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Application of self-care instruction planned program for patients with double lumen catheter at hemodialysis units

Salam Salah Flayyih
Academic Nurse, BSN, MSc, student at University of Baghdad, College of Nursing, Baghdad, Iraq
*Corresponding author email: sallam.salah1202b@conursing.uobaghdad.edu.iq
https://orcid.org/0000-0003-0721-1954

Widad K. Mohammed
Prof. Dr, Department of Adult Health Nursing, University of Baghdad, College of Nursing, Baghdad, Iraq

***Abstract*---**Identify the effectiveness of Self-Care Instruction Planned Program for Patients with Double Lumen Catheter at Hemodialysis Units. To obtain the study goals a quasi-experimental (non-randomized) design was used. Descriptive studies are conducted to describe the distribution of variables, provide information about health status, behavior, attitudes and characteristics of a specific population. The study concluded that before the application of the Instructional Planned Program on hemodialysis patients the study they had an unsatisfactory level of knowledge concerning self-care with double-lumen catheters in the study and control sample.

***Keywords*---**self-care, program, patients, double lumen catheter, hemodialysis units.

Introduction

Chronic kidney disease (CKD) is the 12th death cause globally, which in 2017 resulted in one million deaths, with the expectation to rise to 2.2 million in 2040 (Foreman et al., 2018; Kyu et al., 2018). A hemodialysis (HD) is a treatment option for patients with CKD who reach glomerular filtration rate (GFR), 30ml/min/1.73 m2 (stage 4). Indications for commencing maintenance dialysis include the evaluation of uremia signs and symptoms, protein-energy wasting, metabolic abnormalities, and kidney function. Short, frequent hemodialysis three times weekly is recommended after considering patient preferences, risks of therapy, and potential quality-of-life benefits. Education about treatment options

for patients and family members is needed (Daugirdas et al., 2015). Several elements are required in hemodialysis. One of them is vascular access (De Jesus-Silva, 2020). Patients with end-stage renal disease (ESRD) requires urgent start access. An arteriovenous fistula (AVF) or arteriovenous graft (AVG) implantation needs time to maturate. So, immediate hemodialysis access should be simple, without delay available for use, and have minimal complications within few next days or weeks. Central venous catheters (CVCs) are preferred in acute and chronic hemodialysis treatment, which provide immediate access to blood vessels in urgent cases needed for renal replacement therapy (RRT). A catheter insertion procedure can be performed bedside in the emergency room. The catheter is removed once the fistula or graft can be functionally used (Pinto et al, 2018). Hemodialysis catheters are the most essential devices utilized in the treatment of ESRD patients. These devices are associated with a high risk of morbidity and mortality. Long-term use (mean duration is 20.6 days) is an important factor of catheter-related infection development. Double lumen catheter (DLC) use is associated with more deaths compared with fistula use (Ravani et al., 2013; Shoaib et al., 2021). The two types of CVCs are temporary catheters (made of polyurethane), which have a length of 16–20 cm and have swan-neck-shaped ends). And permanent tunneled catheters (made of silicon). The varying lengths can be used according to the patient's body size (19, 23, or 28 cm). The nephrologists use ultrasound equipment to insert the DLC into the right internal jugular vein for first-time dialysis session patients, and into the left jugular vein if a thrombus or stenosis formed from previous insertion (Aydin et al., 2012; De Jesus-Silva et al., 2020). The large veins that ensure sufficient blood flow (jugular internal, subclavian, and femoral vein) are preferred for all patients needing urgent hemodialysis (Misanovic et al., 2015; Yang et al., 2018).

