

EFFECT OF IMPLEMENTING EDUCATIONAL GUIDELINE ON CLINICAL OUT COME OF PATIENTS UNDERGOING ARTERIOVENOUS FISTULA

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Abstract:

Background: Arteriovenous fistula (AVF) is the life-line for the majority of the patients with chronic kidney disease when hemodialysis (HD) is the treatment of choice; it must be followed by necessary instruction to increase knowledge and practice for patients related to AVF care and healing to complete its success and reduce its complication. **Aim of the study:** to evaluate the effect of implementing educational guideline on clinical outcome of patients undergoing arteriovenous fistula. **Study design:** Quasi-experimental research design was conducted in this study. 90 adult patients were systemic randomly selected from Vascular Surgery Clinic - Mansoura University Hospital to participate in the study which divided into two groups, n=(45 study and 45 control) .Two tools were used for data collection. Patients interviewing questionnaire sheet included two parts socio-demographic data and Interview based questionnaire sheet to assess patient knowledge and practice regarding AVF procedure and Access assessment tool to assess fistula complication. **Results:** Knowledge of the study group improved significantly after health educational guideline implementation (post test), where $P \leq 0.001$ and minor of the study group experienced AVF complication. On the other hand there is no improvement of the knowledge of the control group post test, where $P = 1.000$ and Majority of control group had most AVF complications. **Conclusions:** Majorities of the control group had unhealthy fistula post test & about one third of them had fistula failure .While the majorities of the study group had healthy fistula following the educational guideline implementation, which indicated the effectiveness of this educational guideline to decrease complications. **Recommendation:** All patients scheduled for AVF procedure and their families need adequate knowledge and skills to help them to adapt with their life post-AVF.

Keywords: Arteriovenous fistula, chronic kidney disease, end stage renal disease, Heamodialysis, Knowledge, practice

Introduction:

Chronic kidney disease (CKD) is now the most common cause of end-stage kidney failure worldwide. Today, there are now over 1 million dialysis patients worldwide, with an incidence of about a quarter of a million new patients each year

are alive on dialysis or with a functioning arteriovenous fistula (AVF)⁽¹⁻³⁾

Recently in Egypt, the estimated number of patients with end stage renal disease (ESRD) almost doubled, from 18,000 in year 2000 to 33,693 in 2009⁽⁴⁾

The number of patients with chronic kidney disease requiring renal replacement therapy has increased worldwide. The most common replacement therapy is hemodialysis (HD). Vascular access (VA) has a key role for successful treatment.⁽⁵⁻⁷⁾ Creating a patent vascular access e.g (arteriovenous fistula) is a complex procedure as it requires finding the best location, most accurate technique and at last an efficient post operational care. Patency and long term function of a arteriovenous fistula depends on several factors including patient's blood pressure, coagulation state, the site of the fistula, type of the fistula, the technique of the operation and the drugs being used. Using the anticoagulant drugs and dilators during or after the operation yet remains controversial (8-10).

The nurse is responsible for patients teaching in the preoperative period, must be instruct the patients to avoid draw blood, take blood pressure, or administer intravenous injection and infusion on the arm chosen for the operation. Also nurse should be learn and educate the patient to exercise the arms 4 times daily to enhance blood flow and develop stronger veins.(11).

Once the AV fistula or graft procedure is completed in the OR, the patient is transferred to the post anesthesia care unit (PACU). Upon the patient's coming from the OR, the nurse should confirm with the surgeon that the patient has an audible, continuous bruit and palpable thrill of the AV fistula or graft 12).

The following clinical pearls are helpful when caring for patients with an AV fistula or AV graft: Elevate the extremity on pillows to prevent edema. Don't use arm slings. Keep the extremity in a straight line to prevent vessel constriction. Administer I.V. fluid therapy as ordered to maintain BP within prescribed parameters. Administer vasopressin medication I.V. as ordered to maintain BP within prescribed

parameters. Keep the operative site within view until sensation returns if the AV fistula or AV graft is done under a nerve block. Document the insertion of the vascular access device (VAD), assessment findings, interventions, patient responses, and outcomes, and patient's and caregiver's level of understanding patient teaching (12, 13).

It is very important to instruct the patient about following doctor's recommendations on how to care for patient fistula arm. Patient should also help the fistula to develop by following an appropriate exercise program; doctor or nurse will give patient indications and tell him when to start. By exercising fistula arm, and increasing the blood supply to the fistula. This makes the fistula enlarge and prepare it for cannulation. (11, 13).

The patients and relatives should be properly educated regarding the care of arteriovenous fistula at home. There is a list of reminders that the patients should follow strictly to prevent the complications of arteriovenous fistula. Never touch the area that the needle enters after skin disinfection and during dialysis, never carry heavy loads across or on the fistula, never sleep on the fistula, always keep the access clean. Moreover, these guidelines provide information like how to watch for the signs of complications (14).

It is important to take care of the vascular access to prevent complications. The CKD patients are more prone to develop complications related to their arteriovenous fistula such as infection, clotting, rupture, pseudo aneurism formation and stenosis. Moreover, the researcher felt that post-operative care of arteriovenous fistula is very important nowadays that there is increase in number of complications due to improper knowledge of patients and their care givers regarding care of arteriovenous fistula. They need guidance on prevention of these complications. So the study examine the

knowledge and practice of hemodialysis patients regarding care of their fistula (12).

