

# Effectiveness of an Interventional Program on Nursing Staff practices toward the Prevention of Post-Operative Open Heart Surgery Complications

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**Abstract:** Cardiac surgery with a sternotomy is a highly aggressive procedure that causes extreme stress with local and systemic effects that change the organism's homeostasis and result in the development of postoperative problems. These complications vary in frequency depending on the surgical facility, the procedure, the patient's overall health, and comorbid conditions; they affect a number of organs, particularly the heart, lungs, and kidneys, lengthen hospital stays, impair quality of life, and may even raise mortality rates. The goal of the study is to see how effective the intervention program was in altering the nursing staff's practices toward the prevention of post-operative Open heart surgery Complications.

**Methods:** A quasi-experimental design has been applied with the use of the pre-posttest approach for study and control groups at an intensive care unit at AL-Nasiriyah Heart Center in AL-Nasiriyah city. The sample was non-probability (purposive). The data was analyzed using descriptive statistics and SPSS.

**Results:** Statistically significant improvements of nurses' practice toward the prevention of post-operative Open heart surgery Complications after the interventional program.

**Conclusion:** the interventional program was an effective educational tool for increasing nurses' practice regarding for Prevention of post-operative open heart surgery complications.

**Recommendations:** Nurses should be trained in the prevention of post-operative open heart surgery complications and more studies should be done regarding prevention of post-operative open heart surgery complications

**Keywords:** Interventional Program, Open Heart Surgery, Post-Operative Complications, Nurses practice.

## INTRODUCTION

Open-heart surgery is one of the surgical operations in which the thoracic cavity is opened; this surgery included arteries, muscles, valves, or other parts of the heart <sup>(1)</sup>.

Cardiac surgery with a sternotomy is a highly aggressive procedure that causes extreme stress with local and systemic effects that change the patient's homeostasis and result in the development of postoperative problems. These complications vary in frequency depending on the surgical facility, the procedure, the patient's overall health, and comorbid conditions; they affect a number of organs, particularly the heart, lungs, and kidneys, lengthen hospital stays, impair quality of life, and may even raise mortality rates <sup>(2)</sup>.

Surgical site infections (SSIs) and postoperative sepsis, cardiovascular issues (including myocardial infarction), respiratory issues (including postoperative pneumonia and failure to wean), and thromboembolic issues are some of the most frequent postoperative complications <sup>(3)</sup>.

Individuals who suffer a postoperative complication have significantly longer hospital stays, higher healthcare expenses, and a higher mortality rate. The length of stay is typically 3 to 11 days longer for patients who encounter postoperative problems than it is for people who do not <sup>(4)</sup>.

A cardiac surgery patient's postoperative care might be challenging since changes can occur quickly. Preoperative state and intraoperative events should both be taken into account while providing

postoperative care for the patient. In order to provide early treatment and ensure that the patient has a successful outcome, it is essential for the nurse to anticipate potential issues <sup>(5)</sup>.

Corporate culture had an impact on how employees developed professionally, and the company's dedication to employees' personal and professional growth was viewed as a sign of respect <sup>(6)</sup>.

### Methodology

A quasi-experimental design has been applied with the use of the pre-posttest approach for study and control groups during the period started from (26th of December, 2022 to the 2ed of April, 2023).

The researcher developed the study tools based on the nurses' preliminary assessment results and a review of relevant literature and research. Program's contents were evaluated by experts from several fields. Based on the recommendations and ideas of these experts, the program's contents were modified.

The content validity of the program (practice) was determined by a panel of 13 experts, all have over five years of expertise in their profession, to examine into the contents of the study tools.

A pilot study was conducted on 10 nurses who worked in the intensive care unit to determine the study tools' reliability. The nurses in the pilot study had the same parameters as the original study sample. Participants are submitted to the test and after two weeks the participant exposures to retest.

The study subject consists of (60) nurses working in AL-Nasiriyah Heart Center in AL- Nasiriya city. After the researcher has done the pre - test to the nurses who working in ICU, the nurses in the study group were exposed to the intervention program through four-classroom session to the study sample regarding of Prevention of post-operative open heart surgery complications. The researcher employed a practice checklist that includes (19) to assess the effectiveness of the intervention program on nursing staff practices.

### RESULTS:

The descriptive analysis in table 1,2 shows that 70% of nursing staff in the study group and 60% of them in the control group is female and remaining are males.

The average age for nursing staff in the study group is  $28.6 \pm 3.7$  year in which 46.7% of them are seen with age group of 23-less than 28 years. The average age for nursing staff in the control group is  $31.4 \pm 4$  year in which 53.3% of them are associated with age group of 28-less than 33 years.

Regarding level of education, the highest percentages in the study and control group are referring to bachelor degree in nursing as reported among 66.7% in the study group and 60% in the control group.

The average year of services in nursing refers to  $5.8 \pm 3.8$  year for those in the study group and  $6.5 \pm 4.3$  year for those in the control group and the highest percentage is referring to 1-less than 6 years among study group (63.3%) and control group (56.7%).