Method

Design of the study

To obtain the study goals a quasi-experimental (non-randomized) design was used. Descriptive studies are conducted to describe the distribution of variables, provide information about health status, behavior, attitudes and characteristics of a specific population

Ethical Consideration

One of the basic principles for protecting the participant's beliefs and dignity before gathering data is the ethical considerations. The researcher obtained written informed approval from each participant patient after inform them that their participation in this study is voluntary, and also assured them that he will safeguard the confidentiality of the data and they will be securely maintained during and after conducting the study according to the subject's agreement sheet. Prior to performing the research, a researcher requested permission from the supervisor to send an introduction letter to the administrators of the selected participants at the place where the study was done. The researcher assured all participants that their identities would not be exposed in order to increase their confidence. The researcher requested respondents' informed permission and

protected their rights. The researcher adhered to research ethics and verified that respondents were not harmed.

The setting of the study

The study was conducted at Imam AL-Sadiq Teaching Hospital, hemodialysis unit, and the Medical City of Marjan, artificial kidney center. These hospitals were chosen by the researcher because they are the only teaching hospitals that have a hemodialysis unit in Al-Hilla city.

The purposive sampling method was used in the current study

A non-probability (purposive) sample based on population characteristics and study objectives was used to obtain representative and accurate data. Two groups (control and interventional group) are used in this study, (10) patient has been excluded for the pilot study. So, the total number of hemodialysis patients participating in this study was 40 patients for each group, with a total sample size of 90 patients. After obtaining the official approval from all the aforementioned parties, including: the College of Nursing, University of Baghdad; the Babylon Health Directorate; and the targeted hospitals, the researcher started by conducting a pilot study.

Inclusion Criteria

All patients on hemodialysis sessions who used double lumen catheters as vascular access and were older than 18 years are included in this study. Voluntarily, all study patients agreed to participate in the study

Exclusion Criteria

Hemodialysis patients with arterio-venous (AV) fistula and graft, illiterate patients, and who refuse to participate in the study are excluded.

Data collection

The data collection started from 1th March to 30th April, 2022. A Pre-test for knowledge of double lumen catheter patients was completed before applying educational program. The time required to answer the questionnaire test (10-15) minutes. A post-test for patients with double lumen catheters in the interventional group after applying an educational program has been done.

Result

Table 1
Distribution of hemodialysis patients Socio-Demographic Characteristics for Study & Comparison groups

Socio-Demographic Characteristics	Study group		Comparison group	
	Freq.	%	*Freq.*	%
Age groups				

18-27	1	2.5	0	0
28-37	6	15	6	15
38-47	13	32.5	11	27.5
48 and more	20	50	23	57.5
Total	40	100	40	100
$\bar{x} \mp SD$	48.28 + 10.2		49.78 + 10.4	
Gender				
Male	27	67.5	29	72.5
Female	13	32.5	11	27.5
total	40	100	40	100
Level of education				
Primary	25	62.5	28	70
Secondary	10	25	10	25
Academic	5	12.5	2	5
total	40	100	40	100
Marital status				
Single	1	2.5	0	0
married	38	95	40	100
widowed	1	2.5	0	0
Total	40	100	40	100
Self-care information				
Yes	24	60	22	55
No	16	40	18	45
Total	40	100	40	100
Social media				
Yes	8	20	4	10
No	32	80	36	90
Total	40	100	40	100
Nursing staff				
Yes	14	35	6	15
No	26	65	34	85
Total	40	100	40	100
Medical staff				
Yes	2	5	2	5
No	38	95	38	95
Total	40	100	40	100
Other patients				
Yes	6	15	11	27.5
No	34	85	29	72.5
Total	40	100	40	100
Economic status (income)				
Less than 300.000 IQD	23	57.5	20	50
301.000 – 600.000 IQD	13	32.5	17	42.5
601.000 – 900.000 IQD	4	10	3	7.5
Total	40	100	40	100

Note. Freq.= frequency, % = percentage, $\bar{x} \mp SD$ = arithmetic Mean ($\bar{x}$) and Standard Deviation (S.D.)