Aim of study:

The aim of the study was to evaluate the effect of implementing educational guideline on clinical outcome of patients undergoing arteriovenous fistula.

Research Hypotheses:

There will be clinical outcome improvement among patients undergoing arteriovenous fistula post implementing the educational guideline.

Operational definition

The educational guideline refers to an instructional which contains a set of information needs for patients undergoing Arteriovenous fistula procedure regarding care of arteriovenous fistula include knowledge and practice (before, during, after AVF procedure and patient knowledge post discharge).

Subjects & Method:

The methodology of the current study was discussed under the following four main designs:

1. Technical Design
2. Operational Design
3. Administrative Design
4. Statistical Design

(I): Technical Design:

Study Design:

Quasi-experimental research design was conduct in carrying out this study.

Setting:

The study was carried out in vascular surgery clinic of Mansoura University Hospital.

Subjects:

A convenience sample of 90 adult patients which divided into two groups, the first group consist of 45 study patients and second group consist of 45 control patients undergoing arteriovenous fistula, along the period of six months agreed to participate in the study.

Inclusion criteria:

- Both sexes.
- Able to communicate verbally.

- Age ranging from 20-60 years.
- Adult patients with (CKD) end stage who were treated through heamodialysis and referred for an arteriovenous fistula (AVF).

Sampling:-

Once the necessary approvals granted to proceed with the proposed study, subject who met sampling criteria and agreed to participate in the study, interviewed by the researcher to collect the necessary data and implement educational guideline after explanation of the purpose of the study.

Tools:

Two tools were used for data collection:-

Tool I: Patients interviewing questionnaire sheet:

This tool was developed by the researcher, based on reviewing related literatures and experts' opinions, written in Arabic language in the form of multiple choice questions, it comprised of two main parts and sheet lasted about 20-30 minutes to be filled.

Part I: Socio demographic characteristics of the patients which including: name, age, gender, marital status, occupation, educational level & medical history.

Part II: Interview based questionnaire sheet: this part introduced to assess patients knowledge regarding AV fistula and its related procedure, which consists of 4 parts:

- 1- The first part: Patients knowledge about arteriovenous fistula: constructed and reviewed utilizing the most recent and relevant literature, which include a series of questions to elicit patients knowledge about arteriovenous fistula
- 2- The second part: Patient's knowledge related pre procedure care advantage of fistula exercise, and exercise procedure.
- 3- The third part: assess patients knowledge related early post procedure care.
- 4- The fourth part: patients' knowledge related to care to maintain AVF.

Scoring system:

Scoring system for knowledge questionnaire was done as follows, the items discrete scores for each scale (knowledge or practice) were summed together then the sum of scores for each dimension and total score was calculated by summing the scores given for its responses. All scores were transformed into score % as follow:

Score % = (the observed score / the maximum score) x 100. Then score % was transferred into categories according to the different scales

- **Low level** = consider less than 50% of the total score.
- **Moderate level** = consider from 50 % to <75% of the total score.
- **High level** = considers $\geq 75\%$ of the total score.

Tool II: Vascular access assessment tool:

It was designed by the researcher to determine the effect of implementing nursing guideline of AVF care on the clinical outcome of patient with CKD. It includes AVF assessment and measure to detect AVF complication, this tool completed by interviewed the patient for two times and sheet lasted about 10-20 minutes to be filled. This tool includes five sections:

(A) : Inspection: the researcher observe signs of infection, signs of steal syndrome, open wound visible around access hematoma developed, and patient complaining of increase swelling, Ecchymosis /Discoloration, Break in the skin, Aneurysm, and Presence of accessory vein.

(B) : Auscultation: the researcher assess if the bruit present or absent.

(C) : Palpation: the researcher evaluates the presence of thrill, hand and arm temperature. Also examine total body skin temperature if warm may indicate infection if cold may indicate steal syndrome.

(d) Allen test: indicates positive or negative result. Also other findings assessed; such as bleeding time and new or worsening aneurysms.

(e) Fistula maturation: this section assess fistula functioning and if the patient start dialysis using fistula or not.

II. Operational Design: The operational design of this study included pilot study and field work.

Pilot study:

The pilot study was carried out on 10% patients, who were selected randomly from the vascular surgery outpatient clinic of Mansoura University Hospital. Those patients were excluded in the actual study. The pilot study was done to ascertain the relevance, clarity & applicability of the developed tool and to estimate the time needed to fill the questionnaire sheet. Based on the findings of the pilot study, modifications were made such as omission, addition, and rewording in order to make the tool more applicable to patients. The final form of the tool was formulated and the time needed for completing them was also determined. Each sheet lasted about 20-30 minutes to be filled.

