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RESEARCH ARTICLE

EFFECT OF EDUCATIONAL PACKAGE RELATED TO CONTINUOUS PERITONEAL DIALYSIS ON NURSES' PERFORMANCE

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Abstract

Background: Peritoneal dialysis (PD)is a therapy that individuals with end-stage kidney disease can receive treatment at home. PD is a feasible, effective and an important form of kidney replacement therapy. Nurses managing PD patients should have basic and understanding of PD.
Aim: This study aimedto evaluate effect of educational packagerelated to continuous peritoneal dialysis on nurses' performance.
Methods: Quasi-experimental study design was utilized in this study and conducted at dialysis unit in MineatELnaser Central Hospital, DakahliaGovernate, Egypt, including all available nurses (80) who provide direct care for patients use continuous peritoneal dialysis. Data were collected using two tools:
ToolI: Structured interview questionnaire sheet include demographicd ata& nurses knowledge about continuous peritoneal dialysis.
ToolII:Observational checklist related to continuous peritonealdialysis.
Result: There was a highly statistically significanceimprovement in overall nurses' knowledge and practice levels immediately post and after three months of educational program (P value <0.001*).
Conclusion: Application of educational program regarding continuous peritoneal dialysis has a positive improvement on nurses' knowledge and practice.
Recommendation:This study recommended that continuous education al programs in regular basis and peritoneal dialysis courses are essential for nurses to improve their knowledge and practice while working with peritoneal dialysis patients and attain excellent care quality.

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Introduction:-

Chronic renal failure defined as a state of progressive loss of kidney function evidence of kidney damage more than three months characterized by urine albumin more than 30 mg, high creatinine, hematuria or parenchymal abnormalities and/ or decreased kidney function (glomerular rate less than 60 ml/ min) ultimately requiring renal replacement treatment like dialysis (hemodialysis or peritoneal dialysis) or transplantation (Chen, Knicely&Grams, 2019; Mahajan et al, 2020; Ferri, 2024). Peritoneal dialysis is used for renal replacement therapy in over 200,000 patients all over the world. The frequency of ambulatory continuous peritoneal dialysis in Egypt is 0.29/million population in 2017 (Bello et al, 2019; Hassan et al, 2020; Johnston, Jin& Morris, 2023).

Peritoneal dialysis is an alternative procedure that can be used to remove waste products or toxins that have accumulated; it filters fluid, waste, and chemicals using the peritoneum, the semipermeable membrane that lines the belly. The dialysate's composition is comparable to that of normal plasma, but dextrose makes it hypertonic. A catheter is a thin, soft plastic tube that is surgically inserted through the abdomen into the peritoneal cavity is used to inject and drain the dialysate from the abdominal cavity. There are two ways of peritoneal dialysis manually (continuous ambulatory CAPD) or machine-assisted PD (automated PD)(Wang, 2023; Gliki&Tavares, 2024).

In continuous ambulatory PD (CAPD) the dialysis solution is constantly infused into the peritoneal cavity and changed four times daily at intervals of four to six hours. Through a system of two bags connected by a transfer set to the catheter, this transition is done manually and occurs as a result of gravity. CAPD involves three stages of each exchanges are dwell, fill and drain. Continuous ambulatory PD should be carried out daily at home by the patient or caregiver; there is more independence from nurses and medical personnel as well as more ability to travel(Teitelbaum, 2021; Li et al, 2023).

Peritoneal dialysis nurses are the owner of the peritoneal dialysis training program for patients. The competent patient will have received training on measures to decrease infection and avoid further problems associated with CAPD. In their home or another suitable setting, patients are taught to use the PD technique by skilled PD nurses who have been trained to attach these bags to the catheter using the sterile procedure (Konlan& Shin, 2022; Heather&Golino, 2024).

Implementing safe procedures has been the main emphasis of patient safety; healthcare organizations need to achieve a high level of safety. Having a broad range of nursing practices, including management, clinics, and teaching, is crucial. As a result, nurses are now acknowledged as essential members of the quality care team, and their work plays a key role in enhancing patient safety within the healthcare system (Heather&Golino, 2024).

