

## Assessment of Health Literacy and Self- Care Behavior with Arteriovenous Fistula among Hemodialysis Patients

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### Abstract

**Background:** Chronic kidney disease (CKD) is a major worldwide health issue. Patients on hemodialysis need to practice ongoing self-care to lower the incidence of numerous complications related to arteriovenous fistulas (AVF). **Aim:** To assess health literacy and self-care with Arteriovenous Fistula among hemodialysis patient. **Design:** Descriptive design. **Setting:** The study was conducted in hemodialysis unit at Sohag University Hospital. **Sample:** Convenient sample of 100 adult male and female patients who attended the dialysis unit. **Data collection tools:** Four tools were used in data collection, **first tool:** Structured Interview Questionnaire; **second tool** Health literacy questionnaire; **third tool** Scale of Assessment of Self Care Behaviors with Arteriovenous Fistula in Hemodialysis and **fourth tool** Chronic Kidney Disease Self-Care Scale. **Results:** This study mentioned that 84.0% of the patients had poor health literacy and 81.0 % of the patients had low self-care behaviors. **Conclusion:** The main findings showed that the majority of the patients had poor health literacy as well as, low self-care behaviors. **Recommendations:** Increasing patients' knowledge and awareness about self-care and improve hemodialysis health literacy. Applying continuous health education for patients attended hemodialysis sessions.

**Keywords:** Arteriovenous Fistula, Health Literacy, Hemodialysis, and Self-Care Behavior.

### Introduction

Chronic kidney disease (CKD) is a serious worldwide health problem, and patients necessitate active self-care, CKD has become one of the leading causes of death (Wu, et al., 2021 & Kovesdy, 2022). Hemodialysis is one of the most common methods to treat patients with end-stage renal disease (ESRD) (Bello, et al., 2022). Hemodialysis is a medical procedure where blood is filtered through a semi-permeable membrane or filter. The filter then extracts the excess water, waste products from the body, and toxic substances from the blood. It safeguards normal blood pressure, preserves intact body's homeostatic environment, and purifies the blood (Ashraf, et al., 2019).

Arteriovenous fistula is required for hemodialysis patients in order to receive treatment. When compared to arteriovenous grafts and catheters, the arteriovenous fistula (AVF) has a reduced rate of morbidity and mortality and is seen to be the optimum access for hemodialysis therapy due to its longer durability, which permits a safe and continuous vascular system approach. Dysfunction of arteriovenous fistula can account for up to one-third of hospital admissions and significantly

contribute to the medical expenses of these patients. (Lawson, et al., 2020 & Lok et al., 2020).

In order to minimize the incidence of complications in AVF, patients undergoing hemodialysis must practice standard self-care behaviors. However, numerous numbers of patients are unaware of which type of care the AVF requires, therefore they don't apply it effectively (Costa, 2020). Health literacy is a personal attribute defined as the ability to access, understand and use health-related information (CDC, 2021 & Nutbeam, et al., 2021).

People with low health literacy are more likely to appear with advanced illness, which delays diagnosis and treatment and leads to adverse outcomes. Health literacy is crucial in promoting good lifestyle modification (Aljassim & Ostini, 2020). Therefore, in order to effectively slow the progression of chronic kidney disease (CKD), patients undergoing hemodialysis must be properly instructed in self-care techniques and emphasized on the significance of ongoing self-care behavior and lifestyle change. In this regard, patients must take an active role in the self-care approach (Tsai, et al., 2021).

The ability to provide nursing care to patients receiving hemodialysis is a crucial responsibility for nurses. Patients receiving hemodialysis require

specialized continuous nursing care, which includes implementing therapeutic education, managing symptoms, monitoring physical restrictions, and providing patients with required education (Hermalia, et al., 2021).

### Significance of the study

In 2017, there were an estimated 843.6 million people suffering by CKD worldwide (Jager, et al, 2019). The 9th Annual Report of the Egyptian Renal Registry, which was made by the Egyptian Society of Nephrology and Transplantation (ESNT), who states that there are 483 patients with ESRD in Egypt for every million people. ESRD is one of the major health issues in Egypt (Vanholder, 2017). Patients' self-care behaviors are mostly associated with their CKD. (Yu, 2021). Health literacy may be especially important for individuals with CKD to reduce consequences like metabolic and cardiovascular illnesses (Schrauben, 2020). Due to insufficient illness information resulting from inadequate self-care behaviors, identifying the best therapy strategy might be problematic (Tsai, 2021). Thus, greater health literacy was associated with better self-care practices, like quitting smoking and taking medications as prescribed, among individuals with renal illness. (Schrauben, 2020). Improving self-care practices and developing successful support strategies require an increased awareness of the patient's daily life. For that reason, it's critical to evaluate patients' health literacy and self-care behaviors in order to help them achieve better results and avoid major consequences related to hemodialysis. (Schrauben, 2021).

