Kufa Journal for Nursing Sciences
Open Access Full Text Article

Publisher
University of Kufa, Faculty of Nursing

Received: 29 July, 2023
Accepted: 20 August, 2023
Published: 27 August, 2023
Vol. 13(2), 2023: 291 – 296

https://doi.org/10.36321/kjns.vi20232.12879

ORIGINAL RESEARCH

Effectiveness of an Interventional Program on Nurses' Practices about Applying Guideline of Continuous Renal Replacement Therapy

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ABSTRACT

Background: Continuous renal replacement therapy (CRRT) is widely used to provide renal support to critically ill patients with acute kidney injury.
Objectives: the research aim to the effectiveness of an educational program on nurses' practices regarding the application of the guideline on continuous renal replacement therapy in hemodialysis unit.
Methodology: A quasi-experimental study was conducted with the application of the pre-test and post-test approach to the study group (30) and the control group (30) after applying the educational program. Data were collected in two phases: first baseline data (before any intervention presented to the study group) and then 21 days (after the program was administered education in the study group). Data were analyzed by using SPSS version 23.
Results: The results of current study showed that there was a significant difference between the pretest and the posttest responses in the study group practices after application of the educational program, while there was a small difference between the pretest and the posttest in the control group. In addition, there was significant association between educational level, and years of experience with nurses' practices about application of the guideline on continuous renal replacement therapy.
Conclusion: the results of the current study show that the study group participants have significant improvement in post-test practices scores about application of the guideline on continuous renal replacement therapy.

Keywords: Interventional program, nurses' practices, guideline, continuous renal replacement therapy.

INTRODUCTION

Continuous renal replacement therapy (CRRT) is a type of dialysis that used different methods for treating acute renal failure for critically ill and hemodynamically unstable patients (Tandukar and Palevsky, 2019).

Acute kidney injury (AKI) can come from a variety of diseases, including COVID-19, sepsis, and heart failure. Chronic renal failure is a critical health problem which its incidence was increased in relation to other diseases including diabetes mellitus, hypertension, and malignancies (Shinjar et al., 2018).

Chronic kidney disease can lead to accumulation of waste products in patient's body, and this situation needs immediate management with

How to Cite: Khamees, L. A., & Atiyah, H. H. (2023). Effectiveness of an interventional program on nurses' practices about applying guideline of continuous renal replacement therapy. *Kufa Journal for Nursing Sciences, 13*(2), 291-296. https://doi.org/10.36321/kjns.vi20232.12879

hemodialysis, CRRT, or kidney transplant (Al-Ashour and Mohammed, 2021; Hermis and Abed, 2021; Shawwat and Atiyah, 2022). CRRT have been regarded as the preferred method of renal treatment for patients in the intensive care unit (ICU) (Mowbray, 2009).

Millions of people worldwide are affected by acute kidney injury (AKI), which has become a significant public health issue (Jawad et al., 2021). More than half of admissions to the (ICU) are complicated by (AKI), which frequently affects critically ill patients, renal replacement treatment (RRT) is administered to around 5–6% of ICU patients, and hospital mortality rates in this population are approaching or exceeding 50% (Heung et al., 2017).

Nurses play a significant role during CRRT as they are contact deliver care for patients more than other healthcare providers (Kadhim et al., 2021). Limited resources and research articles were available about training and education of nurses caring for patients on CRRT (Welbaum, 2021).

Establishing an interventional and educational program for nurses about CRRT could assist in improving their practices to deliver a high quality and effective care for patients with AKI (Gardner, 2019).

Patients with acute kidney damage frequently receive renal assistance from continuous renal replacement therapy. to fulfill the current study's objective, which is to determine the efficacy of a training program on nurses' practices on the use of the standard on continuous renal replacement treatment in hemodialysis units.

AIMS OF THE STUDY

The research aim to the effectiveness of an educational program on nurses' practices regarding the application of the guideline on continuous renal replacement therapy in hemodialysis unit.

METHODOLOGY

Study of Design:

A quasi-experimental design used in the present study with the application of a pre-test and post-test approach for the interventional group after implementation of the educational program. Data collection was done at two times: baseline data (before any intervention was provided to the interventional group) and 21 days after giving the educational program (in the interventional group). The period of the study extends from 15th May 2022, to 15th December 2022. Data collection also included from the control group within the same period of the interventional group.

Setting of the Study:

The present study has been carried out in 5 Teaching Hospital in Baghdad city these hospitals are: AL-Yarmook Teaching Hospital, AL- kadhmiyia Teaching Hospital, Surgical specialties Hospital, Baghdad Teaching Hospital, and AL -Kindy Teaching Hospital.

Sample of the Study:

A non–probability (purposive) sample of (60) nurses (males and females) were selected, who were working in the hemodialysis units and intensive care units of the hospitals. The sample divided into two groups (30) nurses considered as study group, and another (30) nurses considered as control group. The study group was exposed to an interventional program, while the control group was not exposed to the program.