Significance of the study:

Nurses have a gap of knowledge and practice about CAPD. In addition, patients potential for many problems such as leakage, peritonitis and catheter failure. So, equally important, nurses should undergo theoretical and practical training and re-training programs and receive encouragement and support to consider peritoneal dialysis treatment as an important and possible first modality option for treatment of end stage renal disease patient(Malaysian Society of Nephrology in collaboration with the Medical Services Unit, 2020).

Aim of the study:

This study aimed to evaluate effect of educational package related to continuous peritoneal dialysis on nurses' performance.

Research hypothesis:

H_1: Nurses' knowledge level will improve after implementation of educational package related to continuous peritoneal dialysis.

H_2: Nurses' practice level will improve after implementation of educational package related to continuous peritoneal dialysis.

Methods:

Study design:

Quasi experimental research design was utilized in this study.

Study settings:

This study was conducted at dialysis unit in MineatELnaser Central Hospital, DakahliaGovernate, Egypt.

Study Subjects:

All convenient nurses (80) who work directly with patients during the study period in dialysis unit andagreed to take part in the study and confirmed their consent.

Ethical considerations:

The study received ethical approval from Mansoura University's Faculty of Nursing's Scientific Research Ethics Committee (Reference number: 331/2023). Before any data was collected, all subjects gave their oral consent. The study's goals were properly explained to the nurses, and they received assurances that their answers and personal information would be kept private. The research allowed nurses to withdraw at any period without facing any repercussions because participation was entirely voluntary.

Tools of data collection:

Tool I: Structured interview questionnaire sheet:

It was developed by the researcher following ananalysis of current relevant literature (Hassan et al, 2020;Ito &Masataka, 2021;Kunin&Beckerman, 2022; Nourse et al, 2021; Teitelbaum, 2021)and was divided into two parts.

Part 1: represents demographic data about nurses, including years of experience, occupation, education level, age, and sex.

Part 2: representsnurses' knowledge related continuous peritoneal dialysis such as definition, types, indications, contraindications, complications, basic cycle of PD, types of PD catheter, method of catheter insertion, components of dialysate fluid, frequency of exchange / day, equipment needed, steps of exchange, amount of fluid/ exchange, how to connect bags for dialysis with catheter, indicators for doctor visit, nutritional instructions and instructions during applied dialysis at home… etc)

Scoring system:

Every question had a zero for a wrong and a one for a right. After being converted to a percentage, the overall score for continuous peritoneal dialysis was divided into two categories: satisfactory level of knowledge ≥ 60% equal and unsatisfactory level of knowledge < 60% equal.

Tool II: Observational checklist:

This tool will be adopted from (AACN Procedure Manual for High Acuity, Progressive, and Critical Care, 2016). Which developed by American Association of Critical Care Nurses **(Astle, 2016).**To

evaluate the nurses' practice related continuous peritoneal dialysis. This contains three parts which included (87) steps divided as:

Part I: Before peritoneal dialysis procedure (preparation) checklist…..10 steps.

Part II: During peritoneal dialysis procedure checklist…….....60 steps. This divided into5sections as the following: peritoneal dialysis initiation (14 steps) followed by drain cycle (10 steps), instillation cycle (10 steps), discontinuation of peritoneal dialysis (11 steps) and finally catheter exit site care (15steps).

Part III: After peritoneal dialysis procedure checklist……..17 steps. This included patient monitoring, care & documentation (12 steps) and Patient & Family Education (5 steps).

Scoring system:

There were two points in the scoring system: one for done and zero for not done. As a result, the reported nurses' practices were scored so that the incompetent level of practice was ≤60% and the competentlevel of practice was ≥60%.

Validity and Reliability of the tools:

A team of five medical-surgical nursing professionals served as a jury to evaluate the research instruments' validity, including their content validity, completeness, practicality, and item clarity. As a result, all required adjustments were made. Reliability was measured to estimate whether all items on the study instruments measure the same variable, and how well the items used together are conceptually consistent. Reliability was tested by using Cronbach,s Coefficient Alpha test.

Pilot study:

To examine the feasibility, objectivity, clarity, and applicability of the study instruments, as well as to identify potential challenges during the study's implementation and estimate the time required for data collection, a pilot study was conducted on 10% (8 nurses) of the study sample. Due to the limited number of nurses in the dialysis unit and to support the study's findings, the pilot sample was incorporated into the main study sample.

