

Is On-the-job Training Sufficient for Attaining Standard Nursing Care in Peritoneal Dialysis Centers?

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ABSTRACT

Background: Peritoneal dialysis (PD) is an important option for treatment of patients with end stage kidney disease (ESKD). PD is primarily a nursing procedure and needs professionally skilled nurses for optimal performance. The aim of this study was to evaluate the knowledge and competences of nurses working in PD units who had little or no formal prior training courses.

Methods: Forty nurses working in four PD centers in Khartoum, Sudan, for one or more years were enrolled in this study. Nine nurses (22.5%) had structured training courses prior to employment, while 31 of them (77.5%) had no formal training in PD care prior to their employment in the centers, and were trained by apprenticeship to senior nurses. A structured face to face interview questionnaire was used to assess nurses' knowledge, and an observational checklist to observe their practical skills. Instrument validity and reliability were tested by a pilot study on five nurses. Pearson correlation coefficient obtained was ($r = 81$) for the knowledge and ($r = 74$) for the practice. The nurses in the study were divided into four groups, and exposed to educational sessions for knowledge and practical skills at a rate of once per week for six weeks. A post-course assessment of knowledge and skills using the same tools was conducted four weeks after completion of the course. Data was analyzed using paired-sample t-test and 95% C.I. Significance was set at $P < 0.05$.

Results: Nurses' knowledge pertaining to ESKD and management of PD and their practical skills improved significantly in most variables tested after the educational and training intervention. The improvement was much more evident in nurses who had no previous structured training in PD management.

Conclusion: This study shows that PD nurses who had experience in performing PD procedures for more than one year but had no formal training were deficient in many aspects of proper PD nursing care. On the job-training seems to be not enough to give good knowledge and practical skills in nursing management of PD patients.

Keywords

On-the-Job Training, Nurses' competences, Peritoneal dialysis.

Introduction

Peritoneal dialysis (PD) is one of the important options for treatment of patients with end stage kidney disease (ESKD) [1]. Continuous Ambulatory Peritoneal Dialysis (CAPD) is the most common type of PD and is primarily a nursing procedure. It needs professionally skilled nurses for optimal patient training and management. CAPD requires no machine and can be done in any

clean, well-lit place. About 2 to 3 liters of clean dialysis solution is allowed to flow from plastic bags through a soft catheter into the abdominal cavity. It takes 5-10 minutes for the plastic bag to empty. The dialysate fluid is left in the peritoneal cavity for 4 to 6 hours before it is exchanged with a fresh cycle. Between cycles the patient is disconnected from the system and is free to carry out normal activities [2].

CAPD was introduced in Sudan since 2005, and there are several centers in Khartoum that perform this type of therapy for ESKD

patients. CAPD depends heavily on good nursing practice and correct techniques for its success. Many nurses who are practicing CAPD in Sudan do so after on-job training at their centers, and only very few have formal well-designed training courses. This study was performed to assess the knowledge and competences of nurses working in CAPD centers in Khartoum, and to evaluate the value of a structured training program delivered to them by a senior nurse experienced in CAPD training.

Materials and Methods

This is an intervention study pre-test and post-test, conducted to evaluate the effect of a training program for PD care on nurses' knowledge and competences at Khartoum state.

Nurses from four dialysis centers working with CAPD patients were recruited by convenient sampling method. There was a total of 65 nurses in the centers.

Inclusion criteria for participation in the study were: nurses who were university graduates with Bachelor or Master degree in Nursing, who had at least one year experience in PD patient care, and were willing to participate in the study. Forty nurses fulfilled the inclusion criteria. Data collection tools used were structured interview questionnaire close-ended questions to assess knowledge; and an observational check list to assess practical skills. Questionnaire knowledge score specified as correct =1 and incorrect = 0. Check list practical score phrased as, done = 1. Not done = 0. A panel of nephrologists evaluated the questionnaire for content validity. Ethics board permission was obtained from the Ethics Board at the National Ribat University and the administrators of the assigned dialysis centers in Khartoum State.

A pilot test was done for 5 nurses from a neutral dialysis center, the results obtained for reliability by Pearson correlation coefficient scored (81%) for the knowledge and (74%) for the practical skills. All participants were informed of the study procedure, and their written consent was obtained. Base line information was collected for the knowledge and practice in the pre test stage. The nurses were divided into four groups (one group for each PD center).

