Effect of Nursing Interventional Program on Stressors for Patients undergoing Cardiac Surgery

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Abstract

Background: Although cardiac surgery is still the treatment of choice for large number of patients. It is considered a stressful, unwanted, life-threatening experience for many patients. Also, intensive care unit is known to be highly stressful for many patients. Improving patients cardiac and intensive care unit stressors require effective and satisfactory interventions by the nurses that help in stress relief. **Aim:** Evaluate the effect of nursing interventional program on stressors for patients undergoing cardiac surgery. **Design:** A quasi-experimental design was utilized in this study (pre/posttest for nurses and study/control for patients) to achieve the aim of this study. **Setting:** The study was conducted at Academic Institute for heart surgery affiliated to Ain Shames University Hospitals, Cairo, Egypt. **Subject:** A convenient sample of all staff nurses (50) working in cardiothoracic care units. In addition, a purposive sample of (60) adult patients undergoing cardiac surgery was selected according to certain inclusion criteria and was divided into two control and study groups. **Tools:** Tool (I) Self-administered nurses' questionnaire, Tool (II) nurses' practice observational checklist, Tool (III) Patient assessment record, Tool (IV) Revised Cardiac Surgery Stressors Scale (RCSSS) and Tool (V) The Intensive Care Unit Environmental Stressor Scale (ICUESS)**.Results:** The results of this study showed that, the total studied nurses' satisfactory level of knowledge and practice regarding caring of patients undergoing cardiac surgery improved post implementation of the designed nursing interventional program compared to pre (68%versus 90%) and (72% versus 94%) respectively. Furthermore, patients' total mean score of cardiac stressors and intensive care unit stressors improved post the designed nursing interventional program implementation compared to pre (21.64±7.4 versus 14.05±5.3) and (21±6.84 versus 14.93±5.2) respectively. **Conclusion:** Implementation of nursing interventional program on stressors for patients undergoing cardiac surgery had a statistically significant positive effect on level of nurses′ performance (knowledge and practice) and patients′ stressors. **Recommendations:** Implementing the designed nursing interventional program for nurses caring for patients undergoing cardiac surgery in different cardiac care units of different hospitals to improve their performance and patients stressors at intensive care unit.

Keywords: Nursing Interventional Program, Patients' stressors, Cardiac surgery

Introduction

Cardiovascular disease (CVD) is the world's deadliest disease. According to a report by the World Health Organization, more than 23 million people will die of CVD every year by 2030 **(Wang et al., 2023).** Cardiovascular diseases are the most mutual life-threatening conditions, such as coronary artery disease and heart valve disease. It is linked with physical manifestations such as pain, sweating and vomiting besides psychological manifestations such as stress and anxiety **(Mohammed et al., 2021)**

Although the innovation of less invasive procedures in treating cardiovascular diseases, cardiac surgery is still the treatment of choice for many patients. The most common kind of cardiac surgery is Coronary Artery Bypass Graft Surgery (CABG), it is an effective modality for the management of a subclass of coronary artery diseases patient. Valve surgery for management of valvular heart disease. It also includes correct congenital heart disease and heart transplantation **(Mahmoud et al., 2023).**

While cardiac surgery is a fruitful interventional technique in cardiovascular care and treatment, it is considered a stressful, unwanted, life-threatening experience for many patients **(Krampe et al., 2021).** Patient's worries related to cardiac surgery such as length of the waiting period before operation, being far from house and workplace and fear of

death resulting from disease or surgery. Also, fear about the recovery time, fear of pain and discomfort, fear about loss of appetite, weakness, sleep troubles, resumption of normal life activities after surgery are major stressors for patients **(Shabestari & Parizad, 2014).**

Critical illness and dealing in an intensive care unit (ICU) is known to be highly stressful for many patients, (ICU) constitutes a traumatic experience for them. Patients in the intensive care unit (ICU) experience more stress due to the physical environment of the ICU, the technological devices used, the way the ICU functions and the special management methods applied **(Karaer & Ozsaker, 2021).**

Managing stressors of cardiac surgery patients may reduce their hospitalization duration and have a better outcome on their improvement and recovery process. Because the nurses in clinical settings spend more time with the patient, they are in the best place to relieve patients' stressors. Nurses should prioritize patients' stressors according to their own perceptions and therefore perform planned care **(Sedaghat et al., 2019)**.

Providing effective interventions by the nurses helps in stressors release. Identification, controlling and managing stressors experienced by the patients should be commenced by the nurses, they manage pain, sleep complications, and other physical problems accurately, provide realistic information about surgery schedules and restarting lifestyle after the surgery **(Ahmed et al., 2017).** Nurses can support the patients through founding effective communication with them, listening to their worries and feelings. They can also respect the patients and support their adaptive mechanisms **(Rezaei, et al., 2017).**

Significance of the study:

Based on the results of the Meta-Analysis, 68 studies on the prevalence of depression with a sample size of 110,219, 36 studies on the prevalence of anxiety with a sample size of 72,374 and 5 studies on the prevalence of stress with a sample size of 533 considered for the meta-analysis. High prevalence rate of depression, anxiety, and stress showed in cardiac patients. The prevalence of depression was 31.3 %, anxiety prevalence; 32.9 % and stress prevalence was 57.7 % **(Karami et AL., 2022).**

Nurses play an important role in the assessment of patients' needs and teach them to have better outcomes. Therefore, continued education of nursing staff will improve the quality of nursing care by improving nurses' knowledge and skills, in which all of these can reflect improvement of patient's clinical status and stressors level for patients undergoing cardiac surgery. Therefore, a nursing interventional program was chosen for nurses to improve their knowledge and practice regarding care of patients undergoing cardiac surgery to decrease level of stressors for those patients.