Field work:

The study's framework was carried in four stages, which are as follows:

Phase I: Assessment phase:

In order to gain the nurses' cooperation and verbal agreement, the researcher presented herself and briefly clarified the purpose of the study. Researcher interviewed each nurse in order to get baseline data used Tool I part (1). The researcher evaluated nurses' knowledge about continuous peritoneal dialysisthrough tool I part (2) and then assessed their practice about continuous peritoneal dialysisfor patients in dialysis unit through tool II. This pretest was completed to assess the level of knowledge and practices of the studied group who caring for patients with peritoneal dialysis before implementation of educational package. This phase took one month (September 2023).

Phase II: planning phase:

The researcher evaluated the study group's educational needs in relation to continuous peritoneal dialysis based on the previous stage. Then, with the supervisors' help, the researcher conducted a literature study and an online search for relevant information to create the educational materials. Through educational booklets, the primary goal was to enhance nurses' understanding and proficiency in continuous peritoneal dialysis. One such booklet was a straightforward, colored Arabic booklet with illustrations that illustrated each step of the process.

Phase III: Implementation phase:

The educational package was sent to the peritoneal dialysis unit's nursing room. The program was implemented during the nurses' regular working hours. The subjects were split up into 16 groups, with 5 nurses in each group based on the total number of members (80). The program consisted of five sessions, which were given to each group over the course of two weeks. Each session lasted thirty minutes in the nursing room, and some of the groups met throughout the morning, afternoon, and night shifts. From the beginning of October 2023 to April 2024, it took seven months.

Phase IV: Evaluation phase:

The researcher evaluate nurses' knowledge and practice using (part 2) in tool I and tool II immediately after implementing educational package from second week of October 2023 to the first week of May 2024 to compare the result (posttest result) with pretest result to determine the effect of the educational package on nurses' knowledge and practice. Then, after 3 months of starting the program the researcher started to evaluate nurses' knowledge and practice using (part 2) in tools I and tool II from second week of January 2024 to first week of August 2024 to compare the result (follow test) with pretest & posttest after implementing educational package.

Statistical analysis

After data collection, IBM-SPSS software (version 21.0) will be used for data entry, processing, and analysis. Count and percent were used to express the qualitative data. Using the Kolmogorov-Smirnov and Shapiro-Wilk tests, quantitative data were first examined for normality; if p>0.050, the data were considered normally distributed. If the quantitative data were regularly distributed, they were expressed as mean ± standard deviation (SD); if not, they were expressed as median and interquartile range (IQR).

Results:

Table (1)describes the distribution of the nurses according to their demographic characteristics. The table shows that the all (100%) of nurses were females, slightly more than three quarters (78،8%) of nurses at the age group 20- 30 years old. Furthermore, more than half (62،5%) of the nurses reported that they didn't received any training regarding continuous peritoneal dialysis, slightly less than two third (61،3%) of the nurses had nursing institute, while only around one third (30%) had bachelor degree in nursing. Finally, the all (100%) of nurses have less than 5 year experience.

Table (1): Distribution of studied nurses according to their demographic characteristics (N = 80 nurses).

Demographic data	Studied nurses (n = 80)	
	No	%
Sex		
Female	80	100
Male	0	0
Age		
20<30	63	78،8
30<40	13	16،3
40<50	4	5
Education level		
Secondary nursing school	7	8،8
Nursing institute	49	61،3
Bachelor of nursing	24	30،0
Years of Experience		
<5	62	77،5
5 <10	8	10،0
10<15	6	7،5
15 & more	4	5،0
Experience years in peritoneal dialysis unit		
<5	80	100،0
Training courses (Workshops attendance)		
yes	30	37،5
no	50	62،5
If yes, how many workshops attended? How many workshops attend (n=30)		

one	27	90
two	3	10

Figure (1) represents that distribution of studied nurses related to overall knowledge about continuous ambulatory peritoneal dialysis. The majority (88.8%) of the studied nurses had unsatisfactory level of overall knowledge about continuous ambulatory peritoneal dialysis pre educational program compared to the all (100%) and the mostly (95%) of the studied nurses had satisfactory level of overall knowledge about continuous ambulatory peritoneal dialysis post and follow up of educational program respectively. There was highly statistically improvement in nurses' knowledge levels post & follow up after 3 months of educational program (P value <0.001*).

