%) indicated poor self-reported practice in this regard. Notably, none of the participants reported achieving a level of good practice.

Table 5 presents the association between the level of knowledge regarding self-care of AV fistula and various sociodemographic characteristics of the patients. Statistical analysis was

conducted to examine potential associations using the chi-square test. The findings indicate a statistically significant association between the level of knowledge and educational levels ($p = 0.040$). Specifically, participants' educational backgrounds showed a significant influence on their level of knowledge regarding self-care of AV fistula.

However, for other sociodemographic variables such as age group, gender, area of residence, marital status, religion, occupation, age of diagnosis of chronic kidney disease, duration of undergoing hemodialysis, duration of having AV fistula, site of AV fistula, and history of AV fistula failure, no statistically significant association was observed with the level of knowledge regarding self-care of AV fistula.

Table 6 presents the association between the level of self-reported practice regarding self-care of AV fistula and various sociodemographic characteristics of the patients. Statistical analysis was conducted to assess potential associations using the chi-square test.

The results indicate that there was no statistically significant association observed between the level of self-reported practice and most demographic variables, including age group, gender, area of residence, marital status, religion, occupation, age of diagnosis of chronic kidney disease, duration of undergoing hemodialysis, duration of having AV fistula, site of AV fistula, and history of AV fistula failure. However, a statistically significant association was found between the level of self-reported practice and educational levels ($p = 0.030$). Specifically, participants' educational backgrounds demonstrated a significant influence on their level of self-reported practice regarding self-care of AV fistula.

These findings suggest that educational levels may play a crucial role in determining the level of self-reported practice of self-care of AV fistula among the study participants, while other sociodemographic characteristics do not exhibit a significant association with practice levels.

Table 1 Sociodemographic Variables of Patients Undergoing Hemodialysis

Sociodemographic Variables		Frequency (N=112)	Percentage (%)
Age Group	14-26	14	12.5
	27-39	8	7.1
	40-52	22	19.6
	53-65	36	32.1
	>66	32	28.6
	M±D	53.79 ± 16.923	
Gender	Male	52	46.4
	Female	60	53.6
Area of residence	urban	87	77.7
	sub rural	19	17.0
	rural	6	5.4
Educational levels	illiterate	50	44.6
	able to read and write	1	0.9
	primary school	13	11.6
	secondary school	28	25.0
	high school	6	5.4
	institute	7	6.3
	college	7	6.3
	post graduate	0	0.0
Marital status	single	24	21.4
	married	71	63.4
	widowed	15	13.4
	separated	0	0.0
	divorced	2	1.8
Religion	Muslim	111	99.1
	Christian	1	0.9
	Yezidi	0	0.0
	others	0	0.0
Occupation	government employee	6	5.4
	private employee	1	0.9
	student	7	6.3
	Unemployed	28	25.0
	house wife	48	42.9
	retired	12	10.7
	daily wages	4	3.6
	others	6	5.4
Total		112	100 %

Table 2 Distribution of clinical variables of patients undergoing hemodialysis

Clinical Variables		(N=112)	(%)
Age of diagnosis of chronic kidney disease	14-26	12	10.7
	27-39	11	9.8
	40-52	28	25
	53-65	46	41.1
	66 and more	15	13.4
Duration of undergoing hemodialysis	Less than 1 year	39	24.8
	1-2 years	29	25.9
	More than 2 years	44	39.3
Since when do you have AV fistula	Less than 1 year	42	37.5
	1-2 years	24	21.4
	More than 2 years	46	41.1
Presence of co-morbid disease	Yes	95	84.8
	No	17	15.2
Do you have Diabetes mellitus	Yes	45	40.2
	No	67	59.8
Do you have hypertension	Yes	90	80.4
	No	22	19.6
Do you have cardiac disease	Yes	36	32.1
	No	76	67.9
Frequency of receiving hemodialysis	Three times per week	41	36.6
	Twice per week	69	61.6
	Once per week	2	1.8
Location of AV fistula on	Dominant arm	43	38.4
	Non-dominant arm	69	61.6
Site of AV fistula	Wrist	2	1.8
	Forearm	25	22.3
	Elbow	85	75.9
History of AV fistula failure	No	85	75.9
	Yes, once	19	17
	Yes, twice	4	3.6
	Yes, three times and more	4	3.6
Aware of care of AV fistula	Yes	84	75
	No	28	25
Did you get information from health care provider	Yes	78	69.6
	No	34	30.4
Did you get information from internet	Yes	3	2.7
	No	109	97.3
Did you get information from other sources	Yes	5	4.5
	No	107	95.5

Table 3 Knowledge regarding self-care of AV fistula among hemodialysis Patients.

