

Effect of Nursing Guidelines on Reducing Post-Operative Arteriovenous Fistula Complications among End Stage Renal Disease Patients

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Abstract: Hemodialysis requires access to blood vessels capable of providing rapid extracorporeal blood flow. Arteriovenous fistula (AVF) is commonly used as vascular access for patients who require hemodialysis. Hemodialysis nursing is a specialized area of nursing practice focusing on needs of patients with renal failure and their families across the life span. **Aim:** The aim of the study was to evaluate the effect of implementing nursing guidelines on reducing post-operative AVF complications among end stage renal disease patients. **Design:** A quasi experimental design was utilized for data collection. **Setting:** The study was conducted in Surgical & Hemodialysis unit at EL Fayoum University Hospital. **Sample:** A purposive sample composed of 60 adult post-operative AVF patients from both gender which will be randomly and alternatively divided into two equal study & control groups (30 for each). **Tools of data collection:** data collection tool included: Interview Patient's assessment sheet, knowledge assessment sheet, Patient's practices observational checklist and observational checklist of post-operative AVF clinical outcome. **Results:** The study revealed that there was a significant difference in decrease of AVF complications among study group after implementing nursing guidelines. **Conclusion:** The application of nursing guidelines is effective on reducing post-operative AVF complications. **Recommendation:** Developing instructional booklet to be given to all admitted patients who will perform AVF. of pain.

Keywords: Arteriovenous fistula, End stage renal disease.

1. INTRODUCTION

Hemodialysis (HD) is the process where the patient's blood is circulated through a special filtering machine known as a dialyzer. The dialyzer works like a healthy kidney, helping to maintain the correct ratios of fluid and electrolytes, preserve the acid-base balance and eliminating waste and toxins. The patient's blood passes via a dialysis venous catheter through the dialyzer's system of semi-permeable membranous tubing and specially formulated dialysis fluid. The blood is then filtered of excess fluid and waste products outside the body and returned to the patient (1).

Successful hemodialysis is entirely reliant on the provision of safe, efficient and durable vascular access. The vascular access serves as the patient's 'lifeline to the dialysis machine'. The arteriovenous fistula (AVF) is the vascular access of first choice for hemodialysis because of less risk of infection and death. However, primary failure, Thrombosis, stenosis, and infection are the three most prevalent complications of AVF (2).

Also vascular access as the 'Achilles' heel of hemodialysis 20% of all hospital admissions and one-third of patients on HD are the result of problematic vascular access. Half of all hospital admissions in the first year of dialysis are access-related. Infection is now the leading cause of hospitalization and the second commonest cause of death (after cardiac events) for patients on HD. Access-related bacteremia is responsible for nearly 30% of all infections in the HD population and is the leading cause of preventable hospital admission (3).

The prevention of these complications can be accomplished through the use of appropriate care. These actions belong to the nurse and to the chronic renal patient, which must be instructed in self-care about preparation and management of his new vascular access. In the AVF period of maturation, the care provided is designed to provide greater fistula durability. The knowledge of those care information is essential, as it influence the attitude and the proper practice of self-care of patients with AVF, failure to comply with these precautions may complicate the clinical condition of patients which will lead to interventions more complex and/or hospitalizations (4).

Significance of Study:

Evidently, it cannot be ignored that CKD prevalence across the world is growing at a substantial rate. With an estimated global disease of between 10% to 16% in adults and an annual growth rate of 8% in ESRD incidence. The prevalence of acute and chronic Renal Failure (CRF) is high in the Arab world. The reported prevalence of CRF is 80 to 120 per million populations (pmp) in Saudi Arabia and 225 pmp in Egypt. In Europe it is estimated to be 283 pmp, 957 in the United States and 1.149 pmp in Japan (5).

Hemodialysis remained the most common treatment modality, with approximately 1,929,000 patients undergoing hemodialysis, for 89% of all dialysis patients. In Egypt the total prevalence of patients on dialysis is 264 per million (6).

2. AIM OF THE STUDY

The aim of the present study was to evaluate the effect of implementing nursing guidelines on reducing post-operative arteriovenous fistula complications among end stage renal disease patients through the following objectives:-

1. Assess needs of the studied patients.
2. Develop nursing guidelines for post-operative arteriovenous fistula patients
3. Implement nursing guidelines for post-operative arteriovenous fistula patients
4. Evaluate the effect of implementing nursing guidelines on reducing post-operative arteriovenous fistula complications among end stage renal disease patients.