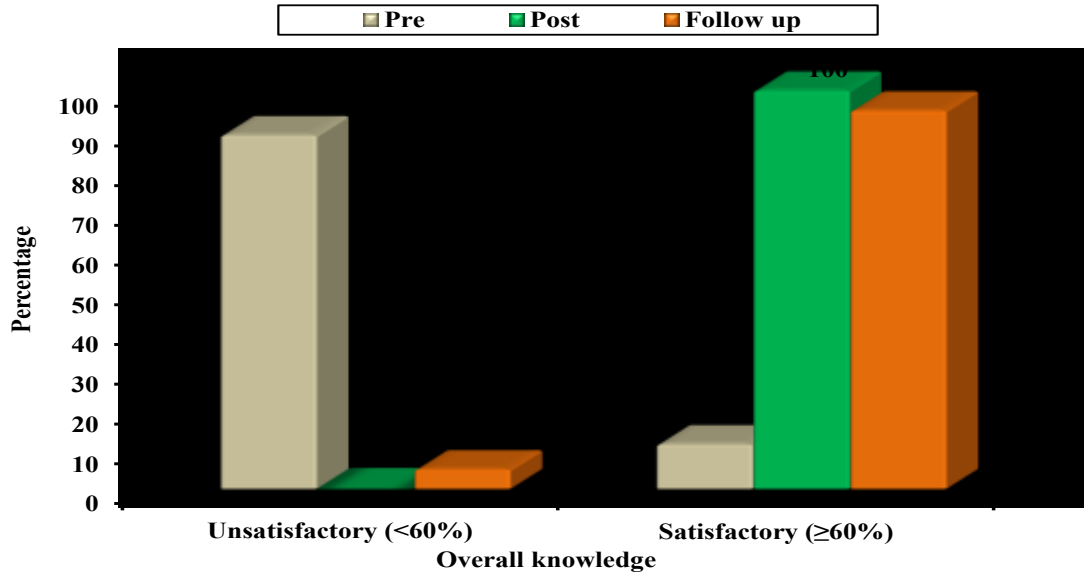

Figure (1): Distribution of the studied nurses according to overall nurses' knowledge about continuous ambulatory peritoneal (N = 80).

Figure (2):show that the distribution of nurses according to overall practice for continuous peritoneal dialysis. All (100%) of the studied nurses had incompetent level of overall practice pre educational program compared to all (100%) & the majority (80%) of the studied nurses had competent level of overall practice post immediately and follow up after 3 months of educational program respectively.