Level of knowledge	Frequency (n= 112)	Percent (%)
Inadequate	54	48.2
Moderately adequate	35	31.3
Adequate	23	20.5
Total	112	100.0

Table 4 Level of Practice regarding self-care of AV fistula among hemodialysis Patients.

Level of Practice	Frequency (n= 112)	Percent (%)
Poor Practice	16	14.3
Moderate Practice	96	85.7
Good Practice	0	0
Total	112	100.0

Table 5 Association of Level of Knowledge with Sociodemographic Variables

Variables		Level of knowledge			p- value
		Inadequate	Moderate adequate	Adequate	
Age Group	14-26	5	4	5	0.395
	27-39	5	3	0	
	40-52	11	6	5	
	53-65	21	11	4	
	>66	12	11	9	
Gender	Male	27	15	10	0.762
	Female	27	20	13	
Area of residence	urban	42	25	20	0.530
	Sub rural	8	8	3	
	Rural	4	2	0	
Educational levels	Illiterate	24	15	11	0.04
	Able to read and write	1	0	0	
	Primary school	7	4	2	
	Secondary school	14	10	4	
	High school	5	1	0	
	Institute	1	4	2	
	College	2	1	4	
	Post graduate	0	0	0	
Marital status	Single	10	9	5	0.944
	Married	36	21	14	

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Variables		Level of knowledge			p- value
		Inadequate	Moderate adequate	Adequate	
	Widowed	7	4	4	
	Separated	0	0	0	
	Divorced	1	1	0	
Religion	Muslim	54	34	23	0.330
	Christian	0	1	0	
	Yezidi	0	0	0	
	Others	0	0	0	
Occupation	Government employee	1	3	2	0.734
	Private employee	1	0	0	
	Student	2	3	2	
	Unemployed	18	4	6	
	House wife	23	16	9	
	Retired	5	5	2	
	Daily wages	1	2	1	
	Others	3	2	1	
Age of diagnosis of chronic kidney disease	14-26	5	3	4	0.825
	27-39	6	4	1	
	40-52	15	8	5	
	53-65	22	16	8	
	>66	6	4	5	
Duration of undergoing hemodialysis	Less than 1 year	22	10	7	0.391
	1-2 years	16	8	5	
	More than 2 years	16	17	11	
Since when do you have AV fistula	Less than 1 year	23	10	9	0.460
	1-2 years	13	8	3	
	More than 2 years	18	17	11	
Sites of AV fistula	Wrist	2	0	0	0.165
	Forearm	10	12	3	
	Elbow	42	23	20	
History of AV fistula failure	No	45	24	16	0.330
	Yes once	5	8	6	
	Yes twice	3	1	0	
	Yes, more than twice	1	2	1	

Table 6 Association of Level of Self-reported Practice with Sociodemographic Variables

Variables		Level of Self-reported Practice			p- value
		Poor practice	Moderate practice	Good practice	
Age Group	14-26	2	12	0	0.598
	27-39	1	7	0	
	40-52	4	18	0	
	53-65	7	29	0	
	>66	2	30	0	
Gender	Male	5	47	0	0.189
	Female	11	49	0	
Area of residence	urban	12	75	0	0.422
	sub rural	4	15	0	
	rural	0	6	0	
Educational levels	illiterate	9	41	0	0.03
	able to read and write	0	1	0	
	primary school	2	11	0	
	secondary school	3	25	0	
	high school	0	6	0	
	institute	1	6	0	
	college	1	6	0	
	post graduate	0	0	0	
Marital status	single	3	21	0	0.489
	married	9	62	0	
	widowed	4	11	0	
	separated	0	0	0	
	divorced	0	2	0	
Religion	Muslim	16	95	0	0.682
	Christian	0	1	0	
	Yezidi	0	0	0	
	others	0	0	0	
Occupation	government employee	1	5	0	0.594
	private employee	0	1	0	
	student	1	6	0	
	Unemployed	4	24	0	
	house wife	10	38	0	
	retired	0	12	0	
	daily wages	0	4	0	
	others	0	6	0	