Field Work: The study was implemented

Through the following four phases:

Preparatory Phase I: (Initial Assessment):

Extensive review of the current national and international literatures related to the research title was done using textbooks, articles, magazines and other related researches. Tools of data collection were developed by the researcher and it was tested for content validity by a panel of 7 experts (jury) from Mansoura University, four experts of Medical- Surgical Nursing, two specialist professors of vascular surgery from Faculty of Medicine- Mansoura University and one specialist in biostatistics from Faculty of Medicine-

Mansoura University, who reviewed the tool for clarity, relevance, understanding and applicability for implementation. Reliability of the developed tool was estimated using cronbach's alpha reliability test, showed a strong positive significance ($r = .89\%$) for all competencies of the tool.

After preparing the tools, the study sample was recruited according to the set criteria. This was followed by collecting baseline data. Pre-tested questionnaire was administered to the study sample to assess patients knowledge related AVF procedure. Patient's selection done in the free time during the outpatient clinic day. Vascular clinic were visited two days/week from the beginning to the end of the vascular clinic day.

The researcher interviewed patients both group after introducing herself and took the consent from them to be recruited in the study after explaining the aim of the study and then distributed the questionnaire sheet after clear explaining the way to fill out. Confidentiality for all collected information was strictly assured. This phase was conducted by the researcher during the period from the beginning of April to the end of September 2015.

Phase II: Educational guideline Development

A simple booklet was developed for patients which covered all items related to AVF procedure. It included the following items:

1- Theoretical part :

- description of the chronic kidney disease

- Brief description of renal failure and its treatment
- Type of vascular access
- Meaning of AVF and its advantage
- AVF complication
- Care related instruction before and after AVF procedure.

2- Practical part :

Include Common Exercise related to AVF (types, how to do it, time needed for each exercises, essential instructions when doing it).

The Educational booklet was written in simple Arabic language with different illustrated colored pictures to enhance the learning process and facilitate patients' understanding.

Phase (III): Educational guideline Implementation

- The educational guideline designed for this study has been carried out for sample selected patients.
- Each study patient interviewed individually before applying the planned educational guideline in order to collect the baseline patients data using the study tools
- The educational guideline was conducted through 33 session; (22 pre-operative and 11 post-operative)
- In the theoretical session pre operative patients was provide with theoretical knowledge which include brief description about CKD and its treatment , type of vascular access and its advantage, AVF and its complication, instruction related care before and after AVF procedure.
- In the practical session pre operative patients were taught about the

- practical part which include common exercise related to AVF (types, how to do it, time needed for each exercises, essential instructions when doing it), at the end of the practical session patients demonstrate the arm exercise.
- In the post session review all theoretical knowledge and practical part with patients which included demonstration & re demonstration
 - The educational guideline was implemented for the study group in a small group (4-5) patients, each session took about one hour.
 - Total number of sessions were 33 sessions (45/4=11), divided as the following (11 sessions for theoretical knowledge, 11 sessions for practical part and 11 sessions for post review part.
 - Different teaching and learning methods were used during the session which included; interactive, demonstration & re demonstration, instructional media included data show, pictures and printed handout which was presented in clear and concise form to be used as memorial reference.
 - At the beginning of the session, an orientation to the aim of the study and the goals of the educational guideline took place. Also, patients were oriented about the phases of the study and the educational guideline sessions (time, duration, place, and contents). The researcher stressed on the importance of follow up and active participation.
- Each session started by a summary of the previous session and objectives of the new session, using a very simple slang language that suits the level of patients without ignoring motivation and reinforcement techniques.
 - Patients were allowed to ask any interpretation, elaboration or explanation of any item included in the sessions.
 - The duration of educational guideline implementation was 6 months (from April till the end of September, 2015)
 - The educational guideline wasn't implemented for the control group.

Phase IV: Evaluation

The same interviewing questionnaire sheet (tool I) was introduced for both group after AVF procedure and program implementation for study groups (post-test), and other post-test (tool II) was done for both group two month after AVF procedure to detect fistula complications or failure. The results of both groups were compared to the pretest results to evaluate the impact of educational guideline of arteriovenous fistula care on the clinical outcome of patients with chronic kidney diseases.

III. Administrative Design:

Permission to carry out the study from the responsible authorities was obtained. Before conducting the study, official letter was submitted from the faculty of nursing, Mansoura University to Mansoura Hospital director, to obtain their approval to carry out the study. Official permission was issued from the Mansoura hospital director and addressed to the managers of vascular-surgery clinic to facilitate the

work. Oral approval was obtained from each doctor (Managers) of vascular clinic to include patients in the study.

Ethical Consideration:

At the time of data collection a verbal agreement was taken from every participant in the study after clear and proper explanation of the study purpose and its importance for them. All relevant ethical aspects were considered for ensuring patient's privacy and confidentiality of the collected data during the study. The purpose of the study was explained to each patient, and then an oral consent for participation in the study was obtained from each one of them. Voluntary participation and right to refuse to participate in the study and withdrawn at any time was emphasized to patients.

(IV) Statistical analysis:

After data were collected it was revised, coded and fed to statistical software IBM SPSS version 20. The given graphs were constructed using Microsoft excel software .All statistical analysis was done using two tailed tests and alpha error of 0.05. P value less than or equal to 0.05 was considered to be statistically significant.

The following statistical tests were used:

A. Descriptive statistics: Included the mean with standard deviation for the numeric data while percent to describe the frequency of each category for categorical data.