Aim of the study

This study aimed to evaluate the effect of nursing interventional program on stressors for patients undergoing cardiac surgery through the following:

1. Assessing the nurses' level of performance (knowledge & practice) regarding care of patients undergoing cardiac surgery pre nursing interventional program implementation.
2. Assessing the level of stressors for patients undergoing cardiac surgery pre nursing interventional program implementation.
3. Designing and implementing nursing interventional program for nurses caring for patients undergoing cardiac surgery.
4. Assessing the nurses' level of performance (knowledge & practice) regarding care of patients undergoing cardiac surgery post nursing interventional program implementation.
5. Assessing the level of stressors for patients undergoing cardiac surgery post nursing interventional program implementation

Research Hypothesis:

The current study hypothesized that: the designed nursing interventional‒‒program implementation will upgrade the level of nurses' knowledge and practice regarding care of patients undergoing cardiac surgery and subsequently promote level of stressors for patients undergoing cardiac surgery.

Subjects and Methods

A-Research design:

A quasi-experimental design was utilized in this study (pre/posttest for nurses and study/control for patients) to evaluate the effect of nursing interventional program on stressors for patients undergoing cardiac surgery.

B- Research Setting:

The study was conducted at Academic Institute for heart surgery affiliated to Ain Shames University Hospitals. The setting includes two cardiothoracic care units on the fourth floor and had 22 beds for patients.

C- Subjects:

The study included a convenient sample of all available staff nurses (50) working in cardiothoracic care units. In addition, a purposive sample of (60) adult patients undergoing cardiac surgery was selected from both genders, with no critical or psychotic disorders, able to comprehend instructions, not exposed before for any educational or learning experience and agreed to participate in the study. The studied patients were divided into control and study groups; the control group (30 patients) pre-implementation of the designed nursing interventional program and the study group (30 patients) post-implementation of the designed nursing interventional program.

Sample Size:

The sample size calculation of (60) patients was done statistically based on power analysis: Type I error (a) = 0.05 Type II error (B) = 0.2 with power of test 0.80, (I-B) 80% and confidence interval = 95%

Tools for data collection:

The study data were collected through the following five tools:

I-Self-administered nurses' questionnaire: It was used to assess nurses' level of knowledge regarding care of patients undergoing cardiac surgery. It was developed by the researchers after reviewing the related literature: **(Mohamed, et al., 2023; Alshvang, 2018; Elateif, 2017).**

It consisted of two parts **Part (A)**: **Nurses' demographic data:** It was used to assess studied nurses' data regarding; age, gender, qualifications, training sessions and years of experience. **Part (B)**: **knowledge assessment questionnaire;** it was used to assess nurses' knowledge regarding care of patients undergoing cardiac surgery. It consisted of 5 parts answered by short, ended questions and true and false questions as following: anatomy and physiology of heart coronary arteries and valves of heart (8 items), knowledge about cardiac surgery (definition, purpose, classifications, indications, complications) (14 items), pre- operative nursing care of cardiac surgery patients (16 items), post- operative nursing care (23 items), and knowledge about stressors for patients undergoing cardiac surgery (13 items).

Scoring system: The correct answer of nurses' knowledge scored by one, while the incorrect answer scored by zero. Total score was 74 marks, and it considered that: ≥ 90 % (≥ 66.6 marks) was satisfactory while < 90% (< 66.6 marks) was unsatisfactory.

II-Nurses' practice observational checklist: It was developed by the researchers based on the related literature **(Mohamed et al., 2020; Hardin, & Kaplow, 2019; Elateif, 2017).**

To assess nurses' level of practice regarding care of patients undergoing cardiac surgery including; pre-operative nursing intervention (general preparation (6 steps), patients' preparation (8 steps), patients' teaching (12 steps) and post operative nursing intervention (immediate nursing intervention (19 steps), chest tube assessment and care (15 steps), ETT tube care and suctioning (24 steps), mechanical ventilator caring (15 steps), surgical wound dressing (13 steps), and patients teaching (13 steps).

Scoring system: If the step was done correctly, it scored one, while if the step wasn't done or done incorrectly, it scored zero. The total score was 125 marks. It was considered that: ≥ 90 % (≥ 112.5 marks) was satisfactory, while < 90 % (< 112.5 marks) was unsatisfactory.

III: Patient assessment record: it was developed by researchers based on reviewing recent literature **(Reisdorfer, et al., 2021).**

This tool consisted of two parts: **Part (A):** Patient demographic data (e.g., patients' age, gender, and level of education,) and **Part (B)**: Patient medical data **(**e.g., medical diagnosis, present and past medical history, length of hospital stays and frequency of admission to ICU.

VI: Revised Cardiac Surgery Stressors Scale (RCSSS): It was adapted from **White, (1998)**. It consists of 37 stressors that are divided into intrapersonal (11 stressors), interpersonal (9 stressors), and extra personal stressors (17 stressors).

Scoring system: each patient's stressor was given one score and zero score for unpresented stressors.

V: The Intensive Care Unit Environmental Stressor Scale (ICUESS): This tool was adapted from **Ballard (1981).** The tool was consisted of (29) statements representing five sources of stressors in the ICU including design and physical structure of ICU (6 stressors); rules and regulations (4 stressors); health team personnel and workers (7 stressors); others surrounding patients (2 stressors); and patient him/herself (10 stressors).

Scoring system: each patients' stressor was given one score and zero score for unpresented stressors.

The ethical research considerations in the study included the following:

- Ethical approval to conduct the study was received from scientific research ethics committee faculty of nursing Ain shams university, Cairo Egypt under study number (23. 10.151) and the director of Academic Institute for heart surgery at which the study was conducted
- The researchers clarified the objectives and aim of the study to nurses and patients included in the study.
- The researchers assured and maintained anonymity and confidentiality of subjects` data.
- Nurses and Patients were informed that they were allowed to withdraw from the study at any time.