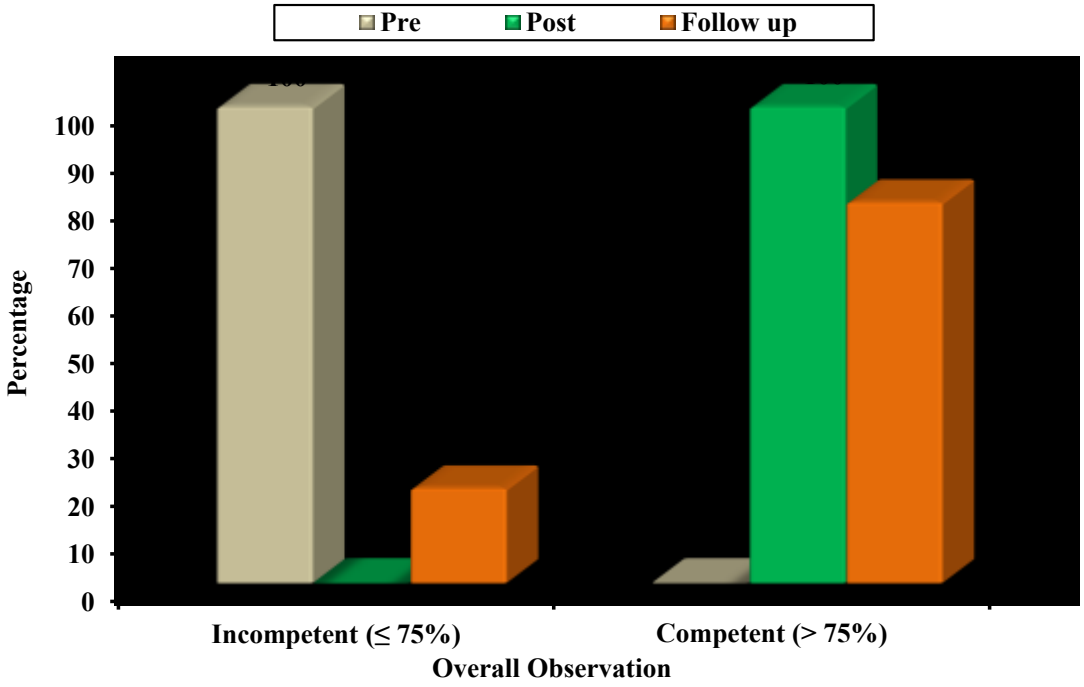

Figure (2): Distribution of the studied nurses according to overall practiceregarding continuous peritoneal dialysis (N= 80).

Table (2) show that there was positive statistically significant association between overall knowledge and overall practice at pre, post and follow up of educational program (P <0.001*, 0.045* &<0.001*) respectively.

Table (2): Correlation between overall knowledge and overall practice (N = 80).

Items		**Overall knowledge**		
		Pre	Post	Follow up
Overall practice	r	0.617*	0.225*	0.655*
	p	<0.001*	0.045*	<0.001*

r: Pearson coefficient

*: Statistically significant at p ≤ 0.05

Table (3) describes that the relation between knowledge and demographic data. Pre educational program, a statistically significant correlation was found between age, education, years of experiencein dialysis unit and workshops attendance items and overall knowledge (<0.001*, <0.001*, <0.001*, 0.036*) respectively. However, post educational program (immediately & after 3 months), there was no statistically significant association between total knowledge and their demographic items except between total knowledge and age after 3 months of educational program (0.016*).

Table (3): Relation between total score for knowledge and demographic data.

Demographic data	N	knowledge		
		Pre	Post	Follow up
		Mean ±SD.	Mean ±SD.	Mean ±SD.
Age (years)				
20 - < 30	63	4.54 ± 6.42	30.79 ± 2.47	27.32 ± 5.14
30 - > 40	13	17.08 ± 6.80	31.62 ± 1.45	31.0 ± 1.91
40 - < 5 0	4	15.50 ± 3.0	32.75 ± 0.50	31.50 ± 3.0
F(p)		24.424* (<0.001*)	1.887 (0.159)	4.374* (0.016*)
Education level				
Secondary nursing school	7	19.57 ± 4.58	31.57 ± 1.13	31.14 ± 2.04
Nursing institute	49	4.76 ± 6.78	30.67 ± 2.54	27.67 ± 5.06
Bachelor of nursing	24	8.38 ± 7.84	31.58 ± 1.98	28.17 ± 5.0
F(p)		14.350*(<0.001*)	1.473 (0.236)	1.553 (0.218)
Years of experience in dialysis unit:				
< 5	62	5.16 ± 7.12	30.76 ± 2.44	27.56 ± 5.23
5 - < 10	8	11.38 ± 8.09	31.88 ± 2.10	29.13 ± 3.52
10 - < 15	6	13.67 ± 7.55	32.67 ± 0.52	32.00 ± 1.55
≥ 15	4	19.50 ± 4.36	31.0 ± 0.82	29.0 ± 2.31
F(p)		8.154*(<0.001*)	1.680 (0.178)	1.715 (0.171)
Workshops attendance				
Yes	30	9.57 ± 7.65	31.03 ± 2.13	27.77 ± 5.33
No	50	5.68 ± 8.04	31.02 ± 2.45	28.34 ± 4.68
t(p)		2.132* (0.036*)	0.025 (0.980)	0.503 (0.616)

SD: Standard deviation F: F for One way ANOVA test t: Student t-test
p: p value for comparison between the studied categories
*: Statistically significant at p ≤ 0.0

Table (4)portrays the relation between total score for practice and demographic data. There was positive statistically significant between total practice and age, educational level, years of experience in dialysis unit and workshops attendance itemspre educational program(<0.001*, <0.001*, <0.001*, 0.002*) respectively. However, there was no statistically significant between total practice and demographic items post & follow up educational program (0.087 & 0.093) respectively.

Table (4): Relation between total score for practice and demographic data.

