

Effect of Nursing Intervention on Fear, Post-Traumatic Stress Symptoms, and Pain among Patients with Open Heart Surgery

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Abstract

Background: Open heart surgery is a source of high levels of emotional distress for the patient. If the stress experienced is not adequately compensated, it could harm the postoperative recovery and could not be treated the comorbid mental disorders. Open heart surgery could be a traumatic and stressful experience, and as a result, many people experience psychological difficulties following treatment. Post-Traumatic Stress Disorder (PTSD) is now being investigated in the post-surgical population with surprising results. Open heart surgery is a common intervention that involves several pain-sensitive structures, and intense postoperative pain is a predictor of persistent pain. **The study aimed** to investigate the effect of a nursing intervention on fear, post-traumatic stress symptoms, and pain among patients with Open heart surgery **Setting:** The study was conducted at the open heart surgical department and open heart surgical intensive care unit at Menoufia University and Shebin elkom teaching hospitals, Menoufia Governorate, Egypt. **Sample:** Purposive sample of 80 patients with open heart surgery were enrolled from the previously above-mentioned settings. **Data collection:** Four tools were used; a semi-structured interview questionnaire, Surgical Fear Questionnaire (SFQ), Davidson Trauma Scale-DSM-IV, and The Numeric Rating Pain Scale **Results:** Results revealed that there was no significant difference between the study and the control groups regarding demographic characteristics ($p > 0.05$). Also, results revealed a highly significant improvement (with $p < 0.0001$, in mean surgical fear, pain, and post-traumatic stress symptoms). **Conclusion:** It was concluded that overall, preliminary findings support the positive effect of the nursing intervention in treating people who have undergone open-heart surgery. Where nursing intervention reduces fear, post-traumatic stress symptoms, and pre and postoperative pain. **Recommendations:** The developed nursing intervention should be carried out pre and postoperative to reduce fear, post-traumatic stress symptoms, and pain among all patients undergoing open-heart surgery.

Keywords: Fear, pain, post-traumatic stress symptoms. Open heart surgery.

Introduction:

The largest cause of death worldwide is cardiovascular disease (CVD), which accounts for 17.5 million fatalities annually, 80% of which take place in low- and middle income nations. Due to a lack of infrastructure, human resources, and financial coverage, around 7.5 percent of the world's population cannot receive open-heart surgery when it is necessary (Vervoot et al., 2020). Since the 1990s, cardiovascular disease has been the main cause of early death in Egypt. The cause of 46.2% of all deaths in Egypt in 2017 was CVD. Heart failure (HF) is a significant and growing public health burden due to the aging of the population and the success in extending

The survival of people with coronary events. (Hassanin et al., 2020).

Open heart surgery is an invasive medical treatment that affects quality of life, increases the chance of significant complications, and may even result in death (Doerr et al., 2015). In medicine, open heart surgery is frequently performed. Every year, only in the US, more than 2 million coronary revascularizations are carried out (Hall et al., 2010). Even before it happens, heart surgery is frequently perceived as an extraordinary and life-threatening occurrence. Another major aspect that raises stress levels for many patients is the perception that they have little or no control over the situation (Ackerman and Shapiro, 2016) As a result, significant

physiological and psychological reactions brought on by surgical stress may affect how well the body's major organ systems work (**Carpenito, 2012**).

Studying fear in relation to surgical treatments is important given the typical response that this condition causes in those who will have surgery as well as the variety of postoperative complications that can result. The emotion of fear has the potential to have detrimental effects on social, familial, emotional, and professional situations (**Carpenito, 2012**). There are a number of potential external or internal variables that could induce anxiety prior to surgery. External influences include the type of operation, the standard of medical care, unusual settings, a lack of privacy in the rooms and operating environments, experiencing anesthesia, and a lack of social support (**Martha et al., 2018**). Before open heart surgery, intense fear and/or anxiety may be linked to postoperative depression, a less favorable postoperative course, and postoperative discomfort. even though dread Although worry and anxiety are expected before surgery, they are frequently not adequately managed, which can have serious consequences (**Nazilla et al., 2013**).

Threatened mortality or "real or threatened serious damage" could refer to the start of a condition that requires surgical treatment or the surgery itself. The symptoms of post-traumatic stress disorder (PTSD), which must persist for more than one month after a stressful experience, are a constellation of symptoms. Flashbacks, nightmares, and avoiding ideas and situations that trigger the incident are some of these symptoms. They can also result in depressive symptoms, unhelpful thoughts, and changes in arousal and reactivity, as well as negative changes in cognition and mood. Additionally, clinically substantial anxiety and/or functional impairment are brought on by hypervigilance, impatience, and sleep disturbance. (**Parker et al., 2015**). Following open heart surgery, a diagnosis of PTSD may have quite substantial repercussions, including a higher risk of mortality and morbidity. According to research, those with PTSD take their medications less religiously, experience worse quality of life outcomes, and enroll in fewer rehabilitation programs than their healthy peers. (**Louise, 2014**).

