

The effectiveness of instructional module on self-care practices of arteriovenous fistula among hemodialysis patients at Hail region, Saudi Arabia



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ABSTRACT

This research attempted to identify the knowledge in self-care practices of patients receiving dialysis with arteriovenous fistula and the effect of an instructional module that consequently improve their self-care practices. The experimental design included a sample of 71 patients using AV fistula to perform hemodialysis at dialysis unit of King Khaled Hospital and Hail Dialysis care center, Hail region, Saudi Arabia. Results showed an increase in mean score on general instructions from 1.78 ± 0.33 in pre-test to 2.78 ± 0.22 in post-test and also the mean score of knowledge about look for infection from 2.04 ± 0.51 in pre-test to 2.33 ± 0.31 in post-test has observed. Moreover the increase of the mean score of knowledge related to the assessment of AVF function from 2.0 ± 0.38 in pre-test to 2.7 ± 0.29 in post-test with statistically significance improvement $p < 0.5$. The written instructional module with explanation enhanced better understanding and promoted the self-care practices among patients using AV fistula.

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1. Introduction

Kidneys are vital organs of our body and are integral to maintain the body's homeostasis. Dysfunction of kidney can adversely affect every body system in a patient and may be fatal without effective management. The chronic kidney disease is a worldwide public health problem and this disease is growing (Xi et al., 2011). Dialysis is used to relieve manifestations of renal failure temporarily until the client regains kidney function or to sustain life in client with irreversible kidney disease. The dialysis must continue for the rest of client life to control uremia and to physically prepare the client to receive a transplanted kidney. There are two types of dialysis, peritoneal dialysis, and Hemodialysis. Hemodialysis is used for clients with acute or irreversible renal failure and fluid electrolyte imbalance. Peritoneal dialysis is a treatment for kidney failure that uses the lining of your abdomen, or belly, to filter your blood inside your bod (Coleman et al., 1997; Graham et al., 2013)

An Arteriovenous fistula is created most commonly in the fore arm with anastomoses between an artery and a vein. This fistula provides for arterial blood flow through a vein (Allon et al., 2000). The surgical creation of an anastomosis between an artery and a vein are thus allowing arterial blood to flow through the vein. This causes venous engorgement and enlargement, allowing large bore needles to be inserted for hemodialysis. The arterial blood is essential to provide the rapid blood flow required for hemodialysis. The vein is accessed using two large gauge needles. The success rate of fistulas is not uniform among patient. An effective hemodialysis treatment is dependent on a well-functioning vascular access which has good blood flow, excellent patency, and allows easy and repetitive cannulation with two needles (Schon et al., 2007; Basavanhappa, 2009).

Established AV fistulas require frequent routine monitoring to ensure continued patency. A failing AV fistula places the patient at risk for inadequate dialysis, which can lead to numerous complications and increased morbidity and mortality. A fistula is a lifeline and patient need to take care of it. Routine monitoring of AV fistulas by patients themselves can prevent all complications related to AV Fistula (Pessoa and Linhares, 2015). Thrombosis, stenosis, and infection are the three most prevalent complications of arteriovenous fistulas for dialysis

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access (Dickey et al., 2013). Infection remains one of the greatest risk factors to morbidity and mortality for the dialysis population. A risk factor for vascular access-site infections was poor hygiene (Daugirdas et al., 2011).

Assessment of vascular access is very important. It is necessary that vascular access be evaluated prior to cannulation (Goodkin et al., 2010). Blood flow through the vascular access should be assessed regularly and should include listening with a stethoscope for a bruit, place the palm of their hand over the access and feel a palpable thrill at the anastomosis, and observing the site for signs and symptoms of local and systemic infection (Ethier et al., 2008; Goodkin et al., 2010).

Poor prognostic signs, such as significant decrease in the thrill, or intensity or character of the bruit, should be referred immediately back to the surgeon for prompt evaluation and intervention. Signs of infection should be reported quickly for medical management. Bleeding is very uncommon. If it occurs; immediate compression on the bleeding area, maintained by pressure provided by a thumb or a single finger on the bleeding site is necessary (Karkar et al., 2014). Severe or continuous swelling of the whole arm may be due to narrowing of one of the veins taking blood back to the heart. If it develops, it needs to be informed to the doctor (Raggi and Bellasi, 2007).