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Variables		Level of Self-reported Practice			p- value
		Poor practice	Moderate practice	Good practice	
Age of diagnosis of chronic kidney disease	14-26	2	10	0	0.270
	27-39	1	10	0	
	40-52	3	25	0	
	53-65	10	36	0	
	>66	0	15	0	
Duration of undergoing hemodialysis	Less than 1 year	5	34	0	0.865
	1-2 years	5	24	0	
	More than 2 years	6	38	0	
Since when do you have AV fistula	Less than 1 year	6	36	0	0.919
	1-2 years	4	20	0	
	More than 2 years	6	40	0	
Sites of AV fistula	Wrist	0	2	0	0.570
	Forearm	5	20	0	
	Elbow	11	74	0	
History of AV fistula failure	No	14	71	0	0.451
	Yes once	1	18	0	
	Yes twice	1	3	0	
	Yes, more than twice	0	4	0	

DISCUSSION

The findings of the study revealed a notable prevalence of inadequate knowledge (48.2%) among patients regarding self-care of AV fistula, with a significant portion (31.3%) demonstrating moderately adequate knowledge and a minority (20.5%) possessing adequate knowledge. Similarly, the majority of patients (85.7%) reported moderate levels of self-reported practice, while a smaller proportion (14.3%) indicated poor practice, with none demonstrating good practice. These results are similar to the previous research done by Ozen et al. (2017), Yang et al., (2019) and Natti Krishna et al. (2024), which similarly highlighted inadequate knowledge and

practice levels among hemodialysis patients.

It is noteworthy that a statistically significant association was observed between the level of knowledge regarding self-care of AV fistula and educational levels. This aligns with findings from Devi and Sengupta (2022) and Natti Krishna et al. (2024), suggesting that higher educational attainment is linked to better knowledge scores. Similarly, the study findings revealed a significant association between self-reported practice levels and educational level, consistent with previous research by Spies et al., (2021) and Bulbul et al., (2023). These findings underscore the influence of education on patients' approaches to self-care practices,

emphasizing the importance of tailored educational interventions.

Although no statistically significant associations were found with clinical variables, such as age, gender, and duration of hemodialysis, it's essential to recognize the potential impact of these factors on patient outcomes. These results are consistent with previous research by Ray et al. (2021) and Grace et al., (2021). Further exploration of these variables could provide valuable insights into optimizing care delivery for hemodialysis patients with AV fistula.

The absence of challenges during the study process indicates the feasibility of conducting such research in similar settings. However, future studies could benefit from expanding the research to a larger population to explore the lived experiences of AV fistula patients undergoing hemodialysis comprehensively. Additionally, investigating the barriers patients face in adhering to self-care practices could inform the development of innovative strategies to enhance patient knowledge and adherence to self-care practices related to AV fistula maintenance during hemodialysis.

CONCLUSION

In conclusion, this study sheds light on the knowledge and self-reported practice levels among hemodialysis patients regarding AV fistula self-care. The findings underscore a prevalent inadequacy in both knowledge and practice, with a substantial proportion of patients demonstrating suboptimal levels in these domains.

The significant association observed between educational levels and both knowledge and practice highlight the pivotal role of education in influencing patients' understanding and adherence to self-care practices related to AV fistula maintenance during hemodialysis. Tailored educational interventions targeting patients with varying educational backgrounds could improve knowledge acquisition and promote better self-care practices.

While no significant associations were found with clinical variables, such as age and duration of hemodialysis, further investigation into these factors is warranted to better understand their potential impact on patient outcomes and inform personalized care approaches.

Overall, the study underscores the importance of enhancing patient education and implementing tailored interventions to address the observed gaps in knowledge and practice among hemodialysis patients with AV fistula. By empowering patients with the necessary knowledge and skills, healthcare providers can contribute to optimizing patient outcomes and improving the overall quality of care for individuals undergoing hemodialysis.

References

- Abd Alfatah, A.H., Ahmad, Mohamed, 2013. Assessment of Nurses' Knowledge and Practice Related to Nursing Care of Children Undergoing Hemodialysis at Assiut City. Assiut Sci. Nurs. J. 1, 36–43.
<https://doi.org/10.21608/asnj.2013.183723>