Demographic data	N	practice		
		Pre	Post	Follow up
		Mean ±SD.	Mean ±SD.	Mean ±SD.
Age (years)				
20 - < 30	63	4.32 ± 11.42	86.22 ± 2.48	77.32 ± 11.89
30 - > 40	13	20.62 ± 17.16	86.54 ± 1.39	84.62 ± 6.65
40 - < 5 0	4	34.25 ± 2.22	87.0 ± 0.0	83.50 ± 7.0
F(p)		18.726* (<0.001*)	0.292 (0.747)	2.717 (0.072)
Education level				

Secondary nursing school	7	29.14 ± 13.31	86.29 ± 1.89	82.86 ± 8.95
Nursing institute	49	5.51 ± 12.62	86.12 ± 2.72	78.08 ± 12.06
Bachelor of nursing	24	8.46 ± 15.0	86.71 ± 1.04	79.13 ± 10.44
F(p)		9.487* (<0.001*)	0.531 (0.590)	0.552 (0.578)
Years of experience in dialysis unit:				
< 5	62	4.42 ± 11.59	86.35 ± 2.26	78.71 ± 11.59
5 - < 10	8	20.50 ± 17.0	85.88 ± 3.18	75.0 ± 12.33
10 - < 15	6	16.50 ± 18.15	86.83 ± 0.41	86.67 ± 0.82
≥ 15	4	35.0 ± 4.55	85.75 ± 2.50	76.25 ± 10.56
F(p)		11.422* (<0.001*)	0.285 (0.836)	1.355 (0.263)
Workshops attendance				
Yes	30	15.80 ± 17.29	85.63 ± 3.22	75.87 ± 12.99
No	50	4.06 ± 11.11	86.72 ± 1.31	80.58 ± 9.90
t(p)		3.330* (0.002*)	1.762 (0.087)	1.712 (0.093)

SD: Standard deviation F: F for One way ANOVA test t: Student t-test
P: p value for comparison between the studied categories *: Statistically significant at p ≤ 0.0

Discussion:

Globally, chronic kidney failure (CKD) ranks as the sixteenthmost common cause of mortality. Chronic kidney disease (CKD) is a significant medical condition and community health concern that costs health care systems worldwide a lot of money. Both the number of dialysis patients and the prevalence of CKD are increasing globally. Renal replacement therapies (RRT) for end-stage renal disease (ESRD) patients are hemodialysis (HD), peritoneal dialysis (PD) and renal transplantation(Filipska, Bohdan, Wieczorek, &Hudz, 2021: Kovesdy, 2022).

Nurses play a vital role as members of the healthcare team in caring for patients undergoing PD treatment, both by performing nursing procedures and by assessing and providing information about their health status, medications, and therapeutic diet (Campos et al, 2019).

The study comprised a total of female nurses, the majority of them aged on second decade, only one-third had advanced degrees, the others had nursing technical institute certificates, and over two-thirds had not participated in any training program related to continuous ambulatory peritoneal dialysis.

Concerning to nurses' knowledgeabout continuous peritoneal dialysis (CAPD), this study revealed that the majority of nurses had unsatisfactory knowledge level about continuous peritoneal dialysis and peritoneal dialysis catheter pre educational program. This may be attributed to recent initiation of continuous peritoneal dialysis, nurses had less years of experience (less than five years), and they had attended fewer courses.

This result is similar toMuhammad, (2023) who reported that the nurses blind to knowledge about CAPD. In contrast with Promjak, Plianbangchan, Somrongthong, and Laohasiriwong, (2021)whoreported that the nurses had average knowledge level of CAPD. This may be related to several factors such as the most of nurses had bachelor degree, many years of experience and more popular use of continuous ambulatory peritoneal dialysis treatment than hemodialysis.

On the other hand the mostly of nurses had satisfactory knowledge level about continuous ambulatory peritoneal dialysis and peritoneal dialysis catheter post immediately and follow up after three months of educational program this findings in agreement with Afzal, Peristiowati, and Widyowati (2024) who concluded that the level of nurses improved after continuous ambulatory peritoneal dialysis training. Also, Elbashir, (2020) who reported that improvement of knowledge of the nurses related to continuous ambulatory peritoneal dialysis after training program. This result emphasizes positive effect of educational program for nurses about continuous ambulatory peritoneal dialysis.