3. THE RESEARCH HYPOTHESIS

At the end of the study patients: Post – operative patients with arteriovenous fistula who will receive the designed nursing guidelines will have less complications than those patient who will not receive this guidelines as measured by observational check list of post-operative arteriovenous fistula clinical outcome & knowledge assessment sheet..

Design:

A Quasi-experimental research design was utilized in this study.

Setting:

This study was carried out at at the Hemodialysis & surgical unit at Fayoum University Hospital.

Subjects:

A purposive sample composed of 60 adult post-operative arterio venous fistula patients from both genders which were randomly and alternatively divided into two equal study & control groups (30 for each).

Inclusion criteria:

1. Adult newly hemodialysis patients of both genders.
2. Immediate post-operative arteriovenous fistula patients.

Exclusion criteria:

1. Patients with liver disease.
2. Patients with diabetes.

Tools for Data Collection:

Four tools were used to collect the data according to the following:

Tool (I): Interview Patient's assessment questionnaire:

It is an interview administered sheet that was adopted from (7) which included two parts that were filled by the investigator:

The socio demographic characteristic of the patient

The medical and surgical history of the patient

Tool (II): knowledge assessment questionnaire:

It was developed by the investigator based on (8) it included three sections.

Section (I): Used to assess patients level of knowledge regarding vascular access.

Section (II): It concerned with assessment patients knowledge regarding how to avoid AV fistula complications.

Section (III): Used to assess patient's level of knowledge regarding care of AV fistula in presence of complications.

Tool (III): patient's practice observational checklist:

It adapted from (8) and modified by the investigator to assess the patients' level of practice regarding management of post-operative AVF .Consists of three main parts:

Part one: To assess patients' practice regarding assessing AVF.

Part two: To assess patients' practice regarding AVF care.

Part three: To assess patients' practice for managing AVF complications

Tool (IV): Observational check list of post-operative arterio venous fistul clinical outcome:

It is adopted by investigator from (9). It was used to assess AVF associated complications in both control and study groups as the following: Local AVF site Infection, thrombosis, neurological disorder, bleeding and venous hypertension.

Operational design

The operational design includes preparatory phase, content validity of the modified tool and reliability, pilot study and fieldwork.

Validity:

Content validity was conducted to determine whether or not the instrument measures what it is designed to measure. The tools were revised by a jury of 5 experts as the following ; who composed of, three professors of medical surgical nursing, two lecturers of medical surgical nursing at Cairo University who reviewed the content of the tools for comprehensiveness, accuracy, clarity, relevance and applicability. Minor modifications were done.

Reliability:

Reliability of the tool was tested to determine the consistency of the measurement instrument. The degree to which an instrument measures the same way each time it used under the same condition with the same subjects. The Cronbach's alpha model, which is a model of internal consistency, was used to test tool reliability. Reliability factor of the second tool was (0.93) and tool 3 was = 0. 93 tool 4 was = 0. 98. Statistical equation of Cronbach's alpha reliability coefficient normally ranges between 0 and 1; higher values (more than 0.7) denote acceptable reliability.

Pilot study:

A Pilot study was carried out with 10% (6 patients) of the sample under study to test the applicability, clarity and efficiency of the tools, then the tools modified according to the results of the pilot study, patients who shared in pilot study were not included in the sample and replaced by other patients.

Administrative design:

An official permission was obtained from the director of Fayoum University Hospital and head of surgical&hemodialysis unit, in which the study was conducted. A letter was issued to them from the faculty of nursing; Helwan University explains the aim of the study for obtaining the permission for data collection.

Ethical consideration:

An approval was obtained from a scientific research ethics committee of the faculty of nursing at Helwan University and oral informed consent was obtained from the study subjects individually before starting the study. The aim and objectives of the study was clarified to the patients included in the study by the investigator. Participants were assured that anonymity and confidentiality would guarantee. Patients were informed that they are allowed to choose to participate or withdraw from the study at any time. Ethics, culture, values were respected.