The patient should be taught to examine his or her access daily, while at home, for redness or swelling around the fistula, experiencing any pain in the fistula area or increased body temperature. Every patient with chronic kidney disease should have a declared plan for preserving the vascular access and potential access sites (Adib-Hajbaghery et al., 2012). Blood need to flow freely through the AV fistula (Moursy and Sharaf, 2017). If the patient put extra pressure on the AV fistula area that will be the risk of blood clots to form. So patient need to have some changes in their daily habits not to wear tight fitting cloths, jewelry and baggage that tighten around the fistula. Patient with AV fistula have to avoid blood pressure taken on the fistula arm and resting head on the fistula (Daugirdas et al., 2011).

More than half of all dialysis patients are now using AV fistulas because it's healthier, easier to maintain and produce better results than other access methods. Taking care of their AV fistula through strengthening exercises, cleanliness and checking daily for proper blood flow can make the dialysis treatments more manageable and effective (Graham et al., 2013).

The patients' knowledge, attitude and skill with AV fistula have been shown to have an impact on their vascular access. After searching and analyzing many studies, it is found that there is a great need to assess the patient's knowledge regarding self-care of AV Fistula undergoing hemodialysis in dialysis unit and initiate an intervention to improve their knowledge on self-care management of their AV fistula (Kawakita et al., 2015). The promotion of patient self-management will empower patients to

actively participate in the management of their vascular access. It instills patient self-confidence to help them carry out behavior necessary to reach a desired goal (Afrasiabifar et al., 2016). Regarding the care practiced for AV Fistula among patients on hemodialysis has to be done independently throughout life to promote and maintain personal wellbeing.

The investigators aimed to undertake the present study to evaluate hemodialysis patients who are attending out-patient dialysis unit in Hail region of Saudi Arabia, to improve their knowledge and practice on care of AV fistula by administering a self-instructional module.

1.1. Objectives of the study

1. Assess the existing knowledge among hemodialysis patients on care of AV Fistula.
2. Assess the knowledge of hemodialysis patients on care of AV Fistula after an intervention.
3. Find out the association between selected demographic variables and knowledge of hemodialysis patients on care of AV fistula.

1.2. Hypotheses

1. H1: There will be a significant difference between the mean pretest and posttest knowledge regarding self-care practices of AV fistula among hemodialysis patients after administration of an intervention.
2. H2: There will be a significant association between the pretest knowledge regarding self-care practices of AV fistula among hemodialysis patients with their selected demographic variables.

2. Methods

2.1. Study design, sample size, and setting

The research design selected for this study was experimental pretest- posttest one group design. In this study, investigator introduces base measures before and after intervention of instructional module to the participants.

2.2. Sample and sampling

Nonprobability purposive sampling technique was used. Setting: Data was collected from hemodialysis patients with AV fistula attending for hemodialysis at dialysis unit of King Khalid Hospital and Hail Dialysis care center, Hail region, Saudi Arabia. Inclusion Criteria: Hemodialysis patients with AV fistula and Patients who are present on the day of data collection and willing to participate were included. Patients who are on other types of access such as AV Shunt, graft and catheters and who are very sick were excluded from the study.

2.3. Data collection

A tool for assessment of self-care practices has been developed by the investigator, which includes: Section A: socio-demographic data included Age, Gender, Educational status, Job, Underlying diseases, Duration of dialysis, Number of dialysis sessions in a week, Duration of using current vascular access, History of previous vascular access and treated with antibiotic therapy in recent 6 months. Section B: Self-care practice assessment Questionnaire with 20 items pertaining to self-care practice which includes AV Fistula access site general care, recognition of early signs of infection and assessing the function of AV Fistula. The data was collected by structured interview technique from 71 patients who meet the inclusion criteria. The investigator introduced her to the participants and the tool has been completed in 20 minutes. On the same day, a well-designed instructional module on care of AV fistula was distributed among the study participants with proper explanation. Instructional module material includes Meaning of AV fistula, Purpose of AV fistula, complications of AV fistula and Management related to AV fistula. After fifteen days a post test was conducted for the same study participants by using same questionnaire. Using Cronbach Alpha the said instrument was found to be reliable as indicated by the value of 0.71.