- Bulbul, E., Yildiz Ayvaz, M., Yeni, T., Turen, S., Efil, S., 2023. Arteriovenous fistula self-care behaviors in patients receiving hemodialysis treatment: Association with health literacy and self-care agency. *J. Vasc. Access* 24, 1358–1364. <https://doi.org/10.1177/11297298221086180>
- Devi, K.M., Sengupta, M., 2022. Effect of self-instructional module on knowledge regarding care of arteriovenous fistula among hemodialysis patients in selected hospitals, Guwahati, Assam. *Indian J. Health Sci. Biomed. Res. Kleu* 15, 270. https://doi.org/10.4103/kleuhsj.kleuhsj_92_22
- Grace, P., Deepa, M., Cheranmadevi, P., Sudha, R., 2021. Assessment of knowledge and self-reported practices regarding self-care of arteriovenous (AV) fistula among patients undergoing hemodialysis. *Manipal J. Nurs. Health Sci. MJNHS* 7, 27–33.
- Hinkle, J., Cheever, K., Overbaugh, K., 2021. *Brunner & Suddarth's Textbook of Medical-Surgical Nursing*, 15th ed. Lippincott Williams & Wilkins, Philadelphia.
- Institute for Health Metrics and Evaluation (IHME), 2018. *Global Burden of Disease Study 2017*. [accessed 2024 Jan 05], Available from: https://www.healthdata.org/sites/default/files/files/policy_report/2019/GBD_2017_Booklet.pdf
- Iqbal, Q., Shareef, A., Afzal, A., Ashraf, S., 2018. ARTERIOVENOUS FISTULA CARE. *Prof. Med. J.* 25, 1426–1431. <https://doi.org/10.29309/TPMJ/18.4422>
- Marsh, A., Genova, R., Lopez, B., 2023. Dialysis Fistula, in: *StatPearls* [Internet]. Treasure Island (FL): StatPearls. [accessed 2024 Mar 23], Available from: <https://www.ncbi.nlm.nih.gov/books/NBK559085/>
- Muthusamy, D., Sudha, R., Pal, G., P, C., 2021. Assessment of knowledge and self-reported practices regarding self-care of arteriovenous (AV) fistula among patients undergoing hemodialysis. *Manipal J. Nurs. Health Sci.* 7. <https://doi.org/10.1177/17423953231167378>
- Natti Krishna, V., Tiwary, B., Nayak, M.N., Patel, N., Gandhi, P., Majumdar, P., 2024. Knowledge of arteriovenous fistula care in patients with end-stage kidney disease in south Asian countries: A systematic review and meta-analysis. *Chronic Illn.* 20, 23–36. <https://doi.org/10.1177/17423953231167378>
- Ozen, N., Tosun, N., Cinar, F.I., Bagcivan, G., Yilmaz, M.I., Askin, D., Mut, D., Ozen, V., Yenicesu, M., Zajm, E., 2017. Investigation of the knowledge and attitudes of patients who are undergoing hemodialysis treatment regarding their arteriovenous fistula. *J. Vasc. Access* 18, 64–68. <https://doi.org/10.5301/jva.5000618>
- Pessoa, N.R.C., Linhares, F.M.P., 2015. Hemodialysis patients with arteriovenous fistula: knowledge, attitude and practice. *Esc. Anna Nery - Rev. Enferm.* 19. <https://doi.org/10.5935/1414-8145.20150010>
- Ray, S.P., Namira, M.S., Rupnawar, M.A., Shinde, M.A., Rathod, M.V., Rasal, M.S., 2021. A study to assess the knowledge regarding

- arteriovenous fistula and its care among dialysis patient in selected hospitals of Pune city. *Drugs Cell Ther. Haematol.* 10.
- Sousa, C.N., Marujo, P., Teles, P., Lira, M.N., Dias, V.F.F., Novais, M.E.L.M., 2020. Self-Care Behavior Profiles With Arteriovenous Fistula in Hemodialysis Patients. *Clin. Nurs. Res.* 29, 363–367. <https://doi.org/10.1177/1054773818787110>
- Spies, H.C., van den Berg, V.L., Nel, M., 2021. Knowledge, attitude and practices of patients receiving maintenance haemodialysis in Bloemfontein, South Africa. *South Afr. J. Clin. Nutr.* 34, 116–122. <https://doi.org/10.1080/16070658.2020.1751415>
- Xu, F., Zhuang, B., Wang, Z., Wu, H., Hui, X., Peng, H., Bian, X., Ye, H., 2023. Knowledge, attitude, and practice of patients receiving maintenance hemodialysis regarding hemodialysis and its complications: a single-center, cross-sectional study in Nanjing. *BMC Nephrol.* 24, 275. <https://doi.org/10.1186/s12882-023-03320-0>
- Yang, M., Zhao, H., Ding, X., Zhu, G., Yang, Z., Ding, L., Yang, X., Zhao, Y., Chen, L., Yang, R., Fang, J., Sousa, C.N., 2019. Self-Care Behavior of Hemodialysis Patients With Arteriovenous Fistula in China: A Multicenter, Cross-Sectional Study. *Ther. Apher. Dial.* 23, 167–172. <https://doi.org/10.1111/1744-9987.12770>