Concerning to nurses' practice about continuous ambulatory peritoneal dialysis, the present study reported that pre educational program the mostly of nurses had incompetent level of practice of continuous ambulatory peritoneal dialysis before, during and after procedure. This result may be due to no familiarity of continuous ambulatory

peritoneal dialysis, not fully aware of all steps of continuous ambulatory peritoneal dialysis, absence of written protocol of continuous ambulatory peritoneal dialysis, unsatisfactory nursing knowledge, failure to attend training courses of continuous ambulatory peritoneal dialysis and increase workload. This result in context with Khalaf, Eweda, ELsayed, Hafez, and Kadhim, (2024) who noticed that the majority of nurses had inadequate practice level. This associated with about one third of nurses attended one previous training session about peritoneal dialysis and the majority of studied nurses are very busy related to shortage of staff.

The result not in context with Promjak et al, (2021) who reported the highest proportion of studied nurses at fair level of continuous ambulatory peritoneal dialysis performance. This related to highly educated nurses with more years of experience and ministry of public health launched the policy on service plan to increase quality of care especially the service plan for chronic kidney disease (CKD).

The present study showed that post immediately of educational program, the mostly of nurses had competent level of practice of continuous ambulatory peritoneal dialysis before, during and after procedure. Additionally, about three quarters of nurses before and after procedure had competent level also; the majority of nurses had competent level during procedure at the period of time at follow up after three months of educational program. This result acquired from knowledge that explained simply and clearly about continuous peritoneal dialysis, used instructional booklet, and used of simple teaching methods and strategies, demonstration and re-demonstration.

This result in accordance with Afzalandand Hardy, (2021) who found improved nurses' competency of practice as result of basic training of CAPD. Also, Promjak et al, (2021)who concluded that most of the nurses had a good level of performance of CAPD care this related to all nurses acquired knowledge on CAPD care on annual training from hospital renal node.

Franco, et al, (2021)who confirmed that training program used in the nursing care of the peritoneal dialysis patient, the best outcomes were obtained in the development of the patient's therapy, enhancing the patient's ability to take care of them and fostering the knowledge and skills necessary to follow the nursing recommendations provided during the training.

The present study showed that there was positive statistically significant correlation between overall knowledge and overall practice at pre, post and follow up of educational program. This result due to sufficient knowledge during program and adherence to recommended steps and protocol. This fact is built on recognizing that nursing knowledge should to be viewed alongside their practices, as well as gaining knowledge apply knowledge through nursing practice.

In this respect Afzalandand Hardy, (2021) who concluded that providing online training can be used as a solution for improving the competency of nurses in continuous ambulatory peritoneal dialysis patient nursing services. This in the same line with Nopsopon et al, (2022)and Khalaf et al, (2024)who stated that the nursing knowledge had been advanced and well-known as a systemic and generalized knowledge base for practice. They added that knowledge was obligatory for nurses to progress practice.

The present study revealed that there was significant relation between nurses' knowledge, their age, educational level, experience years and workshop attendance pre educational program. This result supported by Mohammady, and El-Shahat, (2021)who showed that significant relation between nurses knowledge, age, educational level, years of experience and training courses. In contrast with the result of WaleedandHattab, (2017)who revealed no significantly relation between knowledge, age, gender, years of experience, and academic achievement in nursing and in pediatric medical wards.

Additionally, in the present study post educational program immediately and after three months revealed that there was no statistically significance relation between total knowledge and their demographic items excludingbetween knowledge and age after three months of educational program.On other hand Ezzeldien, (2019)whorevealed that age, gender, educational background, and work history all significantly correlated with knowledge so, it's important to improve knowledge level.

The present study revealed that there was a positive statistically significant between total practice, age, educational level, years of experience in dialysis unit and workshops attendance pre educational program. This result similar as Mohammadyand El- Shahat, (2021)whoshowed that there was a positive association between practice, age, pediatric experience and general experience.This not in accordance withKhalaf et al, (2024)who noted that significant relationship between nursing practice and educational attainment and place of training sessions in peritoneal dialysis.

Conclusion:

This study shows application of educational program regarding continuousambulatory peritoneal dialysis has a positive improvement on nurses' knowledge and practice.

Recommendations

This study recommended that in-service training programs and peritoneal dialysis courses are essential for nurses to improve their knowledge and practice while working with peritoneal dialysis patients and achieve high quality of care.

Limitation of the Study:

Nursing staff workload in the dialysis unit.

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