Field work includes three phases:
I-First phase (Assessment phase):

During this stage firstly assess patient's knowledge using the previously mentioned tools **(II)** knowledge assessment questionnaire t. Filling the questionnaire in the morning and afternoon shifts in surgical unit during pre-operative period for both study and control group. The investigator interviewed the patients and explained the purpose of the study. The patients were assured that information collected would be treated confidentially, and it would be used only for the purpose of the research. Only code numbers were used and no names appeared. Its filling took about 30- 45minute for each patient.

Secondary assess patients practice regarding AVF in which investigator directly observing patient performance during care of their fistula using tools **(III)** patient' practice observational checklist. Its filling took about 30- 45 minute for each patient.

II-Second phase (Implementation phase):

Based During this phase the investigator start to teach the correct knowledge and practice for study patients about care of AV fistula through 2session for practical part & 2session for theoretical part 3-5 patients in each group as following:

Theoretical part divided into 2 sessions

During the day the investigator gave each patient 3 sessions, each session took 2 hours by using brochure, picture and video and at the end of the each session was evaluated as following:

Theoretical part divided into 2 sessions

Session (1): it took 30-45 minute for each group to meet the following objectives:

- Understand type of vascular access
- Identify the definition of arteriovenous fisula.
- Understand the aim of AVF.
- Know the types of AVF.
- Identify indications of AVF
- Identify indications of AVF

Session (2): it took 30-45 minute for each group to meet the following objectives:

- Explain the complications associated with AV fistula
- Describe signs associated with complications associated with fistula
- Discuss measures to prevent complications
- Discuss the care of complications associated with AV fistula

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Total time for theoretical part 60-90 minute for each group.

Practical part divided into 2 sessions
First Session:

Objectives : :patient will be able to assess and care AV fistula, during this session investigator teach each patient how to assess and care AVF by using simulator ,videos on lab top .this session took about one hour.

Second Session:

Objectives: patient will be able to manage AVF complications.

During this session investigator firstly review previous session then teach patients signs and symptoms of AVF complications and how to manage each one. It took about one hour investigator use poster, booklet, pictures and lap top.

During follow up phase each patient in study group was seen 15 day following the last session to be sure that the instructions were followed correctly. Reinstruction, Correction, and re demonstration were offered.

-Third phase (Evaluation phase):

During this phase the investigator evaluated the studied patients in two times: 2days post-operative to evaluate their knowledge & after 15day to evaluate their practice post implementation of guidelines using the same data collection tools (II &III).Then both groups were observed to detect presence of complications 15 days & 6weeks later using tool (IV).

Statistical Analysis

Data were collected and coded to facilitate data manipulation and double entered into Microsoft Access and data analysis was performed using Statistical Package of Social Science (SPSS) software version 18 in windows 7.

Simple descriptive analysis in the form of numbers and percentages for qualitative data, and arithmetic means as central tendency measurement, standard deviations as measure of dispersion for quantitative parametric data.

Quantitative data included in the study was first tested for normality by One-Sample **Kolmogorov-Smirnov** test in each study group then inferential statistic tests were selected.

For quantitative parametric data:

- **Paired t-test** in comparing two dependent quantitative data.

For qualitative data:

- **Chi square** test to compare two of more than two qualitative groups.

Bivariate Spearman correlation test: Is to test association between quantitative non-parametric variables.

General linear model to compare repeated measures

The **P-value** ≤ 0.05 was considered the cut-off value for significance

4. RESULTS

Part (1): Socio-demographic Characteristics for both control and study groups

Item	control group n (30)		Study group n(30)		X2 test	P Value
	No	%	No	%		
Age in years						
<35	6	20.0%	9	30.0%	0.8	> 0.05
35-45	7	23.3%	6	20.0%		
45-55	10	33.3%	9	30.0%		
55 years and more.	7	23.3%	6	20.0%		

Mean ±SD	43.4 ± 9.9		46.1 ± 10.4				
Gender						0	>0.05
Male	12	40.0%	12	40.0%			
Female.	18	60.0%	18	60.0%			
Marital status						0.1	> 0.05
Married	18	60.0%	19	63.3%			
Single	12	40.0%	11	36.7%			
Level education						0.3	> 0.05
Illiterate	14	46.7%	12	40.0%			
Read and write	10	33.3%	11	36.7%			
Basic qualification	3	10.0%	4	13.3%			
University	3	10.0%	3	10.0%			
Occupation						0.3	> 0.05
Not occupied	15	50.0%	18	60.0%			
Occupied	15	50.0%	12	40.0%			

Statistical significant p-value ≥0.05

Table (1): Shows that, about one third (33.3% ,30%) for control and study groups respectively were having 45-55 years with the mean age (43.4 ± 9.9), (46.1 ± 10.4) respectively, that nearly two thirds (60%) in both studied groups were females, more than two third (60%, 63.3 %) for control and study groups respectively were married, more than one third (46.7% , 40 %) for control and study groups respectively were illiterate and (50%, 60 %) for control and study groups respectively were not occupied with no statistically significant difference between both study and control groups with p value >0.05 so they are comparable groups .