3. Results

3.1. Characteristics of the study participants

Table 1 reveals that among the sample of the study the ages are mainly above 41 years old. Regarding gender of the respondents has been depicted, which shows that majority of the respondents are female, so 59.2% are female while 40.8% are male. Most of the patients in the sample are with low level of education, so about 67.6% are Illiterate or elementary schools, also most of our patients are with no work. Nearly half of them have multi-diseases. 83.1% of our patients have 2-3 times dialysis sessions per week and the duration of using current vascular access was mainly less than 5 years. In order to determine the effectiveness of instructional module on self-care of arteriovenous fistula among hemodialysis patients, hypothesis was formulated.

H1- There will be significant difference in the mean score before and after intervention knowledge of hemodialysis patients.

Table 2 shows a comparison conducted using paired sample T-test with significance level 0.05. To study the effectiveness of instructional module on self-care regarding: General instructions, look for infection and function of fistula, the p value indicates that there is a significance difference in the mean values before and after applying knowledge since the tabulated- t- value for 70 degree of freedom is 1.96 and the calculated value greater than it.

The calculated values are much higher than tabulated value. This is statistically acceptable level of significance. So there is significance difference, and it can be easily seen that the mean after knowledge of hemodialysis patients on care of AV fistula is greater than the mean before conducting educational program. This indicates that respondent scores increased after being aware of such knowledge.

Table 1: Participant characteristics of the sample (N=71)

Variable	categories	n	%
Age	(20-40)	18	25.4
	(41-60)	26	36.6
	61 and above	27	38.0
Gender	Male	29	40.8
	Female	42	59.2
Educational status	Illiterate/ Elementary	48	67.6
	Secondary / High school	8	11.3
	University	15	21.1
Job	No job	55	77.5
	Working	16	22.5
	Diabetes Mellitus	3	4.2
Underlying diseases	Hypertension / heart diseases	14	19.7
	Multi disease	38	53.5
	No Disease	16	22.5
Duration of Dialysis	0-1 year	24	33.8
	1-5 years	36	50.7
	More than 5 years	11	15.5
Number of dialysis sessions in a week	2 times in a week	12	16.9
	2 - 3 times in a week	59	83.1
	less than 1 year	34	47.9
Duration of using current vascular access	1- 5 years	32	45.1
	More than 5 years	5	7.0
	History of previous vascular access	yes	35
Treated with antibiotic therapy in recent 6 months	no	36	50.7
	yes	37	52.1
	no	34	47.9

Our objective now is to find an association between selected demographic variables and knowledge of hemodialysis patients on care of AV fistula. The association between pretest and demographic variables such as Age, Gender, Educational status, Job, Underlying diseases, Duration of Dialysis, Number of dialysis sessions in a week, Duration of using current vascular access, History of previous vascular access, and Treated with antibiotic therapy in recent 6 months of the respondent, is done by using Analysis of variance (ANOVA) and Independent T-test with the help of SPSS 16. The outcome of the analysis in Table 3 reveals that there is no association between pretest and some demographic variables such as: Age, Duration of Dialysis, and history of previous vascular access. This can be explained since the p-value is greater than 0.05, which indicates that there is no significant difference between pre- tests of knowledge and demographic variables. Other demographic variables that have association with pre- test are:

- Gender: It is noticed that female average of response is higher than male average response.

- Educational status: Secondary / High school patients have higher average of response than other educational status.
- Underlying diseases: The patients with Diabetes Mellitus have higher average than others.
- Number of dialysis sessions in a week: The patients with 2 times dialysis in a week have higher average than 2 to 3 times in a week.
- Duration of using current vascular access: The patients who use current vascular access for more than 5 years have higher average of response than others.
- Treated with antibiotic therapy in recent 6 months: patients who did not have been treated

with antibiotic therapy in recent 6 months have higher average of response than the others who have been treated.