Ethical Considerations:

The researcher of this study received the first permission to accomplish the study from the Ethical Committee of the Nursing Faculty at the University of Baghdad (No. 20/01/2022). The researcher ensures that all participants receive informed consent to participate in the study. In addition, the study protocol and questionnaire were distributed to the Ministry of Planning (Central Statistical Organization) and to ministry of health to get official permission to conduct the study before data collection procedure.

The Program and Instrument Construction:

According to the findings of nurses' preliminary assessment of their practices about CRRT, a questionnaire was constructed based on the program contents which consisted of two parts:

Part I: Demographical Characteristics of the Nurses:

The first part of the questionnaire sheet includes (4) item relative to the demographic data of the nurse, who work in the hemodialysis units and ICUs including age, gender, educational status, and number of years of experience in hemodialysis unit.

Part II: Nurses' Practices about CRRT:

The second part of the questionnaire was comprised of (31) items of checklist concerned with nurses' practices about CRRT.

The Interventional Program Implementation

Before implementation of the interventional program, the study group were exposed to a pre-test. The interventional program was implemented and introduced through three lectures with respect to the essential information related to nurses' need regarding CRRT. The lectures were designed and presented in the selected teaching hospitals from the period 2nd August, 2022 to 6th November,2022. A first, the study group of nurses were trained on artificial devices in which simulation parts were always available with CRRT machines. So, nurses were trained on these simulation parts to adjust and confirm CRRT machine before connecting the patients to the device. Nurses were trained to connect patients to the CRRT devices based on the standard guideline to ensure less complications and better outcomes.

Validity of the Study

The content validity of the constructed questionnaire was determined through the use of a panel of experts (14) to investigate the content of the questionnaire for the clarity and adequacy in order to achieve the objectives of the present study.

Reliability of the Study Instrument

Purposive sample of (10) nurses selected from 5 teaching hospitals, it was applied on nurse who had the same criteria of the original study sample to determine the test- retest reliability of the questionnaire related to nurse's practices toward vascular access. The reliability of study instrument was determined by using person correlation coefficient (r)= 0.90 significant at $p< 0.01$ level. This means that the instrument is adequately reliable (Polit and Hungler,1999).

Rating and Scoring of the Study Instrument

The questionnaire form has been scored and rated according to Likert scale; always applying (3), sometimes applying (2), never applying (1), the level of scale which is scored as a total of three practices of event is observed for each respondent, three correct practices out of the three trails are valued as (3) always applied; (2) sometimes applied practices (applied in one or two observation), (1) never applied practices. The time practices checklist of each nurse for each practices took about 30-60 minutes, the same practices test is used for baseline and 1-month follow up test.

Data Collection Method

The data were collected from (60) nurses for the period from 15th January to 14th February, 2023, by using the study questionnaire (checklist).

Statistical Analysis

Data were analyzed using SPSS (Statistical Package for Social Sciences) version 23.0 including both descriptive (Frequency, Percentage, mean of score and Standard deviation), and inferential statistics (ANOVA and t-test).

RESULTS

Table (1) showed that (40 %) of the study group and also 53.3 % of the control group were within age group 22 – 27 years old. In addition, 60 percent of the study group and 70 percent of the control group were female. Moreover, 40 percent of the study group have bachelor's degree in nursing and 43.3 percent of the control group have diploma in

nursing. In addition, 66.7 % of the study group and 70 % f control group have 1 – 5 years of experience in nursing.

Table (2) presented highly significant differences in nurses' practices of the study sample between pre-test and post-test score at p value ≤ 0.01. Moreover, no significant difference was presented among the control group at pre-test and post-test practice at p value ≤ 0.05.

Table (3) showed that there were highly significant relationships between age and level of education of nurses with their practices at P (.002, .000) respectively. In addition, significant relationships were presented between nurses' practices with their years of experiences of the study group at both pre and posttest level at P (.014, .048) respectively.

DISCUSSION:

The study found that less than half of the study group and above from half of the control group were 22–27 years old. Almost tow third of the study group and more than two third of the control group were female. In addition, less than half of the study group has a bachelor's degree in nursing and less than half of the control group has a diploma.

In a study which was conducted in Saint Joseph hospital to determine and improve nurses' performance about CRRT, Nance (2019) reported that the majority of participated nurses in this study were female in which most of them were aged between 25 and 34 years old. In addition, Nance (2019) noted that more than half of the study sample had a bachelor's degree in nursing. This could reflect that nurses who work to deliver care for patients on CRRT need to have higher degree in nursing, including at least bachelors' degree with young aged who can bear (Nance, 2019).

Bakey (2019) conducted a study among hemodialysis nurses in Baghdad teaching Hospital who found that 54.3 percent of study participants (35 nurses) were female, 57.1 percent of them were within 21 – 25 years old group, and 48.6 percent of participant have bachelors' degree in nursing (Bakey, 2019).