Table (2): Presentation of total knowledge for patients in control and study groups pre implementation of nursing guidelines n=(60)

Items of total knowledge	control group n (30) pre				Study group n (30) Pre				X ²	P Value
	Satisfactory		Unsatisfactory		Satisfactory		Un-satisfactory			
	No	%	No	%	No	%	No	%		
vascular access	6	20.0%	24	80.0%	4	13.3%	26	86.7%	0.5	> 0.05
AV fistula complications	14	46.7%	16	53.3%	11	36.7%	19	63.3%	0.6	> 0.05
Prevention of AV fistula complications	13	43.3%	17	56.7%	16	53.3%	14	46.7%	0.6	> 0.05
Care f or AV fistula complications	8	26.7%	22	73.3%	4	13.3%	26	86.7%	1.7	> 0.05

*statistical significant p-value ≤0.05

Table (2) above) illustrates that there were no statistically significant difference between total knowledge pre implementation of nursing guidelines for both control and study groups as regard total knowledge about vascular access, AV fistula Complications , Prevention and Care for AV fistula Complications with P Value > 0.05.

Table (3): Presentation of total knowledge for both control and study groups post implementation of nursing guidelines n= (60):

Items of total knowledge	control group n(30) post				Study group n(30) Post				X ² test	
	Satisfactory		Un-satisfactory		Satisfactory		Un-satisfactory		X ²	P Value
	No	%	No	%	No	%	No	%		
vascular access	10	33.3%	20	66.7%	25	83.3%	5	16.7%	15.4	< 0.01**
AV fistula complications	16	53.3%	14	46.7%	24	80.0%	6	20.0%	4.8	< 0.05*
Prevention of fistula complications	13	43.3%	17	56.7%	24	80.0%	6	20.0%	8.5	< 0.01**
Care for AV fistula complications	12	40.0%	18	60.0%	25	83.3%	5	16.7%	11.9	< 0.01**

*statistical significant p-value ≤0.05

Table (3) illustrates that there were high statistically significant difference in total knowledge post implementation of nursing guidelines for both control and study group as regard total knowledge about vascular access, AV fistula Complications , Prevention and Care of AV fistula Complications of with P Value< 0.05*, < 0.01** respectively.

Table (4): Presentation of total practice for both control and study groups regarding care of AV fistula pre-implementation of nursing guidelines n =

Item of total practice	control group n (30) pre				study group n (30) pre				X2 test	
	Satisfactory		un satisfactory		Satisfactory		un satisfactory		X ²	P Value
	No	%	No	%	No	%	No	%		
Patient assessment of AVF site	7	23.3%	23	76.7%	5	16.7%	25	83.3%	0.4	> 0.05
Changing AV Fistula dressing	11	36.7%	19	63.3%	11	36.7%	19	63.3%	0.0	> 0.05
Role of patient for AVF complications	9	30.0%	21	70.0%	7	23.3%	23	76.7%	0.3	> 0.05

*statistical significant p-value ≤0.05

Table (4) illustrates that there were no statistically significant difference between total practice pre-implementation of nursing guidelines for both control and study groups as regard total practice about - patient assessment of AVF site, changing AV Fistula dressing, and role of patient for AVF complications between control and study groups with P Value > 0.05.

