Migration Letters

Volume: 20, No: S7(2023), pp. 427-434

ISSN: 1741-8984 (Print) ISSN: 1741-8992 (Online)
www.migrationletters.com

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

Layth Abbas Khamees[1], Hussein Hadi Atiyah[2]

Abstract

Objectives: The main objective of this study is to determine the effectiveness of an educational program on the knowledge of nurses regarding the application of the guideline on continuous renal replacement therapy in the intensive care unit and the hemodialysis unit.

Methodology: A quasi-experimental study was conducted with the application of the pre-test and post-test approach to the study group and the control group 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). The study period was from March 15th, 2022, to October 15th, 2022. Data were analyzed by using SPSS version 23.

Results: The results of this study showed that there was a significant difference between the pretest and the posttest responses in the study group knowledge 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 were significant correlations between the age, level of education and number of training sessions with the knowledge of nurses.

Conclusions: The results of the nurses' knowledge regarding application of the guideline on continuous renal replacement therapy improved after implementing the educational program in the study group.

Recommendations: The study recommended 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.

Keywords: *Interventional program, nurses' knowledge, 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 (1). Acute kidney injury (AKI) can come from a variety of diseases, including COVID-19, sepsis, and heart failure. Since its inception in 1977, CRRT have been

[1] Clinical Nurse Specialist, Al-Kindy Teaching Hospital, Ministry of Health and Environment, laitha1981@yahoo.com
[2] Professor, Adult Nursing Department, University of Baghdad, College of Nursing, Iraq, husseinatia@conursing.uobaghdad.edu.iq

regarded as the preferred method of renal treatment for patients in the intensive care unit (ICU) (2).

Millions of people worldwide are affected by acute kidney injury (AKI), which has become a significant public health issue (3). 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% (4).

Nurses play a significant role during CRRT as they are contact deliver care for patients more than other healthcare providers (5). Limited resources and research articles were available about training and education of nurses caring for patients on CRRT (6). Establishing an interventional and educational program for nurses about CRRT could assist in improving their knowledge base to deliver a high quality and effective care for such patients with AKI (7).

This quasi-experimental study was conducted to evaluate the effectiveness of an interventional program on Nurses' knowledge about applying guideline of continuous renal replacement therapy, and to find out the relationship between the outcomes of the interventional program on nurses' knowledge with their demographical data (Age, level of education, gender, etc.).

Research Method and 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 was from 15 of march\ 2022 to 15 of 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 was carried out in 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. 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 knowledge 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 (8) item relative to the demographic data of the nurse, who work in the hemodialysis units and ICUs included; age, gender, educational status, monthly income, number of years of employment, number of years of experience, number of training sessions about CRRT and educating yourself within the field of competence in a self-reliant capacity.

Part II: Nurses' Knowledge about CRRT

The second part of the questionnaire was comprised of (37) items of multiple-choice questions that concerned with nurses' knowledge about CRRT which include tow section: the first section includes (14) items (MCQ) presented the nurses' knowledge toward general information of urinary system; and the second section includes (23) item (MCQ) specific information about CRRT and Knowledge of nurses regarding nursing role of 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 of august\ 2022 to 6th of November \2022. At 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) nurse's selected from Baghdad teaching hospital, 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 knowledge 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 (8)

Rating and Scoring of the Study Instrument:

The questionnaire form has been scored and rated on two levels dichotomous scale (2) for correct answer and (1) for false answer. The items were rated according to the Likers' scale of the three levels based on cut point of = 0.33, in which assessment level, L = Low knowledge (1 – 1.33), M = Moderate knowledge (1.34 – 1.66), and H = High knowledge (1.67 – 2).

Data Collection Method

The data were collected from (60) nurses for the period from 2nd of august\ 2022 to 6th of November \ 2022, by using the study questionnaire (direct interview). The data collection included two times duration, pre-test and post-test.

Statistical Analysis

Data were analyzed using SPSS (Statistical Package for Social Sciences) version 23.0 including both descriptive and inferential statistics.

Result:

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
	Total	30	100	30	100
Gender	Male	12	40	9	30