Table (1) presented that 50 percent of the study group and 57.5 percent of the comparison group were within age group 48 years and more. Moreover, 67.5

percent of the study group and 72.5 percent of the comparison group were males. In relation to the education level, 62.5 percent of the study group and 70 percent of the comparison group were within primary school stage. In addition, 95 percent of the study group and 100 percent of the comparison group were married. Approximately, the same percent of the study group and the comparison group have self-care information, in which the study group get their information 20 percent from social media, 35 percent from nurses, five percent from medical staff and 15 percent from other patients. Finally, 57.5 percent of the study group and 50 percent of the comparison group were within low monthly income (less than 300.000 IQD).

Table 2
Comparison between patients pre and post-test knowledge score of the items for the study group

Items	Pre-test				Post-test			
	F				F			
	False	True	Total MS	Assessment	False	True	Total MS	Assessment
1) Double lumen catheter is used as a device	10	30	1.75	H	7	33	1.82	H
2) A double lumen catheter is inserted using a	0	40	2	H	0	40	2	H
3) A double-lumen catheter is inserted into a vein, except	32	8	1.2	L	35	5	1.12	L
4) The physician who responsible for inserting and installing the double-lumen catheter is	5	35	1.88	H	1	39	1.97	H
5) The double-lumen catheter is removed in certain cases, except	37	3	1.08	L	27	13	1.32	L
6) Duration of double lumen catheterization	19	21	1.53	M	11	29	1.72	H
7) All the risks of double-lumen catheters below are assumed to be correct, except	12	28	1.7	H	8	32	1.8	H
8) signs and Symptoms of the double lumen catheter inflammation	28	12	1.3	L	27	13	1.32	L
9) measures are taken When an infection occurs of the double lumen catheter	7	33	1.83	H	2	38	1.95	H
10) Dangerous sleep	29	11	1.28	L	12	28	1.7	H

positions when using a double-lumen catheter									
11) measures taken if the double lumen catheter dressing gets wet	30	10	1.25	L	20	20	1.5	M	
15) The purposes of a double lumen catheter	2	38	1.95	H	4	36	1.9	H	

Items	N	S	U	Total MS	Assessment	N	S	U	Total MS	Assessment
12) handwash before touching the catheter	3	14	23	2.5	H	0	1	39	2.97	H
13) wear clean clothes	3	9	28	2.63	H	1	39	0	2.95	H
14) sleep sheets change	5	7	28	2.58	H	1	39	0	2.95	H
16) Wear clothes and accessories carefully	8	23	9	2.03	M	2	11	27	2.62	H
17) Take the prescribed treatment to prevent complications	5	28	7	2.05	M	1	7	32	2.77	H
18) The double-lumen catheter insertion site monitoring	6	13	21	2.38	H	1	7	32	2.77	H

Comparison between patients pre and post-test knowledge score of the items for the study group.
Note. Assessment levels for two-point Likert scale: L= Low (1 – 1.33), M= Moderate (1.34 – 1.66), H= High (1.67 – 2).
Assessment levels for three-point Likert scale: L= Low (1 – 1.66), M= Moderate (1.67 – 2.33), H= High (2.34 - 3) (items: 12, 13, 14, 16, 17, 18). (N = never, S = sometimes, U = usually)

Table (2) presented shift in mean score of the study group from pretest to post test score, which reflects an improvement in their knowledge toward study objects.

Table 3
Comparison between patients pre and post-test knowledge score of the items for the comparison group

Items	Pre-test					Post-test				
	F					F				

	False	True			False	True		
1) Double lumen catheter is used as a device	14	26	1.65	M	12	28	1.7	H
2) A double lumen catheter is inserted using a	0	40	2	H	0	40	2	H
3) A double-lumen catheter is inserted into a vein, except	29	11	1.28	L	31	9	1.23	L
4) The physician who responsible for inserting and installing the double-lumen catheter is	8	32	1.8	H	8	32	1.8	H
5) The double-lumen catheter is removed in certain cases, except	39	1	1.03	L	31	9	1.23	L
6) Duration of double lumen catheterization	18	22	1.55	M	18	22	1.55	M
7) All the risks of double-lumen catheters below are assumed to be correct, except	9	31	1.78	H	10	30	1.75	H
8) signs and Symptoms of the double lumen catheter inflammation	29	11	1.28	L	31	9	1.23	L
9) measures are taken When an infection occurs of the double lumen catheter	7	33	1.82	H	5	35	1.88	H
10) Dangerous sleep positions when using a	31	9	1.22	L	27	13	1.33	L