### Aim of the study

The aim of the current study is to assess health literacy and self-care behavior among hemodialysis patients.

### Research Question

What is the level of health literacy and self-care behavior with arteriovenous fistula among hemodialysis patients?

### Subjects and methods

#### Research Design

Descriptive exploratory design was utilized in the existing study.

#### Setting

The study was conducted at hemodialysis unit at Sohag University Hospital. Hemodialysis unit found in the first and second floor. First floor hemodialysis unit contains 2 rooms for patients free from

hepatitis, while unit in the second floor contains one room for hemodialysis patients with virus C and one room for hemodialysis patients with virus B.

### Sample

Convenient sample of (100) adult female and male patients, who attended the dialysis unit and have the following inclusion criteria; 18-65 years old, have the ability to communicate, and accept to participate in the study, sample size was calculated using the following equation;

$$n = \frac{N \times p(1-p)}{\left[ \frac{N-1}{d^2} + z^2 \right] + p(1-p)}$$

### Tools of Data Collection

The investigator used four tools following an extensive review of literature:

**Tool (I): Structured Interview questionnaire:** It was comprised of three parts:

**Part 1: Socio demographic data:** To assess patient's socio demographic data that included the following variables: gender, age, marital status, current occupation, history of smoking, and family income).

**Part 2: Patient's medical history it was developed by the researcher which involves the following:**

The following categories of statements were used to evaluate patients' health history information: past history of diabetes, hypertension, heart disease liver disease, and cancer).

**Part 3: Hemodialysis data:**

This part was consisted of hemodialysis data as: (duration of hemodialysis treatment, site of vascular access, number of access creation and durations of each session).

**Tool II: Health literacy questionnaire:** it was developed by (Shih, Chang, Jensen & Chiu, 2016). It contains 26 questions divided into 7 sub-structures as a follow:, communicative literacy, critical literacy, functional literacy, basic health knowledge, interactive literacy and patient safety, the 26 items were presented as a multiple-choice question.

**Scoring System:**

One point was given for a right response, and zero for a wrong one. A final score between 0 and 26 was considered satisfactory if at least 80% of the questions were answered correctly.

**Tool III: Scale of Assessment of Self Care Behaviors with Arteriovenous Fistula in Hemodialysis.**

Scale developed by (Sousa et al., 2015) consisted of 16 items distributed in 2 parts: the first part; self-care in prevention of complications and the second was self-care in managing signs and symptoms.

**Scoring System:**

Every item is rated on 5-point Likert scale ranging from one (Never carry out the self-care) to five (Always carry out the self-care). The total score is obtained by adding all the item scores, with a minimum of 16 and a maximum of 80. A minimum of 16 and a maximum of 80 are the item scores that add up to the total score. Consequently, a higher proportion that is nearer 100 indicates a higher frequency.

#### **Tool IV: Chronic Kidney Disease Self-Care Scale (CKDSC)**

The CKDSC scale was a 16-item questionnaire that had five subscales that covered the following categories of self-care: blood pressure monitoring, diet control, exercise, smoking behaviors, and medication adherence.

#### **Scoring System:**

Based on the Likert scale, responses varied from 1 (almost never) to 5 (almost always). The total score of the CKDSC, which varies from 16 to 80 points, is the sum of the scores from the 16 components. Better self-care practices are indicated by higher ratings (Wang, et al., 2019).

#### **Ethical consideration**

Before beginning the study, formal approval was obtained from the Sohag University Faculty of Nursing's scientific research ethics committee. It was guaranteed to explain the nature, goal, and importance of the study. Every participant was made aware that the study is entirely voluntary and they have the right to withdraw from the study at any time without any explanation and without any penalty.

#### **Procedure**

##### **Preparatory phase**

The researcher began the process of tools development after a comprehensive literature review to assess Health Literacy and Self-Care among Hemodialysis patients.

##### **Validity & Reliability of the tools**

Content validity was done by five experts in Medical & Surgical Nursing, after that all modifications were made accordingly, then the tools were stated in their final format. Whereas Cronbach's Alpha (0.893) was used to statistically measure reliability.

##### **Pilot study**

A pilot study was conducted on 10 patients of total selected patients. As no modification was done on the tools, the participants in the pilot study were involved in the research sample.