Table (5): presentation of total practice for both control and study groups regarding care of AV fistula post implementation of nursing guidelines n = (60)

Item of total practice	control group n (30) post				study group n (30) post				X2 test	
	Satisfactory		un satisfactory		Satisfactory		un satisfactory		X ²	P Value
	No	%	No	%	No	%	No	%		
Patient assessment AVF site	9	30.0%	21	70.0%	23	76.7%	7	23.3%	13.1	< 0.01**
Changing AV Fistula dressing	14	46.7%	16	53.3%	26	86.7%	4	13.3%	10.8	< 0.01**
Role of patient if occur complications	10	33.3%	20	66.7%	27	90.0%	3	10.0%	20.4	< 0.01**

*Statistical significant p-value ≤0.05

Table (5) above illustrates there were high statistically significant difference between total practice post implementation of nursing guidelines for both control and study groups as regard AVF site patient assessment, changing AV Fistula dressing, and role of patient for AVF complications between control and study group with P Value < 0.01**.

Table (6): Percentage distribution of total complications after 15 day for both Control and Study groups n= (60)

Total complications	Control group n (30)		Study group n(30)		X2 test	
	NO	%	NO	%	X ²	P Value
Local site infection	13	43.3%	5	16.7%	5.1	< 0.05
Thrombosis	2	6.7%	1	3.3%	0.4	> 0.05
Neurological disorder	2	6.7%	0	0.0%	2.1	> 0.05
Bleeding	1	3.3%	1	3.3%	0.0	> 0.05
Venous hypertension	0	0.0%	0	0.0%	NA	NA
Total	2	6.7%	3	10.0%	0.21	> 0.05

*Statistical significant p-value ≤0.05

Table (6) illustrates that that (43.3%) of patient in control group in compare to (16.7%) in study group have local site infection ,(6.7%) of patient in control group in compare to (3.3%) in study group have thrombosis while (6.7%) of patient in control group in compare to study group have local neurological disorder post implementation of nursing guidelines.

Table (7): Percentage distribution of total complications after 6weeks for both Control and Study groups n= (60).

Total complications	Control group n(30)		Study group n(30)		X ² test	
	Present		Present		X ²	P Value
	NO	%	NO	%		
Local site infection	4	13.3%	1	3.3%	2.0	> 0.05
Thrombosis	7	23.3%	2	6.7%	3.3	> 0.05
Neurological disorder	4	13.3%	1	3.3%	2.0	> 0.05
Bleeding	2	6.7%	0	0.0%	2.1	> 0.05
Venous hypertension	0	0.0%	0	0.0%	NA	NA
Total	14	46.7%	5	16.7%	6.2	< 0.05*

*Statistical significant p-value ≤0.05

Table (7) above illustrates that (13.3%) of patient in control group in compare to (3.3%) in study group have local site infection (23.3%) of patient in control group in compare to (6.7%) in study group have thrombosis while (13.3%) of patient in control group in compare to (3.3%) in study group have neurological disorder and (6.7%) of patient in control group in compare to in study group have bleeding with statistically significant difference of total complications for both studied groups post implementation of nursing guidelines P Value at < 0.05*.

5. DISCUSSION

Part 1: The socio demographic characteristic and medical data t of the study sample

The results of the present study demonstrated that, one third for control and study groups respectively were between 45-55 years, that two third in both studied groups were females, were married. More than one third for control and study groups were illiterate and half of them were not occupied also hypertension was common among both study and control groups and majority of them has no previous AVF surgery.

These findings were supported by (10) who conducted "Effectiveness of Instructional Health Educational Vascular Access on Hemodialysis Patients' Knowledge at Al-Hussein Teaching Hospital in AL Nasiriyah City. Iraq", reported that the patients between 45-55years were frequently affected by ESRD more than other age groups. It was found also female gender was higher than male gender due to stressful life situation that are common in female

In accordance with present study (11) who conducted "impact of Teaching Guidelines on Quality of Life for Hemodialysis Patients ". it was found that, more than one third were illiteracy patients, quarter of patients were secondary school education and university education which ensure that ESRD can occur either educated or not.

On the same line with (12) who conducted "The Effectiveness of an Educational Intervention on Fatigue in Hemodialysis Patients", mentioned that hypertension is the most common cause of ESRD accounting for over two thirds of the patients seen on hemodialysis.

Part 2: knowledge of the study sample

The present study illustrated that there were no statistically significant difference pre implementation for both control study groups as regard total knowledge about vascular access, AV fistula Complications , Prevention and Care for AV fistula Complications On the same line(13) who conducted" Impact of Designed Nursing Intervention Protocol for Hemodialysis Patients on Patient's Outcomes" pointed that as regard of total knowledge in the study and control group illustrate that the minority of patient had satisfied total knowledge in the pre intervention period as regard vascular access and related complications.