The training program included lectures and practical training, at a rate of once a week session per group of nurses, for a total of six sessions. Four weeks after completion of the training course the post test data was collected and analyzed using the Statistical Package of Social Sciences (SPSS) version 20. Inferential statistical methods were used (95% CI, paired sample "t" test). Significance level was taken at a P. value <0.05.

Results

The study sample consisted of 40 nurses; 30 of them (75%) were females. Twenty four nurses (60%) held Bachelor degrees in Nursing, while 16 (40%) held Master degree in Nursing. The mean age of the study group was 31 years (range 25 - 44 years). Thirty two nurses (80%) had experience in PD for more than 4 years (Figure 1).

Years of experience

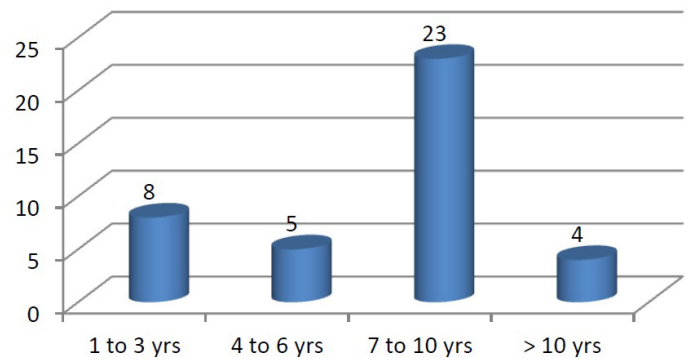


Figure 1: Distribution of the study sample years of experience.

Only 9 nurses (22.5%) had a formal structured training course in PD; while 31 nurses (77.5%) had no formal training course and were attached to senior nurses for training by apprenticeship for variable periods.

The scores obtained for knowledge of definitions of stages of CKD and types of PD equipment prior to and after the intervention are shown in Table 1. There was a significant improvement in the scores obtained for all variables in this group.

Variable	Pretest		Posttest		95% C I		t	P
	Mean	SD	Mean	SD	Lower	Upper		
Stages of kidney disease (CKD)	0.78	0.423	0.95	0.221	-.298	-.052	-2.875	<0.006
Type of PD	0.63	0.490	0.93	0.267	-.465	-.135	-3.674	<0.001
Type of Dialysate	0.58	0.501	0.75	0.439	-.318	-.302	-2.479	<0.018
Dialysis equipment	0.62	0.493	0.79	0.409	-.326	-.033	-2.483	<0.018

Table 1: Distribution of study sample knowledge of definitions related to ESKD/PD prior to and after intervention. n=40, df=39.

The scores obtained for knowledge of clinical assessment of PD prior to and after the intervention are shown in Table 2. There was a significant improvement in the scores obtained for all variables in this group.

Variable	Pretest		Posttest		95% C I		t	P
	Mean	SD	Mean	SD	Lower	Upper		
Diagnosis of Peritonitis	0.78	0.423	0.95	0.221	-.298	-.052	-2.875	<0.006
Advantages of PD	0.63	0.490	0.93	0.267	-.465	-.135	-3.674	<0.001
Disadvantages of PD	0.58	0.501	0.75	0.439	-.318	-.302	-2.479	<0.018
Contraindications of PD	0.62	0.493	0.79	0.409	-.326	-.033	-2.483	<0.018

Table 2: Distribution of study sample knowledge of clinical assessment prior to and after the intervention. n=40, df=39.

The mean score of the overall knowledge rose from 63.83 to 77.10

post the intervention ($P < 0.001$): Table 3.

Variable	Pretest		Posttest		95% C I			P
	Mean	SD	Mean	SD	Lower	Upper	t	
Total Knowledge	63.83	11.542	77.10	6.40	-16.037	-10.51	-9.723	<0.000

Table 3: Distribution of study sample overall knowledge score prior to and after the intervention. $n=40$, $df=39$.

The scores obtained for practical skills for preparing patients and equipment for PD, prior to and after the intervention are shown in Table 4. There was a significant improvement in the scores obtained for most variables in this group. However, skills pertaining to patient preparation for catheter insertion, filling the abdomen and PD connection procedures showed no significant change.

Variable	Pretest		Posttest		95% C I			P
	Mean	SD	Mean	SD	Lower	Upper	t	
Hand Hygiene	0.73	0.452	0.96	.221	-.395	-.055	-2.683	<0.01
Patient preparation	0.83	0.385	1.00	.000	-.298	-.052	-2.876	<0.006
Fluid exchange preparation	0.75	0.439	1.00	.000	-.390	-.110	-3.606	<0.001
preparation for catheter insertion	0.85	0.362	0.93	.267	-.208	.058	-1.138	<0.268
preparation for PD Connection	0.83	0.385	0.90	.304	-.208	.058	-1.138	<0.262
Filling abdomen	0.88	0.336	0.80	.405	-.010	.160	1.776	<0.083

Table 4: Shows practice for preparing patients and equipment for PD, prior to and after the intervention. $n=40$, $df=39$.