Content validity and reliability: Content Validity of the developed tools (I, II & III) and the adapted tools (IV & V) was tested using face and content validity through a jury of seven experts from the critical care and emergency nursing department, Ain Shams University (three professors, two assistant professors and two lecturers). The experts reviewed the tools for clarity, relevance, comprehensiveness, and simplicity; minor modifications were done. Reliability was estimated statistically for the developed tools by alpha Cronbach test. alpha Cronbach for **Self-administered questionnaire** was 0.806, for **Nurses' observational checklist** was 0.791, for **RCSSS** was 0.880 and for **ICUESS** was 0.831 which indicated moderate to high reliability of the used tools.

Pilot study:

A pilot study was carried out on 10% of total study subjects of nurses (five nurses) and 10% of total study subjects of patients (six patients) to test applicability, clarity as well as the time needed to conduct the study tools. Obtained results used as a guide to reconstruct the changes and modifications needed in the data collection tools and those subjects (nurses and patients) were excluded from the study sample.

Field work:

Data collection for the study subjects took about six months, started from the beginning of May 2023 until the end of October 2023.

A. Assessment phase:

The data collection during this phase took about (nine weeks). It was carried out as the following: The researchers visit the selected previously mentioned setting two days per week (Saturday and Thursday) at morning and afternoon shift). A convenience sample of all available nurses (50 nurses) caring for patients undergoing cardiac surgery were enrolled in the study. The researchers interviewed all the studied nurses for explaining the aim of the study and took their approval to participate in the study prior to data collection, then the nurses' needs assessment regarding their performance (knowledge and practice) for caring of such group of patients were done using the previous mentioned tools (I&II) pre

the implementation of designed nursing interventional program as the following sequence:

Firstly, the practice observational checklist **(tool II)** was used prior to administration of the questionnaire (**tool I**) to ensure the maximal realistic observations of the nurses' practice and minimize the possibility of contamination. Each nurse was observed by the researchers while caring for the patients undergoing cardiac surgery including pre and post procedure nursing care, about five nurses were observed each day during their shifts. The 50 nurses took about 6 weeks to be observed by the researchers. Then, Self-administered questionnaire tool (I) was used to assess nurses' level of knowledge regarding care of patients undergoing cardiac surgery. This tool was distributed by the researchers to the studied nurses in the stated shifts and filled in by each one; it took about 20-30 minutes.

A purposive sample of 30 patients undergoing cardiac surgery were recruited as a control group pre the nursing interventional program implementation, which selected according to inclusion criteria and explaining simply the aim and nature of the study as well as taking their approval to participate in the study prior to data collection for assessing their stressors regarding cardiac surgery using tools (III, IV&V) which were filled by the researchers for each patient. It took about 30-45 minutes.

The researchers collected the data from the control group of patients in the previously mentioned two days at the morning and afternoon shifts, data were collected from five patients each day from the mentioned settings at the same time of collecting data regarding nurses' practice during care of patients undergoing cardiac surgery before implementing the interventional program.

B. Planning phase:

An Arabic booklet contained the designed nursing intervention program were developed by the researchers including three chapters as the following: **chapter 1**; Overview about cardiac surgery (anatomy and physiology of heart coronary arteries and valves of heart and definition, purpose, classifications, indications, and complications of cardiac surgery. **Chapter 2**; Stressors for patients undergoing cardiac surgery. **Chapter3**; Nursing intervention for patients undergoing cardiac surgery (pre- and post- operative nursing intervention).

A plan for interventional program sessions was developed to guide the researchers in the implementation and evaluating its effectiveness on the nurses' performance (knowledge and practice) and patients' stressors. The general objective of the program was that the nurses caring for patients undergoing cardiac surgery will acquire the necessary knowledge, skills regard caring for patients undergoing cardiac surgery and the stressors facing them that reflect positively on their performance and consequently on patients' stressors.

The intermediate objectives of the program were the nurses caring for patients undergoing cardiac surgery will be able to state the basic knowledge regarding cardiac surgery, explain stressors for patients undergoing cardiac surgery and apply the nursing intervention for patients undergoing cardiac surgery.

Implementation phase:

The data collection during this phase took about (5 weeks). It carried out through the following sequence:

An interventional program conducted by the researchers to the studied nurses caring for patients undergoing cardiac surgery in the selected setting. Its main purpose is to ensure that each nurse has the capability to apply nursing interventional for such group of patients.

Interventional program sessions were conducted by the researchers for all the studied nurses based on their needs' assessment. The total number of interventional program sessions was four sessions (two theoretical and two practical sessions) for covering its content. The duration of each session was about 60 minutes.

The interventional program was conducted at the nursing office in two times; first time in the morning shift from 1-2 pm over two days/ week (Saturday and Thursday) for group of nurses (about ten nurses) and second time in the afternoon shift from 3-4 pm for another group of nurses (about ten nurses), so 20 nurses

received the four intervention program sessions in 2 weeks. The same manner followed by the researchers for the five groups of nurses for covering total number of nurses in the selected setting (50 nurse), so the intervention program took (5 weeks).

The interventional program started with orientation about its purpose and proceeding with the content by using simple words and proper tone of voice that showed interest, concern, and friendly manner. The teaching methods were lectures, small group discussion, role play, and demonstration supported by using posters and teaching on spot.

The first session included an orientation about the objectives, content of the program, plan of its session implementation and overview about cardiac surgery, the second and third session included nursing care for patients undergoing cardiac surgery and the third session about patients' stressors.

Nurses were allowed to ask questions in case of misunderstanding while listening and expressing interest for them. At the end of these sessions the researchers informed them that they will be followed up by the researchers after two weeks of the designed nursing interventional program implementation at the cardiothoracic care units for post nursing interventional program evaluation.

C. Evaluation phase:

The data collection during this phase took about (nine weeks). It carried out through the following sequence:

Post the interventional program implementation, the studied nurses performance level (knowledge and practice) was assessed by the researchers using the previous mentioned tools (I&II) and the studied group of patients were evaluated regarding their stressors level using tool (III, IV&V) in the same manner as stated in the assessment phase after two weeks of the nursing interventional program implementation.