#### **Implementation phase**

The researcher individually contacted each study participant to explain the goals and design of the study. Patients who offered their consent to participate were asked to sign a written consent form, and the researcher then filled out a questionnaire for each patient, this step took about 30 minutes for each patient.

#### **Statistical Analysis**

Using statistical Package for Social Science (SPSS) version 20 data was coded and analyzed. Descriptive statistics, standard deviation and percentage distribution were used.

#### **Results**

**Table (1)** showed that 50% of the patients were male. Regarding to their level of education 40% of the study sample cannot read and write. Regarding the occupation 36% were housewife, 34.0% working for special business and only 7% were retired. Considering marital status more than half of the sample 59% was married and 9% were widow. As regarded place of residence 59% of the sample living in rural area as well as, about three quarter of the patients was not smoking. It was observed also mean age was  $44.64 \pm 11.490$  and mean income was  $2074.00 \pm 1014.70$ .

**Table (2):** This table showed that, 71% of the sample had chronic disease. About 24% of the sample was diabetic while 42% had hypertension. Regarding heart disease, liver cirrhosis and cancer, results were 12%, 8%, 15% respectively.

**Table (3):** This table showed that approximately 72% of the sample had no history of kidney transplantation. As regard duration of hemodialysis treatment 35% had duration from 1-5 years. Regarding history of previous vascular access 30% had 1-3 access, while only 4% had more than 5 accesses. More than half of the sample 65% had duration of using current vascular access less than one year. Considering frequency of hemodialysis per week 95% of the sample had 3 sessions per week, were 87% had 4 hours in each session.

**Table (4):** This table indicated that 34.0% of patients occasionally address nurses if the hand of the fistula exhibits wound and 42.0% occasionally protect the fistula arm from bumps. Regarding self-care in prevention of complications 38.0% of the patients never avoid places with different temperatures, 32.0% rarely protect the fistula arm from scratches, and 40.0% always avoid using the fistula arm to measure blood pressure.

**Table (5):** This table mentioned that more than three quarter 84.0% of the patients had poor health literacy, and only 16.0% had good health literacy.

**Table (6):** This table revealed that more than three quarter 81.0 % of the patients had low self-care, and only 19.0% had better self- care.

**Table (7):** This table illustrated that there is a positive correlation between knowledge, self-care behavior and kidney disease self-care.

## Results

**Table 1: Distribution of Study participants according to demographic data n =100**

Variables	N	%
<b>Gender</b>		
Male	50	<b>50.0</b>
Female	50	50.0
<b>Educational status</b>		
Illiterate	40	<b>40.0</b>
Primary school	25	25.0
Secondary school	16	16.0
Tertiary school	9	9.0
University	10	10.0
<b>Current occupation</b>		
Retired	7	7.0
House wife	36	<b>36.0</b>
Governmental	12	12.0
Special	34	34.0
Farmer	11	11.0
<b>Marital status</b>		
Single	21	21.0
Married	59	59.0
Widow	9	9.0
Divorce	11	11.0
<b>Residence</b>		
Rural	59	<b>59.0</b>
Urban	41	41.0
<b>Smoking</b>		
No	70	70.0
Yes	30	30.0
<b>Mean age</b>		
	44.64±11.490	
	Maximum	65.00
	Minimum	17.00
<b>Mean income</b>		
	2074.00±1014.70	
	Maximum	5000.00
	Minimum	300.00

**II-Medical data:****Table 2: Distribution of Study participants according to their medical data n =100**

Medical data	N	%
<b>Chronic diseases</b>		
Yes	71	<b>71.0</b>
No	29	29.0
<b>Diabetes</b>		
Yes	24	24.0
No	76	<b>76.0</b>
<b>Hypertension</b>		
Yes	42	42.0
No	58	58.0
<b>Heart disease</b>		
Yes	12	<b>12.0</b>
No	88	88.0
<b>Liver cirrhosis</b>		
Yes	8	<b>8.0</b>
No	92	92.0
<b>Cancer</b>		
Yes	15	<b>15.0</b>
No	85	85.0
<b>Other</b>		
Yes	3	3.0
No	97	97.0

**Table 3: Distribution of Study participants according to their hemodialysis data n =100**

Kidney transplant	N	%
<b>Transplantation history</b>		
Yes	28	28.0
No	72	<b>72.0</b>
<b>-Duration of hemodialysis treatment</b>		
less than one year	34	34.0
1-5yrs	35	<b>35.0</b>
more than 5 year	31	31.0
<b>History of previous vascular access</b>		
<b>Present shunt</b>		
No	56	<b>56.0</b>
Yes	44	44.0
<b>If Yes Number of previous accesses</b>		
1-3 access	30	<b>30.0</b>
3-5 access	10	10.0
More than 5 access	4	4.0
<b>Duration of using current vascular access</b>		
less than one year	65	<b>65.0</b>
1-5yrs	28	28.0
more than 5 year	7	7.0
<b>-Frequency of hemodialysis per week</b>		
2time	5	5.0
3time	95	<b>95.0</b>
<b>Number of hours in each session</b>		
Three hours	13	13.0
Four hours	87	<b>87.0</b>

