

▪ *Basic Research***Impact of Educational Program on Nurses' Knowledge and Practice Concerning Post Operative Patient Care After Open Heart Surgery**Randa Mamdouh Gad Allah¹, Hend Said Ramadan Ahmed²¹Lecturer of Medical Surgical Nursing, Military Medical Academy, Cairo, 11291²Lecturer of Hospital Nursing Administration, Military Medical Academy, Cairo, 11291Corresponding email: rmamdouh0603@gmail.com**Abstract**

Background: Open heart surgery has become a widely employed practice which is accompanied by postoperative care. Intensive care nurses play a critical role in the postoperative care of patients undergoing open heart surgery. **Aim:** to determine impact of educational program on nurses' knowledge and practice concerning care of patient after open heart surgery. **Design:** A quasi-experimental design pre-test, post-test design was carried out. A purposive sample of 40 ICU nurse who worked in cardiothoracic intensive care unit was included. **Setting:** This study was conducted in the cardiothoracic intensive care unit at the International Medical Center. **Tools:** Three tools were used for data collection; nurses interview sheet, nurses knowledge evaluation sheet and practice observational checklist. Tools were developed by the researcher and validity was determined through a panel of experts. **Results:** The study findings showed that there was a significant improvement in nurses' knowledge and practice after implementation of open heart surgery nursing care educational program, where the frequency distribution of nurses according to their satisfactory Knowledge Score at Post the educational Program was 80% versus 45 % in pre educational program, as well as the frequency distribution of nurses according to their satisfactory practice score at Post the educational Program was 75% versus 35 % in pre educational program. There was a positive correlation between nurse's total knowledge score and their total practices score in pre, post evaluation of implementing the educational program with a statistically significant differences at p-value (0.0001), **Conclusion:** The results of the study show that the positive effective of educational program about nurses' knowledge and practice concerning nurses care of patient after open heart surgery. **Recommendations:** The education program can be applied as a teaching mean for all nurses working at cardiothoracic care units.

Keywords: open heart Surgery, nursing knowledge, nursing practice, educational program.

Introduction:

Open-heart surgery is a surgical procedure in which the chest is opened to operate on the heart muscle, valves, arteries, or other parts of the heart. This is a serious procedure that requires hospitalization for a week or more. Patients undergoing open-heart surgery are admitted to the intensive care unit immediately after surgery. This is done to help blood flow around blocked blood vessels in the heart. Open-heart surgery, such as coronary artery surgery. Open-heart surgery, such as coronary artery surgery. (1)

Cardiac bypass grafting (CABG) and valve replacement have been used to improve patient outcomes related to cardiac symptoms, prolongation of life, and health-related quality of life. Although these surgical outcomes are promising, studies have shown that the experience and recovery after open heart surgery can be more challenging than expected, with psychosocial and physical difficulties that persist after discharge. (2)

Life threatening complications after open heart surgery include low cardiac output syndrome, arrhythmias, cardiac tamponade, and myocardial depression with or without myocardial necrosis, as well as excessive bleeding after surgery or due to coagulopathy, uncontrolled hypertension, and neuropsychological dysfunction. The highest risk of postoperative central nervous system dysfunction is associated with prolonged cardiopulmonary bypass (CPB) time, perioperative hypotension, and open heart delirium, which occurs 5 days after cardiac surgery and presents as mild confusion, somnolence, agitation, or hallucinations. (5)

The use of cardiopulmonary bypass (CBM) during cardiac surgery has become widespread. However, it can cause adverse effects, physical harm, and cognitive impairment, which can affect the patient's quality of life. Evidence-based research suggests that technologies using devices such as membrane oxygenators, heparin-coated circuits, ultrafiltration, and polypharmacy may reduce negative physical and neurocognitive effects (16).

About complications after open heart surgery, about 53% of patients who underwent coronary artery bypass grafting (CABG) and cardiopulmonary bypass (CPB) had neurocognitive abnormalities at discharge, and 24% of them reported persistent neurological abnormalities 6 months after undergoing cardiac surgery, and 42% reported cognitive decline 5 years after surgery (3).