Evaluating the effect of the interventional program implementation on nurses' performance and patients' stressors were done by comparing the related results pre and post the nursing interventional program implementation.

IV. Statistical Design:

The data was collected, coded, and entered in a suitable excel sheet. Data were transferred into (the statistical package for social science) SPSS version (17). Quantitative data were presented as mean, standard deviation; comparison was done using X^2 test, t test and Pearson correlation coefficient test. Qualitative data were presented as percentages.

Results:

Table 1 showed that, (64.0%) of the studied nurses were female, (38 %) of them their age ranged from 30-<40 years with mean age 33.24 ± 6.3, and (42 %) of them were nursing school diploma. Regarding their experience years (36%) of them have experience from 10-<15 years with mean experience 20.07 ± 8.39 years and 73.3% of them hadn't received any training courses.

Figure (1) represented that, the total studied nurses' satisfactory level of knowledge and practice regarding caring of patients undergoing cardiac surgery improved post the designed nursing interventional program implementation compared to pre (68%versus 90%) for knowledge and (72% versus 94%) for practice (P≤0.05).

Table (2) clarified that, 53.3% and (60%) of patients in the control and study group respectively were male. Regarding age, (60%) of patients in the control group were ≥40 with mean age 38± 7.3 and (66.7%) of the study group were ≥ 40 with mean age 38.5± 6.7. As for their educational level (53.4%) and (63.3%) of the control and study group respectively can read and write. There were no statistically significant differences between the two groups (control\study) according to their demographic characteristics (P<0.05).

Table (3) regarding intrapersonal stressors, there was a statistically significance improvement post the nursing interventional program implementation regarding stressors of pain or discomfort and fear of dying because of patients' illness or surgery (P≤0.05). While there was no statistically significance improvement post the nursing interventional

program implementation regarding having cardiac surgery, Time lapse before actual surgery, needing pain medications, Change in diet and eating habit, Increasing activity, Resuming previous lifestyle, Being thirty, resuming sexual activity and the progress she/he is making (P≤0.05).

Concerning interpersonal stressors there was a statistically significance different post the nursing interventional program implementation regard needing assistance with various activities, sharing the room with one or more patients, different nurses caring for patients and discussing patients concerns about surgery with physicians and nurses and having physicians and nurses discuss about another patient. (P≤0.05).

Regarding extra personal stressors there was a statistically significance improvement post the nursing interventional program implementation regarding being away from home or/and business, having chest tube, having visitors only certain hours, sleeping in strange and uncomfortable place also, being stuck with needles, payment of hospital and medical bills, being restrained, being transferred from intensive care unit, not having things within easy reach, having the monitoring equipment discontinued, having urinary catheter and cardiac monitors and other connected devices (P≤0.05).

In addition, there was a statistically significance difference regarding patients' cardiac stressors post the nursing interventional program implementation compared to pre (Mean ± SD = 21.64±7.4 versus 14.05±5.3) respectively.

Table (4) represented the design and structure of the unit, there was statistically significance difference post the nursing interventional program implementation regard having lights on constantly, being in a room that is too hot or cold, hearing the alarms from the machinery and Presence of a strange and unfamiliar noise (P≤0.05).

Regarding Sources related to the laws and system of unit, there was statistically significance difference post the nursing interventional program implementation regarding restrictions to smoke and lack of radio and TV, frequent examinations by a physician or nurse and measuring vital signs frequently. In relation to the teamwork of the unit, there was statistically significance difference post the nursing interventional program implementation regarding nurses always work in a hurry, measuring the amount of urine frequently, and health workers speaking in a loud voice (P≤0.05).

As for Sources related to other patients in ICU, there was no significant effect post implementation of nursing interventional program on stressors of study group than pre among the control group regarding hearing of aches of other patient and death of patients in the next bed (P>0.05).

In relation to sources related to the patient himself there was statistically significance difference post the nursing interventional program implementation regarding seeing family for a few minutes each day, being in fear of unknown plan, unable to take decisions, inability to communicate with others, not knowing the place (P≤0.05).

In addition, there was statistically significance improvement regarding patients' cardiac stressors post the nursing interventional program implementation compared to pre (Mean ± SD = 21±6.84 versus 14.93±5.2) respectively.

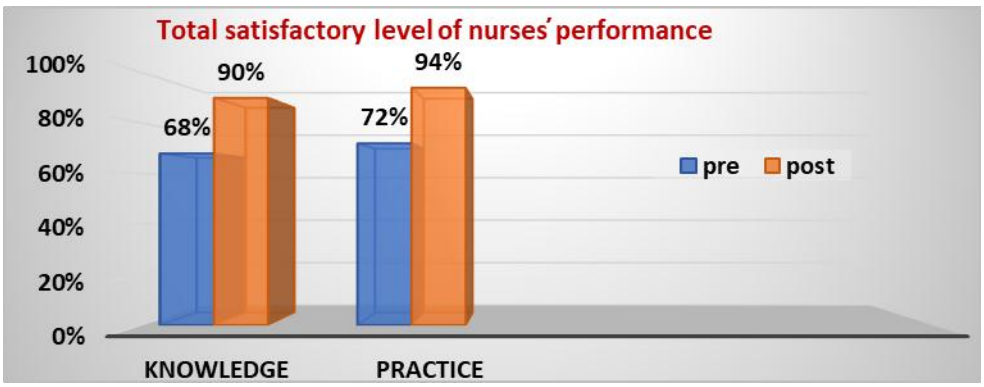
Table (5) revealed that there was statistically significant relation between total mean score of nurses' knowledge and their demographic characteristics including age, level of education, and years of experience pre and post the nursing interventional program implementation (P≤0.05).