double-lumen catheter									
11) measures taken if the double lumen catheter dressing gets wet	32	8	1.2	L	22	18	1.45	M	
15) The purposes of a double lumen catheter	1	39	1.97	H	1	39	1.97	H	

Items	N	S	U	Total MS	Assessment	N	S	U	Total MS	Assessment
12) hand wash before touching the catheter	6	19	15	2.22	M	2	19	19	2.42	H
13) wear clean clothes	7	11	22	2.37	H	5	13	22	2.42	H
14) sleep sheets change	9	13	18	2.22	M	9	11	20	2.27	M
16) Wear clothes and accessories carefully	13	19	8	1.87	M	3	22	15	2.3	M
17) Take the prescribed treatment to prevent complications	5	27	8	2.07	M	3	30	7	2.1	M
18) The double-lumen catheter insertion site monitoring	9	15	16	2.17	M	7	14	19	2.3	M

Note. assessment levels for two-point Likert scale: L= Low (1 – 1.33), M= Moderate (1.34 – 1.66), H= High (1.67 – 2).
Assessment levels for three-point Likert scale: L= Low (1 – 1.66), M= Moderate (1.67 – 2.33), H= High (2.34 - 3) (items: 12, 13, 14, 16, 17, 18). (N = never, S = sometimes, U = usually)

Table (3.) presented that there was no shift in mean score of the comparison group from pretest to post test score.

Table 4
Comparison significant of pre and post-test knowledge score for the comparison group

Total score of knowledge	N	Pre-control			Post-control			t	P-value	Sig.
		M.	SD	df	M.	SD	df			
Pre and post test	40	2.08	.453	39	1.87	.334	39	2.45	.656	N.S

N= number, M= mean, SD= standard deviation, df= degree of freedom, t= t test, NS=non-significant at P > 0.05

Table (4) presented that there was no significant difference between the knowledge of the comparison group within the pre- control and post- control level at (P = .656).

Table 5
Comparison significant of pre and post-test knowledge score for the study group

Total score of knowledge	N	Pretest			Post-test			t	P-value	Sig.
		M.	SD	df	M.	SD	df			
Pre and post- test of the study group	40	2.12	.463	39	2.67	.474	39	6.29	.000	H.S

N= number, M= mean, SD= standard deviation, df= degree of freedom, t= t.test, H.S=highly significant at P =.000

Table (5) presented that there was a highly significant difference between the knowledge of the study group at both the pretest and post-test level at (P = .000).

Table 6
Comparison significant of pre-test of the study and comparison groups

Total score of knowledge	N	Pre-test study group			Pre-test comparison group			t	P-value	Sig.
		M.	SD	df	M.	SD	df			
Pre- test of the study and comparison groups	40	2.12	.463	39	2.08	.453	39	.35	.728	N.S

N= number, M= mean, SD= standard deviation, df= degree of freedom, t= t.test, NS=non-significant at P > 0.05

Table (6) presented that there was no significant difference between the knowledge of both the study group and comparison group within the pretest level at (P = .728).

Table 7
Comparison significant of post-test of the study and comparison groups

Total score of knowledge	N	Post-test study group	Post-test comparison	t	P-value	Sig.

		group								
		M.	SD	df	M.	SD	df			
Post - test of the study and comparison groups	40	2.67	.474	39	1.87	.33	39	8.97	.000	H.S

N= number, M= mean, SD= standard deviation, df= degree of freedom, t= t.test, H.S=highly significant at P = .000

Table (7) presented that there was a highly significant difference between the knowledge of both the study group and comparison group within the post-test level at (P = .000).