The scores obtained for practical skills in steps needed for performing PD, prior to and after the intervention are shown in Table 5. There was a significant improvement in the scores obtained for most variables in this group.

Variable	Pretest		Posttest		95% C I			P
	Mean	SD	Mean	SD	Lower	Upper	t	
Fluid drain	0.98	0.158	0.85	0.362	-.018	-.232	2.360	<0.023
Catheter flushing	0.73	0.452	0.96	0.221	-.395	-.055	-2.683	<0.01
Disconnect catheter	0.88	.336	0.93	0.267	-.121	-.021	-1.433	<0.160
Catheter care	0.83	.385	0.88	0.335	-.174	-.074	-.813	<0.421
Exit site catheter care	0.73	0.452	0.98	0.156	-.110	-.390	3.606	<0.001

Table 5: Shows practical skills in step needed to perform PD prior to and after the intervention.. $n=40$, $df=39$.

The mean score of the overall practical skills rose from 51.9 to 66.96 post the intervention program ($P < 0.001$) Table 6.

Variable	Pretest		Posttest		95% C I			P
	Mean	SD	Mean	SD	Lower	Upper	t	
Total practice	51.9	6.00	66.96	2.74	-15.04	-12	-17.95	<0.001

Table 6: Distribution of study sample overall practice score prior to and after the intervention. $n=40$, $df=39$.

Discussion

Forty nurses were evaluated for their performance in care of PD patients. The majority of the nurses (60%) held bachelor degree in nursing. A similar ratio of university graduate nurses was reported by Babska et al in 2009 [3]. Nine nurses of our study sample (22.5%) had formal training in PD, while the majority (77.5%) had only training on the job.

Nurses knowledge about definitions of CKD, types of PD and equipment used were deficient prior to our intervention, and there was a highly significant improvement in all variables in this group (Table 1). This shows that the basic knowledge about PD was not satisfactory prior to our intervention and improvement was achieved in 100% of scores post intervention. Peritonitis remains a major problem in PD, with a substantial percent of patients developing persistent or relapsing infections [4]. To diagnose peritonitis it is important to observe and care for the catheter exit site [5]. In our study the participants' knowledge about diagnosis of peritonitis was deficient prior to our educational program and this improved significantly ($P = 0.006$) post intervention (Table 2). Knowledge about the advantages and disadvantages of PD is an important aspect in training PD nurses [6]. Our nurses showed significant improvement in the scores attained in this aspect after the intervention program (Table 2).

It has been recommended that hand hygiene compliance is essential for success of any surgical procedure. Compliance with hand hygiene varies greatly between countries and its application is globally low [7]. Several factors have been shown to be related to low compliance with hand hygiene in developed countries [8]. In low-income countries the major reason for non-compliance with hand hygiene may be lack of adequate facilities [9]. WHO has established a multimodal implementation strategy to improve compliance with hand hygiene [10]. In our study, we found low compliance with hand hygiene at baseline. This was similar to two studies from Ethiopia [11], [12] and one from Bamako, Mali [13]. The main reason for the low baseline compliance is probably related to the fact that hand hygiene products and facilities were not available on the wards most of the times [9]. Alcoholic disinfectants were only used for disinfection of patients' skin prior to aseptic procedures, while alcohol and povidone iodine were used for exit-sites care. In the aspect of patient preparation for PD procedures participants in this study had good basic practical skills in preparation for catheter insertion and catheter connection; therefore the level of improvement post educational intervention was not significant (Table 4).

However, hand hygiene and fluid exchange procedures were markedly deficient, and only improved after our intervention. Catheter and exit-site care are of paramount importance in PD care [5], [14]. Our nurses' sample needed a lot of education and training in this aspect before attaining significant improvement (Table 5).

Conclusion

This study shows that PD nurses who had experience in performing PD procedures for more than one year but had little

or no formal training were deficient in many aspects of proper PD nursing care. On-the-job training seems to be not enough to give good knowledge and practical skills in nursing management of PD patients. A structured educational and training program made significant improvements in many aspects of nursing practices of nurses who previously considered themselves experienced in PD care.

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