



Effectiveness of Education Program on Nurses' Knowledge about Nursing Care for Patient Undergoing Cardiopulmonary Bypass Surgery

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Abstract

Objective(s): The aim of the study is to determine the effectiveness of the education program on nurses' knowledge about cardiopulmonary bypass.

Methodology: A pre-experimental design (one group) pre-test, post-test design was carried out during the period from 15th of January 2022 into 20th of March 2023 at three governmental hospitals in Baghdad. The program and the study tool were constructed based on extensive review of literature and previous studies. Validity of the program and study instrument was determined by a panel of experts. Split – half and alpha Cronbach was used for reliability of the instrument. The study results was statically analysed by using SPSS program version 22.

Results: The study findings showed that there are highly statistically significant differences between the scores of nursing staff knowledge in two periods of measurements (pre-test) and (post-test) at p-value (0.001), where the statistical mean of the overall knowledge of nursing staff in the pre-test was (0.47), while it becomes (0.88) in post-test, after the educational program has been applied.

Conclusion: The study confirmed that the education program was very effective in improving nurses' knowledge about nursing care of patients with cardiopulmonary bypass surgery.

Recommendations: The education program can be used as a teaching mean for all nurses working at cardiopulmonary bypass units.

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فاعلية برنامج تعليمي في معارف الممرضين حول الرعاية التمريضية لمرضى جراحة التحويلة القلبية- الرئوية

المستخلص

الاهداف: تهدف الدراسة الى تحديد فاعلية البرنامج التعليمي على معارف الممرضين للمرضى الخاضعين لعملية التحويلة القلبية - الرئوية

المنهجية: تم استخدام تصميم قبل التجريبي في هذه الدراسة (المجموعه واحده) ذات اختبار قبلي وبعدي للفترة الممتدة من ١٥ كانون الثاني ٢٠٢٢ الى ٢٠ من آذار ٢٠٢٣ حيث تم اجرائها في ثلاث مستشفيات حكومية في بغداد. تم تصميم وبناء برنامج الدراسة تبعاً للدراسات السابقة حول الموضوع مع دراسة مستقيضة للادبيات السابقة. تم التأكد من مصداقية البرنامج والاستبانة من خلال عرضها على مجموعه من الخبراء في مختلف المجالات العلمية حيث عدلت وفق توصيات الخبراء , اما بالنسبة للموثوقية فتم التأكد منها عن طريق اختبار الفا كرومباخ والانقسام النصفى للاستبانة . تم تحليل نتائج الدراسة احصائياً باستخدام برنامج التحليلات الاحصائية (SPSS) نسخة ٢٢ .

النتائج: اظهرت نتائج الدراسة عن وجود فروق ذات دلالة إحصائية عالية بين نتائج معارف الكادر التمريضي في مستويين من القياسات للاختبار (القبلي والبعدي) بقيمة احتمالية (٠,٠٠١) حيث ان المتوسط الإحصائي لدرجات المعارف الكلية في الاختبار القبلي كان (٠,٤٧)، بينما أصبح (٠,٨٨) في الاختبار البعدي وذلك بعد تطبيق البرنامج التعليمي .

الاستنتاج: اثبتت الدراسة ان للبرنامج التعليمي اثر كبير في تحسين معارف الممرضين حول العناية التمريضية للمرضى الخاضعين لجراحة التحويلة القلبية - الرئوية .

التوصيات: يمكن استخدام البرنامج التعليمي للدراسة كوسيلة تعليمية لكل الممرضين العاملين في وحدة جراحة التحويلة القلبية - الرئوية.

الكلمات المفتاحية: التروية القلبية الرئوية , المعارف التمريضية , العناية التمريضية , جراحة القلب .

Introduction

Cardiac surgery is treatment of choice for many cardiac complications that cannot be treated medically⁽¹⁾, one of the most common treatment of coronary artery diseases is coronary artery bypass grafting (CABG) specially when there is no benefits of medical treatment and angioplasty^{(1),(2)} .