Regarding years of services in ICU, the highest percentage refers to 1-less than 6 years among 70% of nursing staff in the study group ( $M \pm SD = 4.7 \pm 3.2$  year) and 70% in the control group ( $M \pm SD = 5.4 \pm 3.4$  year).

Concerning participation in training courses, 76.7% in the study group and the same in the control group are reporting they participated in training courses; the highest percentage is referring to 1-less than 6 courses (mainly inside country) as reported by 60% in the study group and 50% in the control group. Only one nursing staff in the study group reported participation in training course outside country (3.3%).

Concerning self-development in field, 96.7% of nursing staff in the study group and 70% of them in the control group have shown intention for self-development and learning; and the sources of their development refer to social media as reported by 66.7% of them in the study group and 40% in the control group.

Table (3) the findings in the study group reveal that nursing staff are showing poor level of practices among all items of the scale during the pre-test time except item 12 that show fair which is (Monitor surgical incision and drain for sign of bleeding%); while during the post-test time, the nursing staff are showing fair among most of items but show poor among items 4 and 9; and show good among items 2, 8, 11, and 19.

The nursing staff in the control group show poor level of practices among all items of the scale during the pre-test and post-test times.

Table (1): Distribution of Nurses by their Socio-Demographic data. N= 60

No.	Characteristics	Study group		Control group		
		F	%	f	%	
1	Gender	Male	9	30	12	40
		Female	21	70	18	60
	<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	
2	Age (year)	23 – less than 28	14	46.7	5	16.7
		28 – less than 33	12	40	16	53.3
		33 – less than 38	3	10	5	16.7
		38 and more	1	3.3	4	13.3
		<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>
	<b>Mean ± SD</b>	<b>28.6 ± 3.7</b>		<b>31.4 ± 4</b>		
3	Level of education in nursing	Secondary school	1	3.3	0	0
		Diploma	9	30	12	40
		Bachelor	20	66.7	18	60
		<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>

No: Number, f: Frequency, %: Percentage, SD: Standard deviation

Table (2): Distribution of Nursing Staff according to their Professional Characteristics.

No.	Characteristics	Study group		Control group		
		F	%	f	%	
1	Years of nursing service	1 – less than 6	19	63.3	17	56.7
		6 – less than 11	7	23.3	7	23.3
		11 – less than 16	4	13.3	6	20
		<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>
	<b>Mean ± SD</b>	<b>5.8 ± 3.8</b>		<b>6.5 ± 4.3</b>		
2	Years of ICU services	1 – less than 6	21	70	21	70
		6 – less than 11	7	23.3	6	20
		11 – less than 16	2	6.7	3	10
		<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>
	<b>Mean ± SD</b>	<b>4.7 ± 3.2</b>		<b>5.4 ± 3.4</b>		
3	Participate in training course	No	7	23.3	7	23.3
		Yes	23	76.7	23	76.7
	<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	
4	No. of courses inside country	None	7	23.3	7	23.3
		1 – less than 6	18	60	15	50
		6 – less than 11	4	13.3	6	20
		11 – less than 16	1	3.3	2	6.7
	<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	
5	No of courses outside country	None	29	96.7	30	100
		1	1	3.3	0	0
	<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	
6	Self-development in field	No	1	3.3	9	30
		Yes	29	96.7	21	70
	<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>	

7	<b>Sources of self-learning</b>	None	1	3.3	9	30
		Social media	20	66.7	12	40
		Scientific websites	8	26.7	4	13.3
		Hospital library	1	3.3	5	16.7
		<b>Total</b>	<b>30</b>	<b>100</b>	<b>30</b>	<b>100</b>

No: Number, f: Frequency, %: Percentage, SD: Standard deviation

**Table (3): Assessment of Nursing Staff's Practices about Prevention Post-Operative Open Heart Surgery Complications among Study and Control Group**

List	Practices	Study group		Control group	
		Pre-test	Post-test	Pre-test	Post-test
		M	M	M	M
1	Hand washing	.30	1.77	.43	.37
2	Monitor vital sign (HR, BT, RR, BP%)	.13	2.03	.17	.00
3	Monitor O2 saturation	.20	1.97	.03	.03
4	Monitor CVP	.03	.73	.50	.50
5	sterile technique for instruments, monitor, and mechanical ventilation	.43	1.63	.90	.87
6	Check urine bag and change catheter every 3 days	.27	1.70	.27	.20
7	Change dressing every 3 days	.33	1.43	.00	.17
8	Monitor blood sugar	.03	2.23	.03	.53
9	Auscultation for heart sound	.03	.93	.33	.07
10	Monitor surgical incision for sign of infection	.03	1.47	.07	.10
11	Check input and output and measure and document balance every hour	.97	2.03	.97	.60
12	Monitor surgical incision and drain for sign of bleeding	1.07	1.70	.77	.87
13	Monitor electrolytes and replace as indicated	.97	1.87	.83	.40
14	Assess and document position of ETT at teeth and on CXR	.03	1.27	.13	.30
15	Assess patient ventilator settings and set all ventilator alarms	.03	1.33	.17	.10
16	Suctioning	.57	1.83	.47	.17
17	Physiotherapy include (Chest tapping, vibration and shaking nebulizer, Breathing exercise, deep breathing, Change position in and out of bed)	.23	1.77	.33	.47
18	Assess limb strength and pupillary assessment attended when vital	.17	1.80	.43	.47
19	Immediately report variances from pre-operative status for further investigation of embolic stroke	.07	2.07	.53	.50