Table (6) declared that there was statistically significant relation between total mean score of nurses' practice and their level of education and years of experience pre the nursing interventional program implementation. While there was statistically significant relation between total mean score of nurses' practice and their demographic characteristics including age, level of education and years of experience prost the nursing interventional program implementation (P≤0.05). **Table (7)** illustrated that there was a positive correlation between total level of

nurses' knowledge regarding caring of patients undergoing cardiac surgery and their total practice level re and post the nursing interventional program implementation (P≤0.05). While there was negative correlation between total level of nurses' knowledge and patients' cardiac stressors and patients ICU stressors (P≤0.05). Also, there was a negative correlation between total level of nurses' practice and patients' cardiac stressors and patients ICU stressors post the nursing interventional program implementation (P≤0.05).

Table (1): Frequency distribution of the studied nurses according to their demographic characteristics (n=50)

Demographic characteristics	Studied nurses	
	N	%
Gender		
Male	18	36 %
Female	32	64%
Age		
<25 years	11	22 %
25-<30 years	14	28 %
30-<40 years	19	38 %
≥ 40	6	12 %
Mean ± SD 33.24 ± 6.3		
Level of education		
Nursing school diploma	21	42 %
Nursing institute diploma	12	24%
Nursing Bachelor	17	34%
Experience years		
1<5 years	15	30 %
5-<10 years	7	14 %
10-<15 years	18	36 %
≥ 15	10	20%
Mean ± SD 20.07 ± 8.39		
Training courses about nursing care of patients undergoing cardiac surgery		
Yes	8	26.7%
No	22	73.3%



Knowledge X^2 test 7.293 at **P-value** 0.006 / **practice X^2** test 8.575 at **P-value** 0.003

Figure (1): comparison of total satisfactory level of nurses' performance (knowledge and practice) regarding caring of patients undergoing cardiac surgery pre and post the nursing interventional program implementation (n= 50).

Table (2): Comparison of the studied patients' demographics-characteristics in control and study groups

Demographic characteristics	Studied patients				Chi-square	
	control (n=30)		Study (n=30)			
	N	%	N	%	X^2	P-value
Gender						
Male	14	46.7	12	40.0	0.271	0.602
Female	16	53.3	18	60.0		
Age						
25<30	2	6.7	0	0	3.057	0.382
30<35	4	13.3	2	6.7		
35<40	6	20	8	26.6		
≥40	18	60	20	66.7		
Mean± SD	38± 7.3		38.5± 6.7.			
Level of education						
Cannot read and write.	4	13.3	2	6.7	3.542	0.315
Read/ Write	16	53.4	19	63.3		
Secondary level	8	26.6	4	13.3		
High education	8	26.7	9	30.0		

Table (3): Comparison of cardiac stressors for the patients in control and study groups

Items	Studied patients				Chi-square	
	Control group (n=30)		Study group (n=30)			
	N	%	N	%	X^2	P-value
Intrapersonal stressors						
Pain or discomfort	27	90	16	53.3	9.931	0.001*
Fear of having cardiac surgery	24	80	22	73.3	0.372	0.541
Fear of dying because of patients' illness or surgery	18	60	10	33.3	4.285	0.038*
Time lapse before actual surgery	22	73.3	17	56.7	1.831	0.175
Needing pain medications	23	76.7	20	66.7	0.738	0.738
Change in diet and eating habit	26	86.7	18	60	5.454	0.019*
Increasing activity	23	76.7	12	40	8.297	0.003*
Resuming previous lifestyle	18	60	13	43.3	1.668	0.196
Being thirty	10	33.3	5	16.7	2.222	0.136
Resuming sexual activity	28	93.3	27	90	0.218	0.640
The progress she/he is making	20	66.7	18	60	0.287	0.592
Interpersonal stressors						
Needing assistance with various activities	21	70	10	33.3	8.075	0.004*
Sharing the room with other patients	13	43.3	3	10	8.522	0.003*
Different nurses caring for patient	17	56.7	6	20	6.493	0.010*
Taking medications	16	53.3	10	33.3	2.443	0.118
Discussing patient concerns about surgery with doctors and nurses.	23	76.7	12	40	8.297	0.003*
Explanation of hospital routines and procedures	10	33.3	5	16.7	2.222	0.136
Having doctors and nurses discuss about patient	23	76.6	12	40	8.297	0.003*
Number of doctors involves patients' care	17	56.7	11	36.7	0.277	0.598
Call light being answered	21	70	14	46.6	3.36	0.066
Extra personal stressors						
Being away from home or/and business	29	96.7	16	53.3	15.02	0.000*
Having chest tube	30	100	18	60	15	0.000*
Having visitors only certain hours	30	100	21	70	10.588	0.001*
Sleeping in strange and uncomfortable	30	100	23	76.7	7.924	0.004*
Having patients' sleep interrupted	26	86.7	20	66.7	3.354	0.067
Having tubes in patients' nose and mouth	30	100	30	100	__---	----
Problems that other patients are having	19	63.3	11	36.7	4.266	0.038*
Being stuck with needles	22	73.3	10	33.3	9.642	0.001*
Payment of hospital and medical bills	20	66.7	11	36.7	5.406	0.020*
Being restrained	24	80	9	30	6.550	0.010*

Items	Studied patients				Chi-square	
	Control group (n=30)		Study group (n=30)			
	N	%	N	%	X^2	P-value
Being transferred from intensive care unit	18	60	10	33.3	4.285	0.038*
Loss of income because of disease	17	56.7	10	33.3	3.299	0.069
Not having things within easy reach eg. call light.	12	40	9	30	16.238	0.000*
Following hospital schedule rather than own	24	80	19	63.3	2.051	0.152
Having monitoring equipment discontinued	26	86.7	13	43.3	12.380	0.000*
Having a urinary catheter	14	46.7	7	23.3	3.589	0.058
Cardiac monitors and other equipment	30	100	21	70	10.588	0.001*
Mean ± SD	21.64±7.4		14.05±5.3		6.459	<0.0001*

*Non-significant P>0.05 * statistically significant P≤0.05*

Table (4): Comparison of patients' perception of ICU stressors between the control and study groups.