**Table (4): Distribution of Study participants according to their self-care behaviors as measured by ASBHD-AVF Scale n =100**

Statement	Never (n %)		Rarely (n %)		Occasional (n %)		Frequently (n %)		Always (n %)	
<b>Self-care 1—Self-care in management of signs and symptoms</b>										
1-I address nurses if the hand of the fistula arm exhibits wound	17	17.0	30	30.0	34	<b>34.0</b>	14	14.0	5	5.0
2-I protect the fistula arm from bumps and shocks	15	15.0	28	28.0	42	<b>42.0</b>	11	11.0	4	4.0
3-I address the nurse if the hand of the fistula arm starts to hurt.	23	23.0	34	34.0	23	23.0	4	4.0	16	16.0
4-I compress the puncture site at home if bleeding occurs	22	22.0	21	21.0	32	32.0	8	8.0	17	17.0
5-I address the nurse when I get a headache during hemodialysis	15	15.0	23	23.0	29	29.0	7	7.0	26	26.0
6-I address the nurse when I have cramps during hemodialysis	12	12.0	18	18.0	29	29.0	12	12.0	29	29.0
<b>Self-care 2—Self-care in prevention of complications</b>										
1-I avoid places with different temperatures	38	<b>38.0</b>	30	30.0	18	18.0	10	10.0	4	4.0
2-I check for signs of redness and swelling at the puncture sites	29	29.0	29	29.0	25	25.0	11	11.0	6	6.0
3-I immediately go to a hospital or a clinic if the fistula has no thrill	16	16.0	19	19.0	14	14.0	18	18.0	33	33.0
4-I check every day changes in the color of the hand of the fistula arm	26	26.0	24	24.0	26	26.0	14	14.0	10	10.0
5-Avoid blood sampling in the fistula arm	10	10.0	26	26.0	20	20.0	17	17.0	27	27.0
6-I protect the fistula arm from scratches, cuts and wounds	24	24.0	32	<b>32.0</b>	22	22.0	17	17.0	5	5.0
7-I apply ointment when hematoma occurs	29	29.0	30	30.0	21	21.0	15	15.0	5	5.0
8-I feel the thrill at the fistula site twice a day	10	10.0	18	18.0	16	16.0	25	25.0	31	31.0
9-Avoid sleeping on the fistula arm	20	20.0	31	31.0	16	16.0	15	15.0	18	18.0
10-I check every day if the hand of the fistula arm cools	26	26.0	28	28.0	13	13.0	20	20.0	13	13.0
11-Avoid measuring blood pressure in the fistula arm	16	16.0	15	15.0	14	14.0	15	15.0	40	<b>40.0</b>

**Table (5): Distribution of Study participants according to their health literacy n =100**

0-26 marks		%
Poor Health literacy	Count	84
	%	84.0
Good Health literacy	Count	16
	%	16.0
Means $\pm$ SD		9.35 $\pm$ 4.03

**Table (6): Total assessment regarding Chronic Kidney Disease Self-Care Scale (CKDSC) and Self-Care Behaviors with Arteriovenous Fistula in Hemodialysis (ASBHD-AVF Scale) n=100**

Items	N	%
Low self-care	81	81.0%
Better self-care	19	19.0 %

Table (7): Correlation between knowledge and self-care behavior, kidney disease self-care

Correlation		Health literacy	Self-care behaviors	Kidney disease self-care
Health literacy	Pearson Correlation		.300**	.250*
	Sig. (2-tailed)		.002	.012
Self-care behaviors	Pearson Correlation	.300**		.694**
	Sig. (2-tailed)	.002		.000
Kidney disease self-care	Pearson Correlation	.250*	.694**	
	Sig. (2-tailed)	.012	.000	
**. Correlation is significant at the 0.01 level (2-tailed).				
*. Correlation is significant at the 0.05 level (2-tailed).				

## Discussion

It has been noted that patients with chronic renal disease have a poor knowledge of their condition. Accurate disease knowledge is crucial for self-care, and it may enhance clinical results. Increased self-care and health literacy that led to better self-management of the disease (Billany, et al., 2023).