Cardiopulmonary bypass is essential for advanced cardiac surgery, it is the cornerstone of life maintenance for cases that require cardiac arrest and ventilator support, and it has opened a new era in cardiac surgery by providing a bloodless field for the surgeons to work on the heart with minimal trauma to the heart and by providing basic life support for the patient during surgery throw maintaining oxygen supply to the tissue with gas exchanged directly to and from

the bloodstream , also can facilitate procedures of the heart and major vessels⁽²⁾.

The purpose of Cardiopulmonary Bypass (CPB) which is type of extracorporeal circulation, is to support the heart and major vessels during cardiac surgery by providing circulatory and respiratory support as well as temperature control but with high risk of further renal and myocardial complication that associated with such a traumatic procedure⁽³⁾ .

In this research we emphasised on nursing education program that can improve nursing care for patient undergoing cardiopulmonary bypass to protect renal and cardiac function during this procedure and provide a comprehensive care for patient by surgeon, perfusionist, and

anaesthesiologist together to perform CPB safely^(3,4).

Charriere et al (2010) reported that Cardiopulmonary bypass (CPB) is a medical act that can be performed by nursing staff as long as they are constantly supervised by a physician during cardiac surgery⁽⁴⁾.

The number of patient that candidate for open heart surgery in Iraq increased rapidly for the last decade including congenital and acquired cases, that make a need to increase in cardiac surgery team including perfusion nurse and the workers on cardiopulmonary bypass, that will be performed by in job training in teaching cardiac centres with certified perfusionists that can conducted Cardiopulmonary Bypass⁽⁵⁾.

According to American Heart Associated AHA (2022) coronary artery diseases is most common type of cardiovascular diseases, its caused by lack of blood supplied into the heart throw coronary arteries related to deposed of cholesterol that plague formation leading to narrowing or obstruction of the coronary arteries that eventually weaken the heart muscle and made a serious condition that effect on pumping ability of the heart called heart failure^{(6),(10)}.

The current study aims to determine the effectiveness of nursing care educational program on nurses' knowledge about cardiopulmonary bypass.

Methodology

A pre-experimental design (one group) pre-test, post-test design was carried out during the period from 15th of January

2022 into 20th of March 2023 at three governmental hospitals in Baghdad; Iraqi Centre for Heart Diseases, Ibn – Albitar Centre for Cardiac Surgery and Ibn – Alnafees Centre for Cardiothoracic and Vascular Surgery.

Ethical approval from the college of nursing at university of Baghdad was obtained for conducting the study, with the approval of the Ministry of Health. Nurses' consent has been taken to participate in the study.

A purposive sample of (29) nurses has been selected for the purpose of the study, those who work at the cardiopulmonary bypass unite in the cardiac surgery department.

The program of the study was designed and constructed based on the results of the need assessment for nursing staff knowledge about nursing care for patients undergoing cardiopulmonary bypass in cardiac operative rooms and the extensive review of literature and previous studies.

The content validity of the program was determined by experts. The revision was made on the program contents and the study instrument. They agreed that the program is valid to be used as an education mean for accomplishing the study objectives.

The study instrument was constructed, it consists of two parts:

Part I: Nurses' Socio-demographic data of age, gender, level of education and years of experiences.

Part II : Evaluation of Nurses' knowledge about cardiopulmonary bypass which include (3) domains; 1. General

information, (10) items. 2. Myocardial protection (9) items. and 3. Renal protection (6) items.

All items were scored on a three levels Likert scale classified into poor (0.26-0.5), fair (0.51-0.75) and good (0.76-1) according to the mean of score .

Internal consistency for the study instrument determined through the use of split-half technique and the computation of Cronbach Alpha correlation coefficient on responses of (6) of nursing staff in pilot study by using SPSS

applications and it was (0.875) which is acceptable that indicate the data collected through this instrument are reliable.

Data collected during the period of Five months from 11th of Jun 2022 into 6th of November2022, at two periods, pre-test and after the applying of the program in (4) weeks the posttest had been conducted.

SPSS statistical analysis program version 22 was used to analyse the data, inferential and descriptive analysis method had been used for data analysis.