Items	Studied patients				Chi-square	
	Control group (n=30)		Study group (n=30)			
	N	%	N	%	X^2	P-value
1)Sources related to the design and structure of the unit						
Having lights on constantly	14	46.7	5	16.7	6.238	0.012*
Uncomfortable pillows	7	23.3	5	16.7	0.416	0.518
Being in a room that is too hot or cold	21	70	11	36.7	6.25	0.012*
Hearing the telephone ring	4	13.3	3	10	0.161	0.687
Hearing the alarms from the machinery	30	100	23	76.7	7.924	0.004*
Presence of a strange noise	27	90	12	40	16.483	0.000*
2) Sources related to the laws and system of unit						
Restrictions to smoke	21	70	11	36.7	8.604	0.003*
Lack of radio or TV	21	70	9	30	11.745	0.000*
Frequent examinations by a physician or nurse	7	23.3	3	10	7.177	0.007*
Measuring vital signs frequently	16	53.3	10	33.3	2.443	0.118
3) Sources related to teamwork of the unit						
Nurses do not identify themselves	20	66.7	16	53.3	1.111	0.291
Nurses always work in a hurry	30	100	24	80	6.666	0.009*
Nurses observe the safety of devices continuously	12	40	6	20	2.857	0.090
Nurses do not listen to complaints	30	100	30	100	---	---
Asking patients about amount of oral liquids	8	26.7	5	16.7	0.883	0.347
Measuring the amount of urine frequently	11	36.7	4	13.3	4.355	0.036*
Health workers speaking in a loud voice	28	93.3	22	73.3	4.32	0.037*
4) Sources related to other patients						
Hearing of aches of another patient	30	100	30	100	---	---
Death of patients in the next bed	30	100	30	100	---	---
(5) Sources related to the patient himself						
Seeing family for a few minutes each day	23	76.7	12	40	8.297	0.003*
Being unfamiliar with time, day, and date	22	73.3	16	53.3	2.583	0.107
Being in fear of unknown plan	30	100	22	73.3	9.230	0.002*
Inability to sleep as usual	30	100	27	90	3.157	0.075
Unable to take decisions	22	73.3	12	40	6.787	0.009*
Being bored	15	50	17	56.7	0.267	0.604
Inability to communicate with others	25	83.3	13	43.3	10.334	0.001*
Not knowing the place	26	86.7	19	63.3	4.355	0.036*
Being exposed to infectious diseases	24	80	19	63.3	2.051	0.152
Fear of death	30	100	26	86.7	1.458	0.227
Mean ± SD	21±6.84		14.93±5.2		5.472	<0.0001

*Non-significant P>0.05 * Statistical significant P≤0.05*

Table (5): Relation between total mean score of nurses' knowledge regarding caring of patients undergoing cardiac surgery and their demographic characteristics pre and post nursing interventional program implementation.

Items	Total mean score of nurses' knowledge					
	Pre			Post		
	Mean ± SD	f/t	P-value	Mean ± SD	f/t	P-value
Age						
18<30	39.15±3.87	4. 861	0.02 8*	55.00 ± 4.09	5.882	0.015*
30<40	46.32 ± 3.08			62.93 ± 5.21		
40<50	43.17 ± 4.44			59.37 ± 3.18		
Level of education						
Nursing diploma	38.26±3.65	4.058	0.024*	51.06 ± 4.15	19.538	<0.001*
Nursing institute	44.28 ± 3.49			60.37 ± 3.89		
Nursing bachelor	47.54 ± 4.01			63.81 ± 4.00		
Years of experience						
<5 years	39.19±2.64	5.825	0.016*	51.03 ± 4.89	3.937	0.039*
5<15	42.24 ± 3.06			59.39 ± 3.23		
15<30	46.54 ± 3.99			63.95 ± 4.19		

*Non-significant P>0.05 * Statistical significant P≤0.05*

Table (6): Relation between total mean score of nurses' practice regarding caring of patients undergoing cardiac and their demographic characteristics pre and post the nursing interventional program implementation.

Items	Total mean score of nurses' practice					
	Pre			Post		
	Mean ± SD	f/t	P-value	Mean ± SD	f/t	P-value
Age						
18<30	80.35±5.67	3.008	0.08 3	103.63 ± 6.38	2.322	0.028*
30<40	89.17 ± 5.58			107.34±5.21		
40<50	85.48 ± 6.84			104.01±5.99		
Level of education						
Nursing diploma	79.28±6.01	4.861	0.02 8*	98.51 ± 6.29	6.33	0.005*
Nursing institute	86.19 ± 5.74			106.11±5.09		
Nursing bachelor	90.22 ± 5.56			107.31±4.91		
Years of experience						
<5 years	82.60±5.66	6.429	0.04 0*	98.00 ± 6.08	5. 357	0.021*
5<15	87.78 ± 6.04			103.61±5.08		
15<30	91.71 ± 5.18			106.74±6.81		

*Non-significant P>0.05 * Statistical significant P≤0.0*

Table (7) Correlations between total level of nurses' knowledge and their total level of practice and patients' stressors level pre and post the nursing interventional program implementation regarding caring of patients undergoing cardiac surgery.

Items	Total level of nurses' knowledge			
	Pre		Post	
	Pearson Correlation Coefficient	P-value	Pearson Correlation Coefficient	P-value
Total level of nurses' practice	0.435	0.001*	0.501	0.0002*
Cardiac stressors (RCSS)	- 0.082	0.533	- 0.328	0.010*
ICU stressors (ICUSS)	- 0.098	0.456	- 0389	0.002*
Items	**Total level of nurses' practice**			
	Pre		**Post**	
	Pearson Correlation Coefficient	**P-value**	**Pearson Correlation Coefficient**	**P-value**
Patients' cardiac stressors (RCSS)	- 0.218	0.097	-.0327	0.010*
Patients' ICU stressors (ICUSS)	- 0.192	0.141	- 0.392	0.001*

Discussion

Continuing education and staff development is the target to help the nurses maintain and refine their performance as required for the delivery of quality care to the patients (**Biglar, et al., 2019).**

Therefore, the present study was carried out in order to evaluate the effect of nursing interventional program on stressors for patients undergoing cardiac surgery.