The present study illustrated that there were high statistically significant difference between both control and study groups as regard total knowledge about vascular access, AV fistula Complications, Prevention and Care of AV fistula Complications. Post implementation of nursing guidelines In an attempt to explain the rational for increasing patient's knowledge in the present study and investigator explained that the study sample identified in this study was relatively new in hemodialysis treatment, they were below one year and they had less knowledge related to hemodialysis and adherence to treatment regimen so they are eager to acquire more knowledge pertinent to hemodialysis regimen. Strong positive correlation was found between receiving education and patient knowledge

On the same line, (10) who reported that there are highly significant correlation between posttest for study group and total patients knowledge, and no significant correlation between the control at pre and posttest and total patient knowledge. This result means the effectiveness of instructional health education vascular access device on study group.

Part 3: Practice of the study sample

The present study illustrated that there were no statistically significant difference between total practice pre-implementation of nursing guidelines for both control and study groups as regard total practice about AVF site patient assessment, changing AV Fistula dressing, and role of patient for AVF complications . This study finding may be related to nursing not follow with patients so they did not make any documentation. Also, the patients had unsatisfactory practice due to unsatisfactory in-service training or orientation program post-operative and not present written clear policies toward vascular access preserving measure and lack of compliance with the procedure.

On the same line (14) who conducted " Clinical Practice Guideline Vascular Access for Hemodialysis" reported that the participants demonstrated an inadequate practice, the patients' attitude regarding the care of fistula may influence on their practice. The recognition of the importance of those cares is associated to the effort employed in their maintenance.

This finding was in accordance with (15) emphasized that reported that most patients did not perform measures in preventing thrombosis in the venous access and avoiding assessing the blood pressure is a very important care, since the evaluation of blood pressure can reduce the blood flow in the fistula. It was also found that avoiding medication administration and avoiding blood collection, are also essential cares that if they are not followed, there is the risk of creating hematomas, besides that they can also impair the venous network.

The present study illustrated that there was high statistically significant difference between total practice post implementation of nursing guidelines for both control and study groups as regard to total practice about AVF site assessment, changing AV Fistula dressing, and role of patient for AVF complications this might be due to the effect of nursing guidelines in raising concern of patient about all aspects care for AV fistula this highlighted the need for changes in practice, for clinical guidelines and focused on practice-based education.

Similar to study (10) stated that, observation of practice have important cause for concern, because the potential for complications caused by incorrect practice for AV fistula is such that this area needs to be addressed. They highlighted the value of audit and standard setting to examine existing practices, address shortcomings and to monitor and evaluate

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any changes that might be introduced. Also, (11) who pointed that nursing guidelines and patient's education had a positive impact in several areas for patients including an increase in quality of life, increased knowledge about the vascular access, and increased self-efficacy.

Part 4: Incidence of complications of the study sample

The present study reveals that there was highly statistically significant difference regarding AV F complications between control and study groups after implementation of nursing guideline that ensure effectiveness of implementing of nursing guideline. This finding is in congruent with (16) who illustrated that there were changes in access arm color as pallor, and cyanosis, swelling associated with decreased fistula blood flow due to inadequate inflow or prolonged compression of the fistula during sleep. On the other hand, it was observed that all patients had normal access appearance after the application of the protocol of nursing care.

In this respect (17) who stated that the quality of vascular care is influenced by the patient's knowledge judgment, skills and values of those participating in the care and the cognitive ability to decide on a plan of actions that depends upon other factors as their education, experience and training in caring for vascular access. Therefore, the patient's action begins with their' knowledge, philosophy and skills affecting on the quality of care given and outcome of vascular access.

6. CONCLUSION

The nursing guidelines for post-operative AVF was effective evidenced by the hypothesis of the present study was achieved through improvement of patients level of knowledge and practice regarding AVF care as well as less incidence of AVF complications that were detected after implementation of nursing guidelines as well as there was a significant differences between patients in study and control group regarding level of knowledge, practice and incidence of AVF complications.

7. RECOMMENDATIONS FOR BETTER PATIENT'S OUTCOME

Apply nursing guidelines patients who suffer from end stage renal kidney disease throughout the pre-dialysis and continued after kidney maintenance with their caregivers to improve their knowledge and skills about the disease and its treatment.

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