Ass: Assessment, M: Mean, (Poor= 0 – 1, Fair= 1.1-2, Good= 2.1 -3%)

## Discussion:

The study show that the sample consists of 60 nurses who were The average age for nursing staff in the study group is  $28.6 \pm 3.7$  year in which 46.7% of them are seen with age group of 23-less than 28 years. The average age for nursing staff in the control group is  $31.4 \pm 4$  year in which 53.3% of them are associated with age group of 28-less than 33 years

This result is consistent with A quasi-experimental study in Al-Diwaniyah stated that the ages of both the study group and the control group ranged from 21 to 40 years (7).

Regarding the gender of the study participants, the results showed that more than half of the participants were female. The percentage of females was 70% of nursing staff in the study group and 60% of them in the control group and remaining are males.

These finding are similar a pre-experimental study in AL- Nasiriya city the researcher stated that the majority of study sample were female 27 (54.0%) of all study sample (8).

On the educational level, the results of the study showed that the highest percentages in the study and control group are referring to bachelor degree in nursing as reported among 66.7% in the study group and 60% in the control group.

This result was similar to A descriptive study used to assessment of nurses' knowledge concerning prevention of central venous catheter infection in intensive care units in Baghdad which stated that the most of intensive care unit nurses (54%) were nursing college graduates (9).

As well A descriptive study was carried out to determine the nurses' knowledge toward Cardiopulmonary resuscitation in Baghdad which reveals that most of the study samples (90 %) have Bachelorate level (10).

Regarding years of services in ICU, the highest percentage refers to 1-less than 6 years among 70% of nursing staff in the study group ( $M \pm SD = 4.7 \pm 3.2$  year) and 70% in the control group ( $M \pm SD = 5.4 \pm 3.4$  year).

This result was similar to A pre-experimental in Al-Diwaniya which show that the majority of nurses (60%) have (less than or equal 3) years of experience in ICU (11).

Concerning participation in training courses, 76.7% in the study group and the same in the control group are reporting they participated in training courses.

This result similar to A descriptive design study was carried out to assess nurse's knowledge toward essential care for patients with mechanical ventilation in Baghdad most of the study subjects (56%) had training session (12).

Concerning self-development in field, 96.7% of nursing staff in the study group and 70% of them in the control group have shown intention for self-development and learning; and the sources of their development refer to social media as reported by 66.7% of them in the study group and 40% in the control group.

This result is consistent with pre-experimental study in Iraq which stated that source the majority (50%) depend on the social media as a self-learning source (13).

The study finding reveals that interventional program is highly effective on nursing staff's practices in the study group as indicated by high significant difference with regard to post-test at  $p\text{-value} = 0.001$  respectively. Among those in control group, there is no significant difference has been reported in nursing staff's practices with regard to post-test.

This result is consisting with pre-experimental study in Iraq which show that there is a considerable practice improvement following the post-test and after completing an interventional program (29.65,70.6 % it was the mean) (14).

Another study in Baghdad shows a significant improvement in nurses' practices toward neonatal Endotracheal suctioning procedure at pre and post-test of the major domains at P. value equal to 0.000 (15).

As well pre-experimental study in Al-Diwaniyah city stated that there is highly statistically significant differences between pre and post-test of all practices domains regarding pressure ulcer prevention for the study sample (study sample) at ( $P < 0.001$ ); participants practices level has increased positively at post-test when analyzed by Paired-sample t-test (16).

## Conclusions:

The study confirms that there is a lack of nurses' knowledge regarding for prevention of post-operative open heart surgery complications and the interventional

program was an effective educational tool for increasing nurses' practice regarding for Prevention of post-operative open heart surgery complications.

### Recommendations:

- 1- Effectively activating the continuing education unit to give many lectures and training courses regarding prevention of post-operative open heart surgery complications and for the various departments of the hospital.
- 2- Nurses should be trained in the prevention of post-operative open heart surgery complications
- 3- More studies should be done regarding prevention of post-operative open heart surgery complications in the intensive care unit in the various governorates of Iraq because of the importance of this topic and the paucity of the studies dealing with it.

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**Ethical considerations:** all Nurses in AL-Nasiriyah Heart Center were filled the consent sheet before the sampling process.

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**Conflict of interest:** There are no organizations or individuals with whom I have a conflict of interest.

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