Open heart surgery is painful as it involves opening the sternum This causes multiple painful regions associated with tissue damage and inflammation, not just where the surgical incision is made but also in locations where the sternum is prolongedly retracted and mediastinal and chest tubes are used. (**Mazzeffi and Khelemsky, 2011**). Through elevated levels of circulatory stress hormones and increased myocardial oxygen demand, uncontrolled acute pain following surgery may raise the risk of myocardial ischemia or infarction (**Wu and Raja, 2011**). Moreover, persistent pain after Open heart surgery may cause pulmonary dysfunction, primarily as a result of difficulty coughing. Patients who experience pain when moving are unable to engage in breathing exercises, mobilization, or rehabilitation. Uncontrolled pain during surgery may eventually lead to poorer recovery, extended stays in intensive care units and hospitals, more readmissions, and increased long-term morbidity (**Sethares, Chin, and Costa, 2013**).

Generally speaking, it's crucial to reassure individuals with heart conditions that their symptoms are typical responses to a life-threatening situation. To normalize symptoms and prevent worsening of symptoms owing to avoidance, psychoeducation about PTSD and other psychological illnesses linked to heart disease is a crucial first step. To assist control high arousal and reduce the frequently reported sleep disturbances, first therapies could include sleep hygiene, behavioral sleep strategies, and relaxation methods including diaphragmatic breathing, meditation, and mindfulness. Patients with heart abnormalities may benefit from cognitive-behavioral therapy (CBT), one of the most effective psychological treatments for PTSD (**Sears et al., 2011**).

Significance of the study

A considerable number of patients who have an acute CAD event describe great distress and dread of passing away. Coronary artery disease (CAD) is a leading cause of death and disability globally. (**Nazilla et al., 2013**).

The cause of 46.2% of all deaths in Egypt in 2017 was CVD. Heart failure (HF) is a significant and growing public health burden due to the aging of the population and the success in extending the survival of people with coronary events (Hassanin et al., 2020). Following cardiac events and treatment, those who experience depression, PTSD, or anxiety are more likely to die from additional cardiac issues than those who do not. Although behavioral and lifestyle change approaches for heart patients have advanced, there is currently a lack of knowledge on how to effectively address the psychological aftereffects of heart disease. (Greenman et al, 2015).

Non-pharmacologic therapies for pain relief have become popular and increased among researchers in recent years. Now, several non-pharmacologic therapies have been proposed to relieve post-Open heart surgery pain including muscle relaxation, cold gel pack, music therapy, and massage therapy (Sineer, et al., 2019). It is well recognized that patient education and knowledge can lessen surgical anxiety. To reduce overall anxiety, however, relaxation techniques and coping strategies must be learned. The objectives of treating anxiety and/or dread of surgery are to improve post-operative adjustment, minimize perceived fear, anxiety, and tension, and provide a happy surgical experience (Nazilla et al. 2013).

Preoperative education, exercise, and psychological rehabilitation programs will improve mental and physical functioning before and after surgery. For example, these programs are associated with increases in preoperative mobility and quality of life and reduce in preoperative depression, postoperative pain, catastrophizing, and disability. (Dunne et al., 2016). Therefore, the current study aimed to investigate the effect of the nursing intervention on fear, post-traumatic stress symptoms, and pain among patients with open-heart surgery.

Aim of the Study

The study aims to investigate the effect of a nursing intervention on fear, post-traumatic stress symptoms, and pain among patients with open-heart surgery.

Specific objectives: -

- To investigate the effect of a nursing intervention on fear among patients with open-heart surgery.
- To investigate the effect of a nursing intervention on post-traumatic stress symptoms among patients with open-heart surgery.
- To investigate the effect of a nursing intervention on pain among patients with open-heart surgery.
- To investigate the relationship between fear, pain, and post-traumatic stress symptoms.

Research Hypotheses:

- Patients with Open heart surgery who received nursing intervention pre- and post-Open-heart surgery (study group) demonstrated low fear and post-traumatic stress symptoms on post-test compared to pretest than those who received only routine care (control group).
- Patients with Open heart surgery who received nursing intervention pre- and post-Open-heart surgery (study group) demonstrated low pain on post-test compared to pretest than those who received only the routine care (control group).

Materials and methods:

Methods:

Research Design

A quasi-experimental design (two groups one study group and one control group) was used to achieve the aim of the current study.

Setting

This study was carried out in the Menoufia University and Shebin elkom teaching hospitals in the Menoufia Governorate of Egypt's open heart surgery department and open heart surgical intensive care unit. The reason for choosing these hospitals was that they were the only governorate hospitals in the Shebin EL-Kom district where these types of surgery could be conducted.

The setting was selected using a multi-stage random sample; Shebin EL-Kom district was selected randomly from a container

containing all districts in Menoufia Governorate then, select all governorate hospitals randomly from a container containing all hospitals found in Shebin El-kom district. The resulting selection is menoufia university and shebin elkom teaching hospitals.