B. Analysis of categorical data:

a. **Mont Carlo exact test and Fishers exact test:** they are alternatives for the Pearson's chi square test to test for differences at scores frequencies

between different groups at different phases (or relation between demographic and clinical data) of the study if there were many small expected values.

b. **Mc-Nemar test:** It is a statistical test used to compare frequencies of categories of variables when measured twice (before and after applying intervention) for the knowledge and practice levels.

Results: The data collected were analyzed statistically and the results are categorized into 4 main parts which are: Socio-demographic data and medical profile, Effect of education guideline on patients Knowledge, Effect of Education guideline on the occurrence of the fistula complication and Statistical Relations and correlations among study variables.

Table (1): Distribution of the study and control group according to their socio-demographic Characteristics n= (45study &45 control).

This table shows that, the majority of both study and control group (82.2% & 84.4%) respectively were male. Regarding to age, there were mostly of the study group 80% and control group 86.7% ranged between 40 to 60 years. Concerning the level of patient's education, it was found that low half of the study group 44.4% & about half of the control groups 53.3% were illiterate. Regarding to patients occupation, it was found that, about two third of the study group & and control group (68.9% & 64.4%) respectively were not working. According to marital status, most of the both group 91% of the study group &

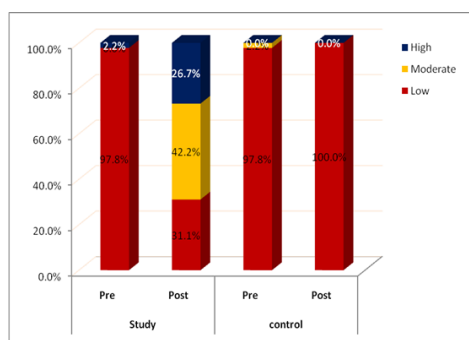
88.9% of the control group were married. group and control group respectively were
 In addition, 82.2% & 75.6 % of the study living in rural areas.

Table (1) :Frequency distribution of the study and control group according to their socio demographic characteristics n= (45study &45 control).

Demographic data		Group				MCP
		Study		Control		
		No	%	No	%	
Gender	Male	37	82.2%	38	84.4%	0.777
	Female	8	17.8%	7	15.6%	
Age	20- <40	9	20.0%	6	13.3%	0.396
	40-60	36	80.0%	39	86.7%	
Education	Illiterate	20	44.4%	24	53.3%	0.691
	Read & Write	9	20.0%	8	17.8%	
	Middle education	13	28.9%	12	26.7%	
	University	3	6.7%	1	2.2%	
Job	Working	14	31.1%	16	35.6%	0.655
	Not working	31	68.9%	29	64.4%	
Work nature	Manual	10	71.4%	11	68.8%	0.873
	Un- manual	4	28.6%	5	31.3%	
Marital status	Single	2	4.4%	3	6.7%	0.976
	Married	41	91.1%	40	88.9%	
	Divorced	1	2.2%	1	2.2%	
	Widow	1	2.2%	1	2.2%	
Residence	Rural	37	82.2%	34	75.6%	0.438
	Urban	8	17.8%	11	24.4%	

MCP: Mont Carlo exact probability

Part II: (a) Effect of education guideline on patients' knowledge.



General knowledge

Figure (1): Comparison between two groups according to their general knowledge regarding AVF Pre and Post guideline implementation Phases n= (45study &45 control).

This figure portrays that, the majority of the study group (97.8%) had low

knowledge level about AVF pre guideline implementation compared by (31%) low, 42.2% moderate and 26.7% had high knowledge post guideline implementation. Meanwhile the majority of the control group (97.8%) had low knowledge level about AVF pre test Compared by (100%) post test. This figure also clarifies that study group general knowledge about AVF improved significantly after guideline implementation, where $P \leq 0.001$. On the other hand there was no improvement of the knowledge of the control group post test.

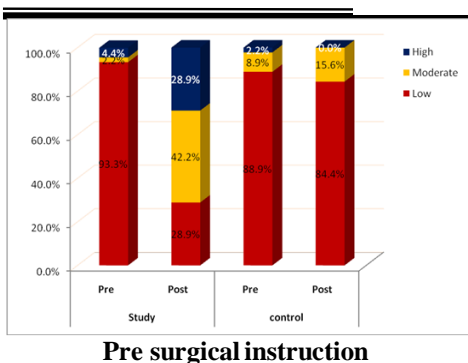


Figure (2): Comparison between two groups according to their knowledge regarding pre surgical instruction Pre and Post guideline implementation Phases n= (45study & 45 control).

This figure shows that, the majority of the study group (93.3%) had low knowledge level about pre procedure care pre guideline implementation compared by (28.9%) post guideline implementation. whereas the most of the control group (88.9%) had low knowledge level about pre procedure care pretest compared by (84.4%) post test. This figure also illustrate that the study group knowledge about pre procedure care improved significantly after guideline implementation, where $P \leq 0.001$. Meanwhile there was no improvement of the control group knowledge post test.