Discussion

Discussion of Socio-Demographic Characteristics of the Sample

According to the study findings in Table (1), half of the participants in the study groups and more than half of the control study sample were 40 years of age or older. These findings indicate that people aged 48 and up are more likely to develop renal disease and its consequences, necessitating hemodialysis. Studies have shown the same percentages in these age groups (Hussein & Ahmed, 2020; AL-Abedi et al., 2020). In terms of gender, the finding show that males composed more than half of the study groups and less than three-quarters of the control study participants. In a similar manner, similar studies have revealed that more than half of the hemodialysis patients studied are male (Fadlalmola & Elkareem, 2020; Gunes, et al., 2020; Hamza et al., 2022; Lazarus, 2019; Sadir Ali, 2021; Sharif, et al., 2017).

According to the findings, more than half of the sample in the study group and less than three-quarters of the patients in the comparison group had a primary School graduate. Hemodialysis patients in the same geographic region of study have a high percentage of illiteracy or those who can read and write and have only a primary level of education (Dias et al., 2017; Lazarus, 2019; Sadir Ali, 2021; Sharif et al., 2017). Patients in the study group and more than half of those in the comparison group had self-care information. They received their information as percentages from nursing staff, social media, other patients, and medical staff (35, 20, 15, and 5%). In contrast, research showed that the majority of hemodialysis patients receive proper self-care knowledge, with physicians acting as the primary source of this information (Sadir Ali, 2021). Finally, more than half and half of the study and comparison group were both in the low monthly income class (less than 300.000 IQD). This contrasts with the findings of previous research, which showed that more than half of hemodialysis patients had an adequate or middle-class income (Gunes et al., 2020; Hamza et al., 2022; Lazarus, 2019; Sadir Ali, 2021; Sharif et al., 2017).

Discussion of pre and post-test knowledge scores for both study and comparison groups

According to study results in Tables (2), and (3), after the application of instructional folder related to patients' self-care with double lumen catheter, the participants' knowledge of double lumen catheter (DLC) self-care was moderate based on two-point Likert scale scores and high based on three-point Likert scale scores, as shown in Table (4). The post-test for the same group of patients demonstrated a small increase in their knowledge. Nevertheless, a considerable improvement in patients' DLC self-care knowledge is evident when compared to the pre- and post-test scores of the comparison group in Table (5). The outcome suggests that the proposed application of instructional folder had a favorable influence on the patients' knowledge after being applied. The results of a study to assess the effectiveness of a self-instructional module for hemodialysis patients for knowledge regarding homecare management at Kollam, showed that 10 percent of patients obtained ordinary knowledge after completing the self-instructional module, 63.33 percent obtained good information, and 26.67 percent obtained exceptional knowledge, according to the results of the post-test. Analyses indicate that post-test knowledge scores have significantly increased (Thomas et al., 2019).

Conclusion

This study shows that before the application of the Instructional Planned Program on hemodialysis patients the study they had an unsatisfactory level of knowledge concerning self-care with double-lumen catheters in the study and control sample. In total, 75 percent (study sample) and 82.5 percent (comparison sample) began kidney failure within less than one year. In addition, 87.5 percent (study sample) and 95 percent (comparison sample) began hemodialysis within less than one year. 72.5 percent (study sample) and 80 percent (comparison sample) suffered from diabetes mellitus. while hypertension, 80 percent (study sample) and 72.5 percent (comparison sample). All study samples did not have myocardial infarction. While 10 percent (study sample) and five percent (comparison sample) have angina. In addition, 7.5 percent (study sample) and 12.5 percent (comparison sample) have heart failure. A statistically significant difference among pre-test and post-test for the study sample at $p < 0.05$ has been found, indicating the effect of the instructional planned program between the two periods (pre and post-test) on hemodialysis patients' knowledge concerning self-care with double lumen catheter in hemodialysis units

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