Delirium occurs in 10% of patients aged 65 years or older and is also associated with higher long-term mortality. Other early postoperative neurocognitive deficits occur in up to 60% of patients and include mild deficits in memory, attention, concentration, and language. Postoperative and psychological disorders such as stroke, confusion, and depression. (6)

However, with the increasing use of neuropsychological tests that generally include measures of language and memory, exercise and activity after open heart surgery are important for healthy healing and will help patients restore quality of life. Aerobic exercise is sustained exercise that uses large muscle groups, helping the heart and lungs work more efficiently. It also helps control other risk factors for heart disease and stroke. (7)

The role of the advanced nursing practice in the preoperative and postoperative care of patients undergoing open heart surgery is critical to achieving positive patient outcomes. Assessing the needs of patients undergoing open heart surgery is critical to facilitating recovery and coping. (4)

Biopsychosocial assessment is an important step in health care because it expands the scope of clinical practice, disease assessment, prevention and treatment, and health and disease research, especially in open heart surgery. This is because complex procedures such as coronary artery bypass grafting, reconstruction of damaged structures, heart transplantation, medical device implantation, and other treatments require highly trained specialists and unique skills. (8)

Significance of the Study

Open heart surgery demands special knowledge and skills to allow the nurse to give excellent nursing care and to function as an effective member of the health care team.

Aim of the Study

The current study aimed to determine the impact of educational program on nurses' knowledge and practice concerning care of patient after open heart surgery.

Study Hypothesis: H1:

To fulfill the aim of this study the following hypothesis was formulated: After implementation of the nursing educational program concerning care of patient after open heart surgery, nurses' knowledge and practices will be improved.

Subjects and Methods

The subjects and method of the current study were formulated as the following.

- I- Technical design.
- II- Operational design.
- III- Administrative design.
- IV- Statistical design.

I- Technical Design: The technical design entails the study design, study setting, subjects and tools for data collection.

Study design: A quasi-experimental design (one group) pre-test, post-test design was carried out. A purposive sample of 40 ICU nurse who worked cardiothoracic intensive care unit was included.

Study Setting: This study was conducted in the cardiothoracic intensive care unit at the International Medical Center

Subjects: A purposive sample of 40 ICU nurse who worked cardiothoracic intensive care unit was included. All nurses from both gender and different education level who worked at intensive care unit were included in the study.

Data collection tool:

Three tools were used for data collection; nurses interview sheet, nurses knowledge evaluation sheet and practice observational checklist, developed by the researcher depending on literature review. (3) & (15).

Tool I : Sociodemographic characteristics sheet of the nurses:

Including age, sex, marital status, level of education, years of experience.

Tool II : Nurses knowledge evaluation sheet regarding open heart surgery:

It was developed by researchers to assess nurses' knowledge of open-heart surgery (15) & (3).

It consisted of 60 closed-ended questions and was organized into four parts:

- Anatomy and physiology of the heart.
- General knowledge of open-heart surgery.
- Nursing care/interventions for open-heart surgery patients.
- Infection control policy prevention measures.

The nursing knowledge assessment system was evaluated according to the questionnaire items.

The responses of the respondents (nurses) were evaluated using the answer sheet prepared by the researcher. The total knowledge score was (60) points (100%).

Each correct answer scored (1) point, and an incorrect or missing answer scored (zero) point.

General knowledge was classified as follows:

- Satisfactory $\geq 75\%$
- Un satisfactory $< 75\%$

Tool III: Nurses practice evaluation sheet regarding open heart surgery: Observational checklist of nurses' practices for patients with open heart surgery :

It was developed by the researcher to assess nurses' practice during caring for patients undergoing open heart surgery (3).

The tool covered procedures nursing care procedures for post-operative open heart.

Subtitle assessments hourly

- Maintain airway patency
- Monitor vital signs
- Record intake and output hourly.
- Assess the patient's hemodynamic and cardiac status.
- Check drains and chest tubes
- Assess surgical wound
- Assess kidney function and urine out put
- Assess conscious level and neuro symptoms.
- Perform coughing and breathing exercise
- Ensure proper pain management

The answers of respondent (nurses) were evaluated using key answer prepared by the researcher. The total score of the practice was (50) grades, (100%).

Each correct answer scored (1) grades, and (zero) for un-correct or missed answer total knowledge classified as the following:

- Satisfactory $\geq 75\%$
- Un satisfactory $< 75\%$

Tools validity and reliability:

Tools validity was tested by face and content validity. Face validity aimed to inspect the tools for clarity, relevance, comprehensiveness, simplicity and applicability; minor modifications were done. Testing content validity was done by 5 experts, one of them was cardiothoracic surgeon, two of them were ICU intensivist physician, and two were expert supervisor in critical care nursing specialty.

Ethical Considerations:

Ethical integrity was maintained throughout the study; oral approval obtained from all participants after fully explaining the study's purpose, procedures, and potential benefits.

Participants were made aware of their rights, including the right to withdraw from the study at any time without any impact on their standard of care.

II- Operational design.

Preparatory Phase: It included reviewing of literature and theoretical knowledge of the various aspects of this issue using books, articles, internet, and magazines in order to develop the data collection tools. (16).

Pilot study: The pilot study was applied on 4 nurses (10%) of the study sample with the selected criteria to test the applicability of tools, arrangement of items, and estimate the time needed for each sheet.