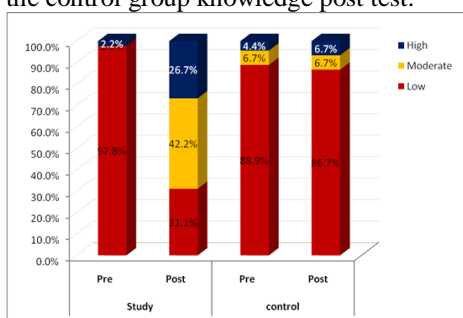


Figure (3): Comparison between two groups according to their knowledge regarding pre-operative care Pre and Post educational guideline

Implementation n= (45study &45 control).

This figure reveals that, the majority of the study group (97.8%) had low knowledge level regarding pre operative care about AVF pre guideline implementation compared by (31.1%) post guideline implementation. But, the most of control group (88.9%) had low knowledge level about pre-operative care pretest compared by (86.7%) post test. This figure also clarifies that, the knowledge of the study group about pre operative care improved significantly after health educational guideline implementation, where $P \leq 0.001$. On contrast there was no improvement of the knowledge of the control group about pre-operative care post test.

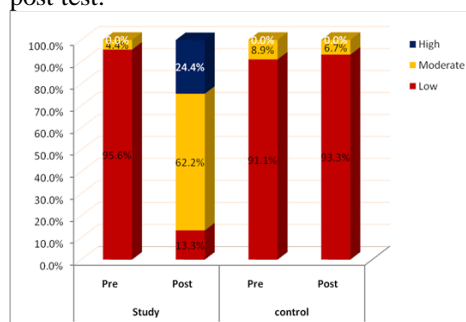
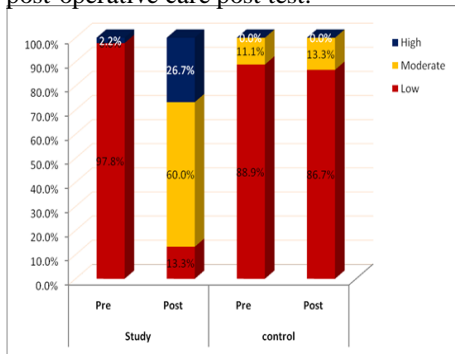


Figure (4): Comparison between two groups according to their knowledge regarding post-operative care Pre and Post educational guideline Implementation n= (study 45&control 45).

This figure clarifies that, the majority of the study group (95.6%) had low knowledge level regarding post operative care about AVF pre guideline implementation compared by (13.3%) post guideline implementation. On contrasting to the control group(91.1%) had low knowledge level about post-operative care pretest compared by (93.3%) post test.

We can see from this figure also that, the knowledge of the study group about post operative care improved significantly after

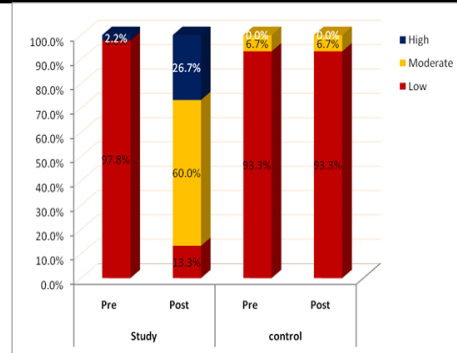
health educational guideline implementation, where $P \leq 0.001$ on the other hand there was no improvement of the knowledge of the control group about post-operative care post test.



Instructions at home

Figure (5): Comparison between two groups according to their knowledge regarding instruction at home about AVF Pre and Post educational guideline Implementation n= (45study &45 control).

This figure reveals that, the majority of the study group (97.8%) had low knowledge level regarding instruction at home about AVF pre guideline implementation compared by (13.3%) post guideline implementation. Whereas, the most of the control group (88.9%) had low knowledge level about instruction at home about AVF pretest compared by (86.7%) post test This figure also illustrate that ,the knowledge of the study group about instruction at home improved significantly after health educational guideline implementation, where $P \leq 0.001$ but there was no improvement of the knowledge of the control group about instruction at home post test

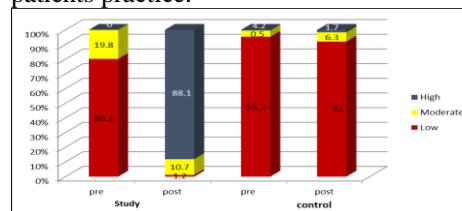


Overall knowledge

Figure (6): Comparison between two groups according to their knowledge regarding overall knowledge bout AVF Pre and Post educational guideline Implementation n= (45study & 45control)

This figure summarizes that, the majority of the study group 97.8% had low knowledge. On the other hand in the post test following educational guideline implementation, 13.3%of them had low knowledge, about two third of them60% had moderate knowledge and about quarter 26.7% of them had high knowledge. Whenever, the majority of the control group (93.3%) had low knowledge level About AVF pretest compared by (93.3%) post test.

This figure also portrays that, the knowledge of the study group about AVF improved significantly after health educational guideline implementation, where $P \leq 0.001$. As well as there was no improvement of the knowledge of the control group about AVF post test. (b) Effect of education guideline on patients practice.



Arm exercise

Figure (7): Comparison between two groups according to their practice regarding arm exercise about AVF Pre and Post educational guideline Implementation n= (45study & 45control).