Results:

Table 1. Distribution of the Study Sample According to their Socio- Demographic Characteristics

Demographic Characteristics	Subgroup	f.	%
Age group	20-26 years	1	4.5
	27-32 years	3	13.6
	33-38 years	14	63.6
	39-44 years	2	9.1
	45-50 years	2	9.1
	Total	22	100%
Gender	Male	8	36.4
	Female	14	63.6
Years of experience	1-5 years	9	40.9
	6-10	8	36.4
	11-15	3	13.6
	16 years and above	2	9.1
Education level	Diploma	0	0
	Bachelor	19	86.4
	Master	3	13.6
	PhD	0	0

f= frequencies, %= Percentages

In table (1) the results showed the most of participants (63.6%) with age group 33-38 years and regarding the gender at most (63.6%) were female. According to the years of experience the high percentage (40.9%) from one to five years. Regarding education level the majority (86.4%) had Bachelor.

Table 2. Comparative Significant between Pre-test and Post-test of Nurses’ Knowledge about Nursing Care for Patients Undergoing Cardiopulmonary Bypass surgery

knowledge	Pretest		Posttest		t- test analysis		
	Mean	SD	Mean	SD	t- test	df	p. value
General knowledge	0.56	0.313	0.91	0.090	5.436-	21	0.0001
Myocardial Protection	0.43	0.295	0.87	0.098	6.525-	21	0.0001
Renal Functions Protection	0.41	0.351	0.86	0.175	6.852-	21	0.0001
Overall knowledge	0.47	0.287	0.88	0.052	7.046-	21	0.0001

Mean=Mean of score, SD = Standard Deviation, df = degree freedom, P=probability value, Sig.= Significance, N. S=non-significant at p>0.05, S= Significant at p<0.05, H.S: High Significant at p<0.001, poor (0.26-0.5), fair (0.51-0.75) and good (0.76-1).

The results in table 2 showed there were highly significant differences between pre and posttest mean of knowledge for nursing staff.

Discussion

Data analysis of the finding show that majority of the nursing staff was within 33-38 years old (63.6 %) that ranged from (20-50) , in studies that conducted by Nicoletti et al (2018) showed that the majority of the study sample are within 35 years old (47.8%)⁽¹⁰⁾.

Most of nursing staff gender was females (64 %) wile (36%) is males. Kareem and Hassan (2022) reported in their research that female was (56.7 %) from their sample study, also these results are reported by Ali et al (2015) that (92.5 %) were female^{(11),(12)}.

The study reported that level of education presented in the study was (86.4 %) of study sample have a bachelor degree.

Falih and Hassan (2022) had (63%) of the study sample with bachelor degree which was supported by Garcia when reported

that the majority of study sample was bachelor degree (59%)⁽¹³⁾.

Concerning to nurses’ years of experiences, the study shows that (40.9 %) of study group have (1 -5) years of experience and (36.4 %) of them within (6-10) years of experiences, that make the majority of the study group are within (1-5) years of experiences, comparing with Al-Bdary and Hassan study (2022), they reported that (59.3 %) of their study group has less than 5 years of experiences⁽¹⁴⁾.

Regarding to the nurses’ knowledge at the pre-test, results of study show that poor knowledge (0.47) mean score in nursing staff, this is before the application of the program, the same level of knowledge had been noted in several educational programs or knowledge part in educational programs^{(15),(16)}.

Otherwise the results of the post -test show very different level in nurses’ knowledge

about the nursing care for patient undergoing cardiopulmonary bypass, (0.88) of them has good knowledge after applying the education program.

These results presented of a highly significant different between pre -test and post -test at P. value < 0.001 that regarding to knowledge part its achieved the general objective of present study, these results are supported by several studies with educational program^{(16), (18)}.

Conclusion

The study confirmed that the education program was very effective in improving nurses' knowledge about nursing care of patients with cardiopulmonary bypass surgery.

Recommendations:

The education program can be used as an teaching mean for all nurses working at cardiopulmonary bypass units.

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