Field Work: The study was implemented and evaluated by the researcher through three months from the beginning of May 2024 to the end of Aug. 2024, over three days per week (Saturday, Monday, and Wednesday) during day shifts

Phase 1: Based on the information obtained from pilot study, in addition to literature, the researcher designed the instructional program.

Phase 2: Pre-test phase (prior training program implementation):

After preparing the tool, the researcher interviewed the nurses individually in cardiothorathic department distribute the pretested questionnaire sheet after clear explaining the way to fill out.

The researcher used Tools; (1) A structured interviewing questionnaire sheet Then the nurses were asked to write down their answers.

Tool: (2) Observational checklist of nursing practices for patients with open heart surgery which information was collected by the researcher.

Phase 3: Implementation phase: the training program the studied nurses were divided into four groups each group consisted ten nurses, consists of six sessions, time available at the early shift was 11.15 am – 12 pm.

First session about (anatomy and physiology of the heart)

Second session about (definition, types, indications and complications of open heart (surgery)

Third session about (Proper nursing care before, during, and after open heart surgery)

Fourth session about (drains and chest tubes)

Fifth session about infection control measures)

Sixth session about adverse events regarding open heart surgery).

Different teaching and learning methods include; interactive lecture, discussion, &, instructional media included pictures, videos, power point and printed handout. Nurses were allowed to ask any interpretation, elaboration or explanation of any item included in the sessions.

Phase 4: Evaluation phase (post-test):

Each nurse in study group was interviewed in cardiothorathic department at International Medical Center, after applying the training program sessions to assess his or her knowledge and practice using the study tools II and II to determine the impact of training program on nurse's knowledge and practice regarding open heart surgery.

II- Administrative design

Ethical Consideration: an oral approval was obtained for conducting the study from all participants. All relevant ethical aspects were considered for ensuring nurses privacy and confidentiality of the collected data during the study. Aim of the study was explained to each nurse, and oral consent for participation in the study was obtained from each one of them.

Voluntary participation and right to refuse to participate in the study and withdrawn at any time was emphasized to nurses.

IV- Statistical design

All collected data were organized, categorized, tabulated, entered, and analyzed by using computer SPSS, (Statistical Package for Social Sciences), soft-ware program version 19 , which was applied to frequency tables, statistical significance and associations were assessed, and Spearman Rho Correlation Coefficient Test to detect the relations between the variables, mean, and standard deviation were also used.

Significance of results was as the following: •

Significant (S) $p \leq 0.05$

Non-significant (NS) $p > 0.05$

Results :

Table (1): portrayed that, about 57.5 % of the studied nurses were in age group of 21 - <30 Regarding the level of education of the studied nurses, it was found that, 40.0% of them had secondary nursing school. Concerning the years of experience, it was found that 50 % of the studied nurses had 6 - 10years of experience. Also,77.5 % of the studied nurses were female.

Table (2): revealed that, 55% of the studied nurses in pre test had unsatisfactory knowledge regarding open heart surgery versus 20% in post test. Also, it was found that 80 % of them had satisfactory knowledge in post test versus 45 % in pre test.

Table (3): revealed that, 65% of the studied nurses in pre test had unsatisfactory practice score regarding open heart surgery versus 25% in post test, but it was found that 75% of them had satisfactory practice score in post test versus 35% in pre test.

Table (4): pointed out that, nurses' total knowledge score correlated positively with their total practices score in pre, post of implementing the educational program.

Table (1): Frequency Distribution of Nurses According to their Sociodemographic Characteristics: (n. 40)

Socio-demographic characteristics	Studied nurses no. 40	
	n	%
Age		
Less than 21	8	20
21 - < 30	23	57.5
30 - ≤ 40	9	22.5
Educational level		
Secondary nursing school	20	40
Technical nursing institute	12	33.3
Bachelor degree	8	26.7
Years of experience		
1-5	12	30
6-10	20	50
11-15	8	16

Gender		
Male	9	22.5
Female	31	77.5

Table (2): Frequency Distribution of Nurses According to their Total Knowledge Score at Pre, Post and Follow Up Phases of the educational Program: (n. 40)

Total Knowledge score	Pre test				Post test			
	satisfactory		unsatisfactory		satisfactory		unsatisfactory	
	no.	%	no.	%	no.	%	no.	%
	18	45	22	55	32	80	8	20

Table (3): Frequency Distribution of Nurses According to their Total practice Score at Pre, Post of the educational program: (n. 40)

Total practice score	Pre test				Post test			
	satisfactory		unsatisfactory		satisfactory		unsatisfactory	
	no.	%	no.	%	no.	%	no.	%
	14	35	26	65	30	75	10	25