This figure clarifies that, the effect of the educational guideline according to their practice regarding arm exercise. In the pre test the majority of the study and control group (80.2% & 95.3) respectively unable to perform arm exercise. On the other hand in the post test following educational guideline implementation, the majority of study 88.1% able to perform arm exercise. In contrast the majority of the control group 92.2% unable to perform arm exercise post AVF procedure post test.

This figure also portrays that, the practice of the study group about arm exercise of AVF improved significantly after health educational guideline implementation, where $P \leq 0.001$. On the other hand there was no improvement of the practice of the control group regarding arm exercise post test.

Part III: Effect of Educational guideline on occurrence of the fistula complication

Table (2): Comparison between two groups according to their complication post guideline implementation in the 2^{ed} meeting Phases n = (45study & 45control).

Assessment meeting 2		Group				FEP
		Study		Control		
		No	%	No	%	
Signs of infection	Positive	2	4.4%	38	84.4%	0.001*
Signs of steal syndrome	Positive	3	6.7%	37	82.2%	0.001*
Visible open wound	Positive	0	0.0%	6	13.3%	0.001*
Swelling, numbness or pain in extremities ¹	Positive	15	33.3%	25	55.6%	0.023*
Decreased temperature, Capillary refill, movement sensation of operative extremities	Positive	2	4.4%	37	82.2%	0.001*
Hematoma	Positive	1	2.2%	37	82.2%	0.001*
Ecchymosis, break in the skin	Positive	1	2.2%	37	82.2%	0.001*
Aneurysm	Positive	0	0.0%	38	84.4%	0.001*
Accessory vein	Positive	0	0.0%	37	82.2%	0.001*

FEP: Fisher exact probability

* $P < 0.05$ (significant)

Table (3): Comparison between two groups according to their nursing assessment related to signs of healthy AVF post educational guideline Implementation

Table (2): Comparison between two groups according to their complication post guideline implementation in the 2^{ed} meeting Phases n= (45study & 45control). This table illustrates that, the majority of the study group in the post test reported no symptoms of fistula complication in the 2^{ed} meeting. Only about third 33.3% of them had swelling, numbness or pain in extremities in the post test, but still has statistically significant difference, where $P \leq 0.001$.

This table also represents that the majority of the control group developed Signs of fistula complication in the 2^{ed}

Meeting such as infection and aneurysm 84.4%, steal syndrome developed by 82.2% ,13.3% had visible open wound, 55.6% had swelling, numbness or pain in extremities, 82.2% had decreased temperature, capillary refill, movement sensation of operative extremities, Hematoma, and accessory vein. This table also shows that there was statistically significant difference between both group in all signs of fistula complication, where $P \leq 0.001$

2^{ed} meeting Phases n= (45study & 45control).

This table illustrates that, the majorities of the study group had signs and symptoms

of healthy fistula following the educational guideline implementation 2^{ed} meeting .Only 8.9% of them had signs and symptoms of fistula failure include absent thrill and bruit. This table clarifies that, the majorities of the control group had signs and symptoms of unhealthy fistula

post test in the 2^{ed} meeting and about third 28.9% of them had signs and symptoms of fistula failure include absent thrill and bruit. This table also shows that these complains greatly increased in the 2^{ed} meeting but the difference observed was statistically significant, where $P \leq 0.001$.

Table (3): Comparison between two groups according to their nursing assessment related to signs of healthy AVF post educational guideline Implementation 2^{ed} meeting Phases n= (45study & 45control).

Assessment 2, continued		Group				FEP
		Study		Control		
		No	%	No	%	
Absent bruit	Positive	3	6.7%	12	26.7%	0.001*
Absent thrill	Positive	3	6.7%	12	26.7%	0.001*
Different temperature of hands	Positive	1	2.2%	35	77.8%	0.001*
Skin temperature	Positive	4	8.9%	33	73.3%	0.001*
Allen test	Positive	10	22.2%	6	13.3%	0.001*
Bleeding time > 15 min	Positive	2	9	36	80.0%	0.001*
Access show new aneurysm	Positive	1	2.2%	38	84.4%	0.001*
Fistula maturation failure	Positive	4	8.9%	13	28.9%	0.015*

FEP: Fisher exact probability

* P < 0.05 (significant)

Discussion:

The vascular access is a major cause of financial resources mobilization. Dysfunction of vascular access represents around 20–25% of hospitalizations of patients on dialysis. The maintenance of vascular access for hemodialysis (HD) is a major challenge in the care of people with ESRD on dialysis (15).