4. Discussion

Results of the study revealed that the majority of participants were above 41 years and were female. Recording education 67.6 % illiterate, and 77.5 % did not work. Most patients (53%) have multi diseases and only 15.5 % having dialysis more than 5 years. The number of dialysis sessions 2-3 times in a week was 83.1 %.

Table 2: Testing the hypothesis: Effectiveness of instructional module (N=71)

Self-care management guidelines in patient with AVF	Pre test		Post test		t- value	P-value
	M	SD	M	SD		
General Instruction	1.7	0.33	2.7	0.22	22.5	0.00
Look for infection	2.0	0.51	2.3	0.31	4.2	0.00
Function of Fistula	2.0	0.38	2.7	0.29	13.0	0.00
Over all	1.9	0.23	2.6	0.15	22.4	0.00

T (70, 0.025) = 1.96

Table 3: Association between pre knowledge of hemodialysis patients on care of AV fistula and demographic variables (N=71)

variables	N	M	SD	t/F- value	P-value	
Age	(20-40)	18	1.9	.28	.3	0.7
	(41-60)	26	1.9	.21		
	61 and above	27	1.9	.22		
Gender	Male	29	1.7	.15	6.8	0.0
	Female	42	2.0	.20		
Educational status	Illiterate/ Elementary	48	1.9	.19	8.9	.00
	Secondary / High school	8	2.1	.18		
	University	15	1.8	.26		
Job	No job	55	1.9	.20	1.9	0.0
	Working	16	1.8	.30		
	Diabetes Mellitus	3	2.3	.00		
Underlying diseases	Hypertension / heart diseases	14	2.1	.17	10.1	0.0
	Multi disease	38	1.8	.20		
	No Disease	16	1.8	.21		
Duration of Dialysis	0-1 year	24	1.9	.21	2.5	0.0
	1-5 years	36	1.9	.24		
	More than 5 years	11	2.0	.22		
Number of dialysis sessions in a week	2 times in a week	12	2.0	.18	2.4	0.0
	2 - 3 times in a week	59	1.9	.23		
	less than 1 year	34	1.8	.22		
Duration of using current vascular access	1- 5 years	32	1.9	.22	3.5	0.0
	More than 5 years	5	2.1	.24		
	History of previous vascular access	yes	35	1.8		
no	36	1.9	.28			
Treated with antibiotic therapy in recent 6 months	yes	37	1.8	.20	2.5	.01
	no	34	2.0	.25		

Around half of the respondents (49.3%) had history of previous vascular access and also majority of respondents (52.1%) were treated with antibiotic therapy within 6 months period. People should be self-reliant and responsible for their own care. Deficiency of cognitive information related to their health makes an individual to be deficient and unable to think and carry out certain actions. Thus a person has a tendency to neglect and do not follow the recommendations to preserve and care the AV fistula. This result probably indicate that illiterate who are jobless have negative impact on their self-care compliance. Patients who have higher educational level can identify their self-care needs better (Pessoa and Linhares, 2015). Moreover ill individual have impact in their autonomy. Lack of

knowledge will lead to lack of self-care and decreases the level of participation in their own care. Theoretical self-care model of Dorothy Orem also determines that self-care is related to personal care required by people daily, to regulate their own functioning and development as well as the practice of activities which people personally imitate and do for themselves to maintain life (Basavanhappa, 2009)

The present study findings showed the positive effect of instructional module on self-care guidelines in patients with AV Fistula related to general instruction which includes, keeping the fistula site clean and dry, by washing with soap and water daily, avoid giving injections, checking blood pressure, carrying heavy things and laying on the limb with AV

Fistula among the participants as evidenced by increased in mean score from 1.78 ± 0.33 in pre-test to 2.78 ± 0.22 in post -test with statistically significant improvement was observed at p value < level 0.05. This finding confirms H1 and it is agreed with (El Minshawy et al., 2004). It is very important for the patient with AVF to know the blood pressure measuring, collecting blood samples and giving medications in the limb with AV Fistula can reduce the blood flow in the fistula and causing thrombosis in the venous access and impair the AV fistula.