In addition, 66.7 percent of the study group and 70 percent of control group have 1 – 5 years of experience in nursing. Nance (2019) reported that the highest percent of participated nurses in the study (30 %) had 6 – 10 years of experience (Nance, 2019).

Results also revealed that there were highly significant differences in nurses' practices for the study group between pre-test and post-test score at p value ≤ 0.01. Moreover, no significant difference was presented among the control group at pre-test and post-test practices at p value ≤ 0.05.

In addition, results presented no significant differences between the study group and control group practices at pre-test level in which P value higher than (.05). While highly significant differences were found between study and control group practices at post-test level in which P value = (.000).

Nance (2019) reported a statistically significant change in nurses' CRRT practice after an interventional program.

Patients on CRRT could have life-threatening problems, such as sepsis. Effective teamwork, treatment guideline, and improving competencies through continuous education are key factors to improve health status of patients on CRRT (Baldwin and Mottes, 2021).

Patients on CRRT need continuous care from nurses especially in ICU for 24 hours. A high-quality care is required to maintain and improve health status of such patients on CRRT. Standardized continuous education is required to improve nurses' knowledge, practices, and competencies about delivering care for patients on CRRT and decrease error (Stoltman, 2018).

Based on previous results, these significant shifts and differences in nurses' practices about CRRT in the study group reflected that sharing in educational programs can assist in improving

capabilities of healthcare providers toward delivering a high-quality care and ensuring better outcomes.

Findings of this study showed that there were significant differences between nurses' practices with their age which could reflect that age of nurses can assist them in improving their practices through enrolling in educational program. Moreover, highly significant relationships were presented between nurses' practices with their educational and with years of experience which reflected that sharing in training sessions and educational level can assist nurses in improving their practices at post-test level through enrolling educational program specified to a specific area of interest. This was an indicator that diversifying resources of receiving information can enhance nurses' practices base about delivering the optimal care for patients in healthcare.

CONCLUSIONS:

In conclusion, the results of the current study show that the study group participants have significant improvement in post-test practice scores about interventional program about guideline of CRRT.

RECOMMENDATIONS:

The study recommends that the interventional program can be implemented for all nurses working in ICU and dialysis units to be prepared and competent with applying standards of CRRT. Moreover, efforts should be targeted toward employing nurses with higher degrees to deliver care for AKI patients who need CRRT. In addition, a standard guideline should be prepared and distributed for all nurses working in ICU and dialysis unit to be followed and applied to deliver required care for patients with CRRT.

ACKNOWLEDGEMENTS:

We would like to thank the patients who participated in the study.

DISCLOSURE STATEMENT:

The authors report no conflict of interest.

FUNDING:

This research did not receive any grant from funding agencies in the public, commercial, or non-profit sectors.

AUTHOR'S CONTRIBUTIONS

All authors contributed: study concept, writing the original draft, data collection, data analysis, and reviewing the final edition.

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TABLES:

Table (1): Distribution of the Study Sample According to their Demographic Characteristics

Variable	Groups	Study group		Control group	
		F.	%	F.	%
Age Groups	22 - 27	12	40	16	53.3
	28 - 33	8	26.6	8	26.7
	34 - 39	5	16.7	2	6.7
	40 years and more	5	16.7	4	13.3
Gender	Male	12	40	9	30
	Female	18	60	21	70
Educational level	Preparatory	7	23.3	5	16.7
	Diploma	11	36.7	13	43.3
	Bachelor's	12	40	12	40
Years of experience	1 -5	20	66.7	21	70
	6 - 10	10	33.3	5	16.7
	11 – 5	0	0	3	10
	16 and more	0	0	1	3.3

F. = Frequency, % = Percentage.

Table (2): Comparative Significant of pre and post-test practices scores for the study sample

score	N	M	SD	t	df	P. value
Pretest and Posttest Practices (Study Group)	30	1.83	.14	21.52	29	.000
		2.46	.06			
Pretest and Posttest Practices (Control Group)	30	1.85	.104	.669	29	.508
		1.863	.142			

N= number, M = mean of score, SD= standard deviation, NS =non-significant at P>0.05, S= significant at P<0.05.

Table (3): Differences between Socio-demographic Variables of the study group with their practices (pre and posttest) by ANOVA and t-test

Socio-demographic variables	(N=30)					
	pretest			posttest		
	df	F	P value	df	F	P value
Age	26	6.701	.002	26	1.51	.235
Education Level	27	18.9	.000	27	1.03	.36
Years of experience	26	6.87	.014	26	4.28	.048
Variables	Df	t-test	P value	df	t-test	P value
Gender	28	.003	.954	28	.951	.338

df: degree of freedom. NS =non-significant at P>0.05, S= significant at P<0.05.