Education focused on time-sensitive objectives, specifically vascular access preparation for dialysis, must be addressed to avoid unnecessary complications and poor outcomes. Therefore, the purpose of this study was to investigate the potential impact of implementing educational guideline of arteriovenous fistula care on the clinical outcome of patients with chronic kidney diseases in patients initiating dialysis. The study focused specifically on informing and encouraging patients, through education, to plan for and obtain optimal methods of vascular access in advance of the need for hemodialysis.(16)

Regarding socio-demographic characteristics of the participants, the findings of the present study represented that, males constituted more than three-quarter of both groups, this may be explained as males who are exposed to agrochemical products in combination with presence of other risk factors, and males are smoke cigarettes more than females, which agree with the study of *Orantes et al. (2011)*.(17). This result in the same line with study of *Ghonemy, et al (2016)* (18), while *El-Arbagy, et al (2015)*(4)study revealed that difference according to gender is not significantly related to gender as the incidence of chronic renal diseases. This can be explained as the diversity in population with different governance in Egypt, hence females are less in Dakhliya Governorate, comparing to *El-Arbagy's* study that performed in Menoufia Governorate.

In relation to age, the findings of the present study represented that, the majority of both group were between 40 to less than 60 years of age, which agreed with the

study of *Ghonemy, et al (2016)*(18), who stated that ESRD increasing with aging (40-60), and this result also in the same line of *El-Arbagy, et al (2015)* (4) study revealed that the main age of CKD in Egypt was 52 years, however we still away from developed countries as mean age in United State was 61.1 years and median age in United Kingdom (UK) was 65.9 years. Such differences between the current study and other studies on the impact of variables such as gender and age could be due to genetic or social differences between the Egyptian community and other communities.

Concerning the level of patient's education, it was found that less than half of the study group & more than half of the control group were illiterate our result disagree with the study of *Gérard, et al (2016)*(19) who observed that the most common level of education was high school. Such differences between the current study and other studies on the impact of variables such as education this might be due to learning cultural or social differences between the Egyptian community and other advanced communities.

In reference to patient's occupation, it was found that, about two thirds of patients in study group and control group were not working. Which comes in consistent with the result of *Hod, et al, (2014)*(20) & *Gérard, et al (2016)*(19), who found the majority of their patients unemployed, farmers or retired.

According to marital status, the majority of the both group were married. This was highly similar to findings of *El Arbagy's (2015)* (4), who found that the majority of their patients were married 88.9% in his study about Prevalence of End Stage Renal Disease in Menoufia Governorate

In related to place of residence, majority of patients in study and control group were living in rural areas, which may

explained by the presence of hospital of the study nearby rural areas. This was not the situation of the patients of the study of *Hod, et al (2014)* (20) as majority of patients lived in urban areas.

Regarding general knowledge of patients, majority of patients in both control and experimental groups had low knowledge level in pre-test, while post tests showed that majority of control group did not exhibit any improvement in their knowledge, whereas half of patients in study group had moderate general knowledge and quarter of them had high general knowledge, which indicated remarkable increasing in general knowledge comparing to control group. Study of *Glidewell, et al (2013)*(21), agree with the current study as it stated that an intervention strategy that focuses on providing, first, patients with information about the shared nature of care, may improve their general knowledge about AVF.

Results about pre-surgical instructions indicated that both groups had low knowledge about pre-surgical instructions, which was expected referring to the socio-demographic characteristics of the groups, as most of patients were illiterate or read & write only. Comparing to pre-surgical instruction knowledge post-test, we can recognize that half of study group had moderate knowledge and quarter of them had high level of knowledge regarding pre-surgical instructions, which revealed the beneficial effect of the proposed educational guideline toward raising knowledge among AVF patients. Our results agree with the study of *Karkar, (2011)* (22), who stated that educational program for the patients' attending hemodialysis improves their level of knowledge. While the results obtained by *Leitch, et al, (2003)* (23) had different opinion as it indicated that nursing personnel face the exciting challenge of improving on patients' knowledge.

Concerning knowledge related to pre-operative care, the result displayed that both control and study groups had low level of knowledge regarding pre-operative care during pretest, while only study group shown improvement in knowledge post guideline implementation. A survey study of *Xi, et al, (2011)*(24) indicated that papers given to patients had an important role in raising patients' knowledge regarding preoperative care of AVF, while other patients said that they took their knowledge regarding preoperative care from other patients.

As regard to knowledge of post-operative care, it was obvious that patients in control group exposed low level of knowledge regarding post-operative care, while the patients study group showed remarkable increasing in their knowledge after implanting of health educational guideline, in the same line of the present study's results the study of *Karkar, (2011)*(22) who indicated that implementation of effective structured educational programs has been shown to be of great benefit in promoting self-care of AVF. The study of *Lederer, et al, (2015)*(25) disagreed with our results as it reported that many patients trust their doctors and they believed that if any knowledge important, doctors will tell them.

In related to instruction at home, most patients in the control group had low knowledge level about instruction at home about AVF pretest and post test. While patients in the study group showed significant improving in knowledge of instruction at home after health educational guideline implementation. This agree with the study of *Sousa et al. (2014)*(15) who stated that educational intervention contributed to patients' information about self-care behaviors that the patient should carry at home, to prevent or detect early complications of the AVF. On the other hand, results

obtained by *Lederer et al. (2015)*(25) revealed that CKD patients desire more information about the disease process, self-care techniques, and psychosocial implications, suggesting the need for improved patient-provider communication. Interventions designed to help healthcare providers to better educate patients about their CKD have been shown to increase patients' knowledge and stimulate discussion with physicians. However, educational interventions that focus solely on provider-driven communication position patients led to passively receive education. Such an approach is limited because effective communication is preferably bidirectional. Regarding overall knowledge about AVF, the result illustrated that no improvement could be observed among patients in control group in pre and post tests, comparing to remarkable improvement could be achieved after application of health educational guideline. The current results agreed the results obtained by *Lingerfelt & Thornton (2011)*(26), hence the author suggested that the structured one-on-one sessions on ESRD education significantly improved overall knowledge scores post-test assessment, respectively. Findings showed a significant improvement in ESRD knowledge post-intervention. While this results disagree with study of *Cavanaugh et al. (2009)*(14), that indicated that high level of overall knowledge was associated with high level of education of patients and younger age regardless any educational programs.