Table (4): Correlation Co-efficient between the Total Knowledge of Nurses Score and their Total Practice Score at Pre, Post. (n. 40)

Nurses Practice score	Nurses Knowledge score			
	Pre program		Post program	
	R	P	R	P
	0.882	<0.0001*	0.907	<0.0001*

(*) Significant at $P \leq 0.05$ R: Spearman Rho correlation coefficient p: p-value

Discussion:

After the implementation of the educational program, a significant improvement was demonstrated in the post-program phase, with the majority of the surveyed nurses being observed to have satisfactory knowledge of open heart surgery nursing. This result reflected the need for such information among these nurses. The effectiveness of the intervention was confirmed through multivariate analysis, which confirmed that program attendance was a strong and positive independent predictor of knowledge scores. The results showed that the nurses consistently used their knowledge and applied it to their daily work, contributing to memory and retention.

Our findings are in accordance with Hafez, 2014, who stated that, an improvement in nurses' knowledge sustained after implementing the educational program.

Also, there was a significant improvement demonstrated at the post-program phase which showed that majority of the nurses have satisfactory practice regarding open heart surgery nursing care. Taha and Ali, 2013, were in agreement with our findings, reported that, there was a positive significant improvement in nurses' practices after program intervention this improvement continued and extended even after two months. The findings of the current

study as well as this one highlight the need to provide in-service educational programs in acute care settings.

Regarding correlation between nurses' knowledge and their practice, it was found that, there was an extremely statistically significant correlation between total nurses' scores of knowledges and practice. This is certainly due to the impact of the training program which improved nurses' knowledge and practice. Nurses' knowledge and practice scores turned to be strongly and positively correlated. In fact this is an objective proof of the success of the program intervention and the authenticity of our question .

This result was in agreement with Malek, 2013, who stated that, there was positive correlation between nurses' knowledge and their practice. However, this result disagrees with Marouf, et al., 2012, who stated that, there was no statistically significant correlation between nurses' knowledge and practice

Conclusion:

The results of this study clearly showed that the training program significantly improved nursing knowledge and nursing practice for open-heart patients after implementation of the educational program.

Recommendations:

Continuing education programs should be provided for nurses, especially newly recruited nurses, to improve their knowledge and practice of cardiac surgery. Nurses caring for cardiac patients should receive theoretical training.

They should be well trained in the principles of caring for cardiac patients.

Specialized procedures required to care for patients.

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الملخص العربي

تأثير البرنامج التعليمي على معرفة وممارسة الممرضات فيما يتعلق برعاية المرضى

بعد جراحة القلب المفتوح

أصبحت جراحة القلب المفتوح ممارسة شائعة الاستخدام مصحوبة برعاية ما بعد الجراحة. تلعب ممرضات العناية المركزة دورًا حاسمًا في رعاية المرضى الذين يخضعون لجراحة القلب المفتوح. الهدف: تحديد تأثير البرنامج التعليمي على معرفة وممارسة الممرضات فيما يتعلق برعاية المريض بعد جراحة القلب المفتوح.

تم إجراء تصميم شبه تجريبي قبل الاختبار وبعده. تم تضمين عينة مقصودة من 40 ممرضة في وحدة العناية المركزة للقلب والصدر. المكان: أجريت هذه الدراسة في وحدة العناية المركزة للقلب والصدر في المركز الطبي الدولي. الأدوات: تم استخدام ثلاث أدوات لجمع البيانات؛ ورقة مقابلة الممرضات، وورقة تقييم معرفة الممرضات وقائمة مراجعة الممارسة. النتائج: أظهرت نتائج الدراسة أن هناك تحسنًا كبيرًا في معرفة وممارسة الممرضات بعد تنفيذ برنامج تعليمي لرعاية تمريض جراحة القلب المفتوح، حيث ان التوزيع التكراري للممرضات وفقًا لدرجة معرفتهن المرضية في مرحلة ما بعد البرنامج التعليمي كان هناك ارتباط إيجابي بين الدرجة الكلية للمعرفة لدى الممرضة ودرجة ممارساتهن الكلية في التقييم قبل وبعد تنفيذ البرنامج التعليمي مع وجود فروق ذات دلالة إحصائية عند الاستنتاج: أظهرت نتائج الدراسة أن البرنامج له تأثير إيجابي على معرفة وممارسة الممرضات فيما يتعلق برعاية الممرضات للمريض بعد جراحة القلب المفتوح. التوصيات: يمكن تطبيق البرنامج التعليمي كوسيلة تعليمية لجميع الممرضات العاملات في وحدات رعاية القلب والصدر.

الكلمات المفتاحية: جراحة القلب المفتوح، المعرفة التمريضية، ممارسة التمريض، البرنامج التعليمي.