	Female	18	60	21	70
	Total	30	100	30	100
Educational level	Preparatory	7	23.3	5	16.7
	Diploma	11	36.7	13	43.3
	Bachelor's	12	40	12	40
	Total	30	100	30	100
Income level	Sufficient	7	23.3	6	20
	Barely Sufficient	13	43.4	17	56.7
	Not Sufficient	10	33.3	7	23.3
	Total	30	100	30	100
Years of work	1 – 5	13	43.4	18	60
	6 – 10	12	40	7	23.4
	11 - 15	4	13.3	1	3.3
	16 years and more	1	3.3	4	13.3
	Total	30	100	30	100
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
	Total	30	100	30	100
Sharing in training sessions	No	4	13.3	7	23.3
	Yes	26	86.7	23	76.7
	Total	30	100	30	100
Number of training sessions	0	4	13.3	7	23.3
	1 – 2	24	80	21	70
	3 – 4	2	6.7	2	6.7
	Total	30	100	30	100
Inside Iraq	No	4	13.3	7	23.3
	Yes	26	86.7	23	76.7
	Total	30	100	30	100
Outside Iraq	No	28	93.3	27	90
	Yes	2	6.7	3	10
	Total	30	100	30	100
Education	No	1	3.3	1	3.3
	Yes	29	96.7	29	96.7
	Total	30	100	30	100
communication	No	3	10	10	33.3
	Yes	27	90	20	66.7
	Total	30	100	30	100
Qualified	No	27	90	22	73.3
	Yes	3	10	8	26.7
	Total	30	100	30	100
Library	No	29	96.7	29	96.7
	Yes	1	3.3	1	3.3
	Total	30	100	30	100
Nurses	No	4	13.3	7	23.3
	Yes	26	86.7	23	76.7
	Total	30	100	30	100
Physicians	No	24	80	20	66.7
	Yes	6	20	10	33.3
	Total	30	100	30	100
Visible	No	26	86.7	26	86.7
	Yes	4	13.3	4	13.3
	Total	30	100	30	100

Table (4.1) showed that 40 percent of the study group and also 53.3 percent 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 relation to income level, 43.4 of the study group and 56.7 of the control group were barely sufficient level of income. Also, 43.4 percent of the study group and 60 percent of the control group have 1 – 5 years of work. In addition, 66.7 percent of the study group and 70 percent of control group have 1 – 5 years of experience in nursing. Corresponding to sharing in training sessions, 86.7 percent of the study group and 76.7 percent of the control group were sharing in training sessions. The highest percent of the study group (80 percent) and the control group (70) percent have only 1 – 2 training sessions. Also, the majority of the study group 86.7 and the control group 76.7 percent have training sessions inside Iraq. Only 6.7 percent of the study group and 10 percent of the control group were shared in training sessions outside Iraq. The same majority percent 96.7 of both the study and control groups have their source of knowledge from education, 90 percent of the study group and 66.7 percent of the control group have their source of knowledge from communication, and 3.3 percent of both groups have their knowledge from library.

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

score	N	M	SD	t	df	P.value	Sig.
Pretest and Post-test knowledge (Study Group)	30	1.39 1.74	.103 .108	12.52	29	.000	H.S
Pretest and Post-test knowledge (Control Group)	30	1.36 1.41	.07 .10	3.406	29	.071	N.S

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

Table (2) presented highly significant differences of the knowledge of the study sample between pre-test and post-test score at p value (.000). Moreover, no significant difference was presented among the control group at pre-test and post-test knowledge at p value higher than (.05).

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

Socio-demographic variables	(N=30)							
	pretest				posttest			
	df	F	P value	Sig.	df	F	P value	Sig.
Age	26	.294	.829	N.S	26	3.25	.038	S
Education Level	27	.102	.904	N.S	27	16.91	.000	H.S
Income level	27	.16	.853	N.S	27	1.55	.229	N.S
Years of work	26	.631	.47	N.S	26	3.23	.071	N.S
Years of experience	28	.216	.64	N.S	28	3.24	.08	N.S
No. of training	27	1.03	.36	N.S	27	9.59	.001	H.S
Variables	Df	t-test	P value	Sig.	df	t-test	P value	Sig.
Gender	28	1.75	.19	N.S	28	.422	.52	N.S
Sharing in training	28	.066	.799	N.S	28	.656	.425	N.S
Inside Iraq	28	.769	.8	N.S	28	.66	.4	N.S

Outside Iraq	28	2.157	.153	N.S	28	.232	.63	N.S
Education	28	.96	.344	N.S	28	.124	.902	N.S
Communication	28	3.61	.068	N.S	28	.099	.75	N.S
Qualified	28	3.11	.089	N.S	28	2.17	.151	N.S
Library	28	2.05	.049	S	28	.124	.902	N.S
Nurses	28	.916	.34	N.S	28	.012	.912	N.S
Physicians	28	.547	.466	N.S	28	3.507	.072	N.S
Visible	28	1.25	.271	N.S	28	8.38	.007	H.S

Table (3) showed that there was a significant relationship between nurses' knowledge with their age at P value (.038) which could reflect that age of nurses can assist them in improving their knowledge through enrolling in educational program. Moreover, highly significant relationships were presented between nurses' knowledge with their educational level at P value (.000) and with number of training sessions at P (.001), which reflected that sharing in training sessions and educational level can assist nurses in improving their knowledge at post-test level through enrolling educational program specified to a specific area of interest. In addition, a significant relationship was found between nurses' knowledge with library as a source of knowledge at P (.049).

Discussion

Results of the present study showed that 40 percent of the study group and also 53.3 percent 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 a study which was conducted at Saint Joseph hospital to determine and improve nurses' knowledge 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 the responsibilities (9). Bakey (2019) conducted a study on hemodialysis nurses at Baghdad teaching Hospital and 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 (10). This reflected that most of nurses work in ICU have higher education level as bachelors' degree than other levels.