Concerning patients practice regarding arm exercise, the result reveals that, the practice of the study group about arm exercise of AVF improved significantly after health educational guideline implementation. In contrast, there was no improvement of the practice of the control group regarding arm exercise. Results obtained by *(Kakkos et al., 2010)*(11),

agree with the current results as it showed that, the nurse should be learn and educate the patient to exercise the arms 4 times daily to enhance blood flow and develop stronger veins. Also result obtained by *Pessoa and Linhares (2015)* (27) agree with the current results as it showed that majority of participants had inadequate knowledge related to the proper way of fistula care during the maturation period ,the recommendations most mentioned on how to care for AVF access were exercises with a malleable object

Second meeting displayed clearly, the highly significant difference in complications occurrence between control group and study group. Study result exposed that majority of control group had most AVF complications, while minor of the study group experienced AVF complications. Our results agreed with the results obtained by *Adib-Hajbagheri et al. (2014)*(28)who reported that dimensions of aneurysm were significantly more among the patients who did not follow fistula exercises guidelines and were not sleeping on the fistula limb, also patients who did not stick with the educational guidelines had complications of thrombosis and infections. Also, results of *Sousa et al. (2014)*(15)agree with current results, hence it stated that educational intervention for self-care management contributing to avoidance of AVF complications during post construction and maturation stages.

As regard to nursing assessment related to signs of healthy AVF post educational guideline Implementation 2^{ed} meeting, the majorities of the control group had signs and symptoms of unhealthy fistula posttest in the 2^{ed} meeting and about one third of them had signs and symptoms of fistula failure include absent thrill and bruit. While the majorities of the study group had signs and symptoms of healthy fistula following the educational guideline implementation 2^{ed}

meeting, which indicated the effectiveness of this educational guideline to decrease these kinds of complications. The results of the current study agreed with the results obtained by *Choi and Lee (2012)* (29) who stated that the self-management program could allow more opportunities of direct interactions between patients and health care providers. Scores of self-care practice in the study group were significantly improved by the face-to-face self-care management program compared to the control group. However, in the study group scores of self-care practice four weeks after the re-enforcement education didn't have any significant differences from those a week after the face-to-face education. Previous studies of hemodialysis patients also found that a 4-week education program improved self-care practice at the 2nd or 4th week after the program

The authors of study done in (2014) hypothesized that more frequent face-to-face visits with physicians and advanced practitioners, which current Medicare incentives encourage, lead to more procedures aimed at preserving arteriovenous (AV) fistulas and grafts, improved access survival, and fewer access-related hospitalizations. This study suggests that the first 90 days of hemodialysis may be another period during which nephrologist or advanced practitioner visits can be particularly beneficial *Erickson et al. (2014a)*.(30)

Conclusion:

Based on the findings of the present study the following can be concluded that:

1. Majority of both study and control groups have poor knowledge in all investigated domains pre test.
2. Knowledge of the study group about AVF improved significantly after health educational guideline implementation (post test), where $P \leq 0.001$. on the other hand there is no

improvement of the knowledge of the control group about AVF post test, where $P = 1.000$

3. Majority of control group had most AVF complications, while minor of the study group experienced AVF complication.
4. Majorities of the control group had signs and symptoms of unhealthy fistula post test & about one third of them had signs and symptoms of fistula failure. While the majorities of the study group had signs and symptoms of healthy fistula following the educational guideline implementation, which indicated the effectiveness of this educational guideline to decrease these kinds of complications.

In the light of the findings of the present study, the following recommendations are suggested:

1. All patients scheduled for AVF procedure and their families need adequate knowledge and skills to help them to adapt with their life post-operative.
2. Distributing the designed health education booklet to all patients undergoing AVF.
3. Establishment of a web site that includes all information related to AVF procedure and hemodialysis process and all aspects of health education that involve different educational materials, medias and audio-visual aids.
4. Orienting health team personnel about the importance of health education provided to patients undergoing AVF
5. Patient's knowledge should be assessed by nurses constantly and progressively.
6. Designing educational programs and investigating the clients before leaving the hospitals to ensure that such a basic need is fulfilled and patients have received the needed self-care programs.
7. Continuous educational program for nurses about preoperative preparation and post-operative changes related to AVF help in increasing patients' knowledge and practice.
8. Replication of the research on larger probability sample and various setting in Egypt to examine the effectiveness of educational program for patients undergoing arteriovenous fistula to understand their condition and to promote self-care level.

Conflict of interest:

The authors declare that they have no conflict of interests.

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