The discussion of this study finding supporting our research hypothesis stated that the designed nursing interventional program will upgrade the level of nurses' knowledge and practice regarding care of patients undergoing cardiac surgery and subsequently promote level of stressors for patients undergoing cardiac surgery.

Regarding nurse's demographic characteristics, the results of the present study revealed that two third of the studied nurses were females with mean age 33.24 ± 6.3 years old and more than half of them were married. This may be due to that the higher percentage of female nurses increased in the number compared with males in our country Egypt. This finding is consistent with **Parvan, et al., (2012)** who found in study entitled "Nurse's perception of stressors associated with coronary artery bypass surgery" that all the participating nurses were female and most of them were married.

Regarding the professional level of the studied nurses, the present study revealed that two third of them were diploma nurses with 10-<15 years of experience and all of them had not received any courses about stress and management in ICU. This may be due to lack of in-service training programs/ workshops/ scientific conferences regarding stressors and management in ICUs as well as the health care team focused on providing care for critical ill patients and decisions toward life-threatening conditions.

This result in the agreement with study conducted by **Sasidharan & Dhillon (2021)** entitled: "Intensive care unit stress and burnout among health-care workers" who reported that one of the unique challenges faced by health care personnel is the education framework in ICUs only focusses on management of the illness, handling the added burden of stress that comes with the management becomes overwhelming.

Regarding the total nurses performance (knowledge and practice), the current study indicated that, there was significant improvement in the studied nurses satisfactory level of performance regarding caring of patients undergoing cardiac surgery Post the designed nursing interventional program implementation compared to pre in which about two third of the studied nurses had satisfactory level of performance Pre the program implementation, while the majority of them had satisfactory level of performance Post the program implementation.

The significantly improvement in the level of the studied nurses' performance (knowledge and practice Post the nursing interventional program implementation might be related to the fact that the majority of the studied nurses had increased awareness regarding their responsibilities toward the care of patients undergoing cardiac surgery, which increased their readiness for learning new things.

This study is consistent with **Elateif, (2017)** who reported in the study entitled: "Effect of Training Program Regarding Care of Patients Undergoing Open Heart Surgery on Nurses' Performance Approach" that, Significant improvements are demonstrated in nurses' level of performance regarding open heart surgery post program as it was noticed that more than one half of the study subjects had unsatisfactory performance level preprogram implementation, while less than two third of them had satisfactory performance level post program implementation.

Concerning the patients' demographic characteristics, the present study shows that two third of the control group and the study group their age ≥40 years old, more than half of them were females. This may be due to that female more liable to some form of heart disease than males which can affect them at any age.

These finding with harmony of **CDC, (2023)** that noted heart disease is the leading

cause of death for women. In 2021, it was responsible for the deaths of 310,661 women or about 1 in every 5 female deaths. Research has shown that above half (56%) of US women recognize that heart disease is their number 1 killer.

As regards educational level, more than half of the control group and about two third of the study group can read and write. Educational level can help the patient to understand health care providers' directions and may increase their knowledge and improve the level of stressors for those patients. There were no statistically significant differences between the two groups according to their demographic characteristics this could be attributed to the patients in both groups were homogenous.

concerning to the total satisfactory level of nurses' performance (knowledge and practice) regarding caring of patients undergoing cardiac surgery, there were statistically significance effect post implementation of nursing interventional program on stressors of study group. This is because of the positive effect of the interventional program that was given to the nurses after assessing their needs, which was written in a simple Arabic language based on scientific references and supported with related pictures.

Regarding intrapersonal stressors, the present study results showed that there was statistically significant effect regarding stressors of pain or discomfort, dying because of patients' illness or surgery in post implementation of nursing interventional program on stressors of study group than pre among the control group. This may be due to the studied patients expressed that they had received sufficient information about pain after cardiac surgery and preparation as well as adaptation strategies of pain post cardiac surgery.

This finding was contradicted with **Dias et al., (2015**) who stated in the study entitled: " Patient stress in intensive care: comparison between a coronary care unit and a general postoperative unit" that the stressor "being in pain" was the main factor reported and the patient cannot overcome, and the pain perception may be a result of the clinical condition of the patient and the procedures performed.

As regards intrapersonal stressors, the study results showed that there was no statistically significant improvement regarding having cardiac surgery, time lapse before actual surgery, resuming sexual activity. This might be attributed to the study group unable to overcome the fact that they will transform immediately to ICU after their surgery. It is obvious that patients reported the fear of death. These findings in the same line of **Parvan, et al., (2012)** who revealed that "The need of surgery" with mean of 3.13 was the first factor among the intrapersonal stressors and among all the other stressors of CABG.

Nurses should encourage patients to talk about their anxiety. Evaluating patients' perception such as their fear and anxiety may help identify patients at risk of extensive psychological stress. Regarding interpersonal stressors, the study results showed that there was statistically significant improvement regarding needing assistance with various activities, sharing the room with one or more patients, different nurses caring for patient, discussing patient concerns about surgery with doctors and nurses.

This might be due to the proper pre assessment of the nurses about the interpersonal stressors and instructing the patient the coping strategies through nursing instructions which help in solving this problem. This finding is consistent with **Wade et al., (2018)** who stated in the study entitled: " Providing psychological support to people in intensive care" that courses and materials to train staff nurses to detect stressors and identify patients with acute stress improved patients' communication; provide targeted support for the most stressed patients; and provide stress relief with meaningful activity for patients. As well as creating a health team to patient relationship and a therapeutic environment that encourage patients to perform activities and understood nursing plan for caring more than one patient at the same time.