In relation to income level, 43.4 of the study group and 56.7 of the control group were barely sufficient level of income. Also, 43.4 percent of the study group and 60 percent of the control group have 1 – 5 years of work. In addition, 66.7 percent of the study group and 70 percent of control group have 1 – 5 years of experience in nursing. Corresponding to sharing in training sessions, 86.7 percent of the study group and 76.7 percent of the control group were sharing in training sessions. The highest percent of the study group (80 percent) and the control group (70) percent have only 1 – 2 training sessions. Also, the majority of the study group 86.7 and the control group 76.7 percent have training sessions inside Iraq. Only 6.7 percent of the study group and 10 percent of the control group were shared in training sessions outside Iraq. Nance (2019) reported that the highest percent of participated nurses in the study (30 %) had 6 – 10 years of experience (9).

The same majority percent 96.7 of both the study and control groups have their source of knowledge from education, 90 percent of the study group and 66.7 percent of the control group have their source of knowledge from communication, and 3.3 percent of both groups have their knowledge from library. According to the previous evidence, nurses have limited years of experience in nursing. The employed nurses who should deliver care for patients on CRRT should increase their sharing in training sessions to be

competent to deliver high quality care. In addition, nurses need to diversify their source of knowledge to expand their knowledge base about CRRT. Results also revealed that there were highly significant differences of the knowledge and practices of the study group between pre-test and post-test score at p value (.000). Moreover, no significant difference was presented among the control group at pre-test and post-test practices at p value higher than (.05). In addition, results in table 4.7. presented no significant differences between the study group and control group knowledge and practices at pre-test level in which P value higher than (.05). While highly significant differences were found between study and control group knowledge and practices at post-test level in which P value = (.000). This finding is supported by results of Nance research in (2019) who found that there was a significant difference and statistically significant finding (p = .001) in the knowledge of nurses about CRRT after application of an interventional program (9). 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 (11). 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 (12).

Based on previous results, these significant shifts and differences in nurses' knowledge and 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 was a significant relationship between nurses' knowledge with their age at P value (.038) which could reflect that age of nurses can assist them in improving their knowledge through enrolling in educational program. Moreover, highly significant relationships were presented between nurses' knowledge with their educational level at P value (.000) and with number of training sessions at P (.001), which reflected that sharing in training sessions and educational level can assist nurses in improving their knowledge at post-test level through enrolling educational program specified to a specific area of interest. In addition, a significant relationship was found between nurses' knowledge with library as a source of knowledge at P (.049). This was an indicator that diversifying resources of receiving information can enhance nurses' knowledge base about delivering the optimal care for patients in healthcare settings.

Conclusions:

The recent study concluded that nurses' knowledge and practices about CRRT were improved after implementing the 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.

References

1- Tandukar, S., & Palevsky, P. M. (2019). Continuous renal replacement therapy: who, when, why, and how. Chest, 155(3), 626-638.

2- Mowbray, K. (2009). The Continuous Renal Replacement Therapy Education Package, p 4.

3- Singbartl, K., & Kellum, J. A. (2012). AKI in the ICU: definition, epidemiology, risk stratification, and outcomes. Kidney international, 81(9), 819-825.

4- Heung, M., Bagshaw, S. M., House, A. A., Juncos, L. A., Piazza, R., & Goldstein, S. L. (2017). CRRTnet: a prospective, multi-national, observational study of continuous renal replacement therapy practices. BMC nephrology, 18, 1-7.

5- Saunders, H., & Sanghavi, D. (2020). Continuous Renal Replacement Therapy.

6- Welbaum, C. (2021). Nurses' role in continuous renal replacement therapy: Expand your knowledge for safe, quality care. American Nurse Journal, 16(9), 26-30.

7- Gardner, L. (2019). Does Nurse Management Effect Continuous Renal Replacement Downtime?.

8- Polit, D. and Hungler, B. (1999). Nursing Research: Principles and Methods, 6th ed., Philadelphia, Lippincott Williams and Wilkins. Pp. 345-398.

9- Nance, L. (2019). The Effect of a Focused Education Session on Continuous Renal Replacement Therapy (CRRT) Troubleshooting to Increase Knowledge and Self-Confidence in ICU Nurses.

10- Bakey, S. J. (2019). Hemodialysis Nurses' Practices toward Hand Hygiene Performance at Baghdad Teaching Hospitals. Indian Journal of Public Health Research & Development, 10(4).

11- Baldwin, I., & Mottes, T. (2021, November). Acute kidney injury and continuous renal replacement therapy: A nursing perspective for my shift today in the intensive care unit. In Seminars in Dialysis (Vol. 34, No. 6, pp. 518-529).

12- Stoltman, B. (2018). Continuous Renal Replacement Therapy: Educating Nurses for Prevention of Complications.