Regarding demographic data of this study, the results approves that mean age was  $44.64 \pm 11.490$ , half of them were males, this result matched with El Sayed, (2018), who mentioned that about more than half of the sample were male and with study conducted by Goma et al. (2021), as regard to their study conducted in Tanta, Egypt, the average age of the patients were  $44.78 \pm 6.52$ .

As regard, level of education and occupation, this study showed that more than one third of the study sample was illiterate and working for special work. These results comply with Mosavi et al., (2020) who reported that more than three quarters of patients on hemodialysis are illiterate and no one of them have higher education. These results were incongruent with the study done by Atta, et al., (2023), who revealed that fifty of the sample had secondary education, and about two thirds of them were working as governmental employees. It may be related to approximately one third of the sample were house wife, living in rural area it may affect educational level. The researcher believed that it may be due to effect of disease on physical ability of the patients, chronic disease that need to three sessions per week that last four hours; all previous factors affect patients' occupation.

Regarding place of residence, this study stated that slightly more than half of the sample was living in rural area. This result matched with Hamza et al., (2021) who shown that the great majority of HD patients exist in rural areas.

Concerning cigarette smoking, the present study indicated that three quarter of the patients was not smoking. This result in congruent with Ramezani et

al., (2019) who informed that two thirds of intervention group of hemodialysis patients are non-smoker and about ten percent are smoker. These finding also in the same line with study done in Egypt by Abo Deif, (2015) who revealed that slightly of the sample were smokers.

Regarding medical data, the results of this study reported that, nearly half of the patients had hypertension as a chronic disease, also, about one quarter of the sample were diabetic. These results matched with Atta, et al., (2023), who showed that hypertension was the most prevalent chronic disease, followed by nephritis, diabetes mellitus. However, it is not in the same line with İkiz et al. (2021), who stated that the most common etiologies of CKD were cardiovascular disease followed by diabetes mellitus.

As regard duration of hemodialysis treatment, this the study confirmed that over one-third of the patients' duration was between one and five years. This finding similar with Atashpeikar et al. (2021), who indicated that more than one third of patients began hemodialysis sessions from 1-5 years but this result is contraindicated with İkiz et al. (2021), who mentioned that more than one third of the patients had dialysis sessions between one and three years.

Concerning hemodialysis data, the study reported that approximately three quarter of the sample had no history of kidney transplantation. These results are matched with Khamis, et al., (2021) & Shih et al., (2016) who added that Kidney transplant was reported among only ten percent of the studied sample.

As regard frequency of hemodialysis sessions per week, this study verified that the duration of more than one-third of the patients was one to five years., and more than three quarter had 4 hours in each session. These results in compatible with Atta, et al., (2023), who reported that all the studied patients, were arranged for three times every week and four hours in each session. However, disagreed with Mehmood et al. (2019), whose study was conducted in Lahore and stated that most of their subjects were planned for two

times per week for hemodialysis treatment. Frequency of hemodialysis sessions may be three sessions per week as patients' tolerance, physical disability and presence of other complications that affect health conditions of the patients.

Regarding health literacy, the results of these study mentioned that more than three quarter of the patients had poor health literacy, and only fifteen percent had good health literacy. These results are matched with study done by **Khamis, et al., (2021)** who approved that health literacy was unsatisfactory in more than sixty percent of hemodialysis patients while it was satisfactory among more than one third of them.

According to Hemodialysis Self-Care Behaviors, this result revealed that majority of the patients had low self-care, and only less than one quarter of the sample had better self-care. This finding similar with **Atta, et al., (2023)**, who revealed that more than two thirds of the studied patients had total inadequate self-care behaviors. The researcher believed that low self-care behavior may be due to decrease of patient's level of education, as there is significant correlation between educational level and self-care. As well as, more than one third of the sample were illiterate, also half of the sample were house wife, living in rural area that may affect on knowledge of patients.

Concerning knowledge and self-care, this study illustrated that there is a positive correlation between knowledge and self-care. These results are congruent with **Tsai, et al., (2021)**, who noted that in patients with chronic kidney disease (CKD), self-care behavior and diseases knowledge are closely correlated.

## Conclusion

The current study determined that the majority of the patients had poor health literacy as well as, low self-care behavior; this may be due to decrease educational level of the patients and presence of other chronic disease and its complications that affect self-care and overall health of the patients.

## Recommendations

Based on the results, this study recommended the following suggestions:

- Apply advanced program in the study setting for patients on hemodialysis concerning self-care behavior.
- Increasing patients' awareness of the benefits of self-care and hemodialysis for chronic renal disease

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