In this study patients did not know to look for signs and symptoms of infection at the AV Fistula site. Consequently, it leads to treating with antibiotic therapy among patients with AV Fistula. So it is essential to provide some essential information such as inspection for redness, edema, presence of drainage, pain and fever (Kawakita et al., 2015). Moreover chronic renal failure patients who are on hemodialysis are at high risk of developing vascular access infection due to low immunity, uremia and the susceptibility to nosocomial infections due to repeated dialysis (Kaplowitz et al., 1988). In another study, regarding care of AV fistula among Hemodialysis patients in Nepal, India, it was concluded that there is a need to improve their level of knowledge and there by prevent complication (Kawakita et al., 2015).

So it is very important that patients with AV fistula are informed about inspecting their vascular access site for infection. The mean score of knowledge about look for infection from 2.04 ± 0.51 in pre-test to 2.33 ± 0.31 in post-test with statistically significant level 0.05 and it is evidenced that instructional module with teaching enabled the study participants to gain knowledge regarding signs and symptoms to look for infection at AV fistula site. This finding is agreed with (Ibrahim et al., 2018) who studied self-care practices of patient on maintenance hemodialysis at king Fahed dialysis unit.

Regarding self-care practices for assessing AV fistula function, the study participants were not checking for thrill on the site of fistula, feel the pulsation, check for hardness and numbness in the AV fistula arm. National Kidney Care Audit Vascular Access Report have emphasized on the increase of fistula function efficiency (Pessoa and Linhares, 2015).

Effectiveness of the instructional module was shown by the increase of the mean score of knowledge related to assessment of AVF function from 2.0 ± 0.38 n pre-test to 2.7 ± 0.29 in post -test with statistically significance improvement p < 0. 05 Advice regarding the need and method of checking the function of AV fistula were given to the individual patient. This result is supported by the study done in Nepal Medical College and Teaching Hospital which reported a significant difference in mean pretest and posttest knowledge scores among two groups of 50 hemodialysis patients with and without pre dialysis health teaching respectively in the two groups (Pandit et al., 2017). This result not

only shows unawareness of the patients about the caring process of vascular access site and the necessity for patient education in this regard but also reveals the association between the quality of self-care and the underlying diseases, number of dialysis sessions in a week, duration of using current vascular access and incidence of treated with antibiotics within 6 months duration. Experienced dialysis nurse Ann Compton estimated that about 38% (41 of 109) of patients in one of her outpatient dialysis clinics would be capable of performing in-center self-care and report that the desire to do self-care is the most important criterion and concludes that in his center self-care patients experience significantly less morbidity and mortality (Elias et al., 2017).

So several studies recommended that transmission of information regarding the important aspects of AV fistula care must be facilitated by the professionals working in dialysis centers and accelerate the essential aspects of self-care among patients.

5. Conclusion

The instructional module with explanation provided was effective. Hence, the patients with renal failure undergoing hemodialysis having AV Fistula should be encouraged to attend the teaching sessions/ teaching programs during their visit to the dialysis unit or during their stay in the hospital as these programs will be highly effective in improving their knowledge level thus improving the self-care practices.

6. Implications for nursing practice

Clinical nurses have to take up responsibility to plan teaching programs to hemodialysis patient with vascular access as well as caregivers. Hence, nursing service must have the policy of posting nurses with specialized training in dialysis units.

Emphasis should be made on in service education and also in conducting discussions and workshops in dialysis units to increase the knowledge of nurses as well as patients with AV Fistula to become compliance with their self-care practices

7. Recommendations

Longitudinal studies to determine the constant effectiveness of teaching program over a period of time may be conducted with large number of sample

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Compliance with ethical standards

Conflict of interest

The research investigators declare not to have any financial and non-financial competing interests regarding the publication of this paper.

Informed consent

This study was carried out with the approval of the ethical committee of University of Hail (reference no. H-2017-078). Permission was secured from the Dean of the College of Nursing and the directors of King Khalid Hospital and Hail Dialysis care center, Hail region, Saudi Arabia to conduct the study. Informed consent was received from each participant prior to dissemination of the questionnaire. Participants were assured that their responses would be confidential and anonymous, and that refusal to participate would in no way jeopardize their treatment.

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