Concerning extra personal stressors there was statistically significant effect in the mean score post implementation of nursing

interventional program on stressors of study group regarding being away from home or/and business, having chest tubes, sleeping in strange and uncomfortable and interruption, problems of other patients, being stuck with needles, Payment of hospital, being restrained, being transferred from intensive care unit, not having things within easy reach, having the monitoring equipment discontinued, having urinary catheter and cardiac monitors. This may be due to the explanation of the studied patients about the nurse's recognition and attention to extra personal stressors during critical care admission and early interventions which assist patients in coping strategies.

These finding was in contrast with **Abuatiq (2020); Puntillo et al., (2014)** who found in the study entitled: "Perceptions of stress: patient and caregiver experiences with stressors during hospitalization" that poor knowledge among the studied population regarding post operative cardiac surgery caring tended to be more stressful. These findings reinforce the importance of including pleasant conversations between the multidisciplinary team and the patients to decrease the levels of patient anxiety and stress. In addition to **Dias et al., 2015 who** recommended in the study entitled:" Patient stress in intensive care: comparison between a coronary care unit and a general postoperative unit" that it is extremely important that the multidisciplinary team of the ICU be involved in strategies that can minimize extra personnel stressors.

Regarding sources related to the design and structure of the unit, the present study finding that there was significant improvement post implementation of nursing interventional program on stressors of study group than pre among the control group regarding having lights on constantly, being in a room that is too hot or cold, hearing the alarms from the machinery and presence of a strange noise. This may be due to the patient expression about being familiar toward ICU design, technical equipment with alarms and nature of work in ICUS which sometimes being noisy.

This finding is consistent with **Gültekin et al., (2018)** who found in the study entitled:" Evaluation of stressors in intensive care units "that ICU patients were less affected by the presence of unfamiliar devices, smells, and noise. This situation suggested that awareness of critical illness and intensive care have increased after interventional program that reduce stress.

Regarding sources related to the laws and system of unit, the present study finding that there was significant improvement post implementation of nursing interventional program on stressors of study group regarding restrictions to smoke, lack of radio or TV and frequent examinations by a physician or nurse and measuring vital signs frequently. This may be due to recognition of the patient about ICU as a critical area which differs than other areas in hospital that have restricted policies, close observation to the patients.

This finding is consistent with **Gültekin et al., (2018)** who found that found that most of the patients had already been followed up by doctors and nurses; therefore, they were less anxious about their situations and futures. The least stressful factor for the patients was the presence of nurses constantly performing activities around the bed. Concerning sources related to other patients in ICU, the present study finding that there was no significant effect post implementation of nursing interventional program on stressors of study group than pre among the control group regarding hearing of aches of other patient and death of patients in the next bed.

This is explained by all patients that even adaptation strategies they followed up insufficient to reduce their stress with these situations. As regards to sources related to the patient himself the present study finding that there was significant effect post implementation of nursing interventional program on stressors of study group regarding seeing family for a few minutes each day, being in fear of unknown plan, unable to take decisions, inability to communicate with others, not knowing the place than pre among the control group.

This is might because of the effect of nursing interventional program which provide information about stress management and adaptation during treatment plan. This finding is consistent with **Biglar et al. (2019)** who

noted in the study entitled:"The effects of nursing welcome program on the level of stress and satisfaction of patients in the Coronary Care Unit" that nurses were able to relieve stress in patients by familiarizing patients with hospital, nurses, and physicians and giving them information about their disease and the treatment processes. Furthermore, preoperative patient education and counseling based on the patient's individual needs can reduce the stress of patients undergoing cardiac surgery.

Concerning relation between total mean score of nurses' knowledge and practice regarding caring of patients undergoing cardiac surgery there was statistically significant relation between total mean score of nurses' knowledge and their demographic characteristics including age, level of education, and years of experience pre and post the nursing interventional program implementation. While there was significant relation between total mean score of nurses' practice and their level of education and years of experience pre the nursing interventional program implementation.

While there was statistically significant relation between total mean score of nurses' practice and their demographic characteristics including age, level of education and years of experience post the nursing interventional program implementation. From researcher point of view, it may interpret to the reasons that these variables, suggesting that the older practitioner nurses in ICU increased their level of experiences and perception of the intensity of stressors. These findings were supported with **Gültekin et al., (2018)**who stated that knowledgeable nurses who able to determine stressors and eliminating them in ICU would contribute positively to the treatment process of ICU patients. As well as **Golden et al., 2017** proposed in the study entitled: "A Gap Analysis Needs Assessment Tool to Drive a Care Delivery and Research Agenda for Integration of Care and Sharing of Best Practices across a Health System." that health care organizations have the responsibility to improve patient's care by developing competent, integrated approaches to delivering this care.

As regards correlations the study finding represented that there was positive correlation between total level of nurses' knowledge regarding caring of patients undergoing cardiac surgery and their total practice level, while there was negative correlation between total level of nurses' performance (knowledge and practice) and patients' cardiac stressors and patients ICU stressors.

This result goes in the same line with **Hosny et al., (2022)** who illustrated in the study entitled: " Assessment of Nurses' knowledge and Performance Regarding Fluid and Electrolyte Management for Cardiac Surgery Patients" a positive correlation between nurses' practice and their knowledge which was identified as an independent positive predictor of this score

Conclusion

Implementation of nursing interventional program on stressors for patients undergoing cardiac surgery had a statistically significant positive effect on level of nurses′ performance (knowledge and practice) and patients′ stressors.

Recommendations:

The result of this study projected the following recommendations:

- Implementing the designed nursing intervention program for nurses caring for patients undergoing cardiac surgery in different cardiac care units of different hospitals to improve their performance and patients̀ cardiac and intensive care unit stressors
- Implementation of an educational training program for patients undergoing cardiac surgery regarding management patients' stressors.
- Further researches are recommended periodically to be carried out using new approaches in the area of caring for patients undergoing cardiac surgery for improving patient's stressors.

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