Sample Size

Based on the review of past literature Nazilla et al (2013) found that the mean difference in fear score before CABG was significantly lower in the psycho education group than in the routine care group (mean difference -1.3 ; 95% CI, $-2.1, -.2$; $p < .05$). According to 2002 data from the hospital where the study was conducted, 100 patients underwent open-heart surgery. The sample was calculated at a power of 80% and a confidence level of 95%, with the following equation

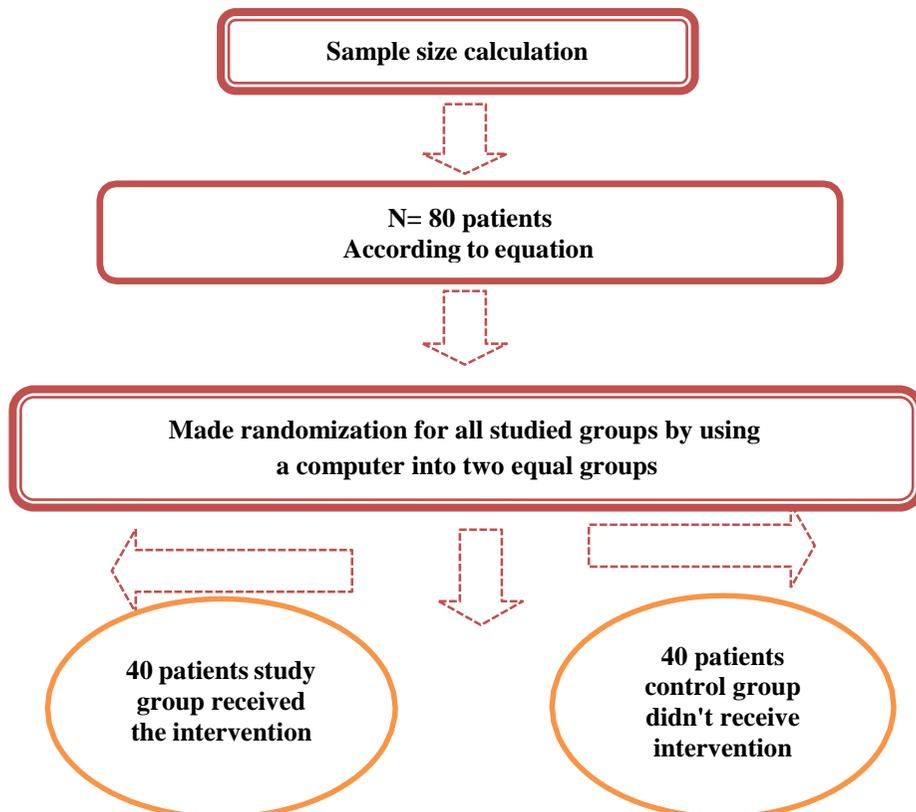
$$N = 2SD^2 [Z_{\alpha/2} + Z_{\beta}]^2 / d^2$$

So total calculated sample was 80 participants divided into two groups study group and a control group each group with 40 participants.

Sample Type: A purposive sample of 80 patients with Open heart surgery at Menoufia University hospital and Teaching Shebin EL-Kom hospital, was selected in the chosen setting.

Sample technique:

- Following an explanation of the study's purpose and requesting their agreement to proceed, official letters were written by the Menoufia University Faculty of Nursing and addressed to the administrators of the Menoufia University Hospital and the Teaching Shebin EL-Kom hospital.
- The researcher visited Menoufia University Hospital and Teaching Shebin EL-Kom Hospital three days a week (Sunday, Monday, and Tuesday) for 4 months (from March 2020 to June 2020) until the researcher reached the required sample size according to the formula
- The researcher made randomization for all the studied groups by using the computer into two equal groups, 40 patients in the study group who received the nursing intervention, and the other 40 patients in the control group who received the routine care.



Menoufia university) and two experts specialized in the field of Medical-Surgical (one professor of Medical-Surgical nursing and one professor of Medical-Surgical medicine, Menoufia university) to ascertain relevance and completeness.

Reliability of tools

By administering the same tools to the same participants under identical circumstances on one or more occasions, the researcher employed reliability to test the internal consistency of the tools. The results of multiple tests were compared (Test-re-test reliability). The tools revealed reliability at 0.87 for the tool (1) & 0.86 for the tool (2).

Pilot Study:

A pilot study was conducted on 10 % of the total sample (8) patients (4 in each group) to test the feasibility, clarity, and applicability of the tools then necessary modifications were done. Data obtained from the pilot study were not included in the current study.

Preparatory phase:

- This phase included reviewing relevant literature and different studies related to the topic of research, Textbooks, article magazines, periodicals, and internet research were used to get a clear picture of all aspects related to the research topic.
- Administrative and ethical considerations: An official letter was issued from the Faculty of Nursing Menoufia University and sent to the directors of Menoufia University Hospital, and Teaching Shebin EL-Kom Hospital after an explanation of the aim of the study to get their approval to carry out this study.
- The participant was asked to give an informed verbal consent to participate. It was emphasized that all collected data was strictly confidential, and the data would be used for scientific purposes only.

Ethical considerations: This work was approved by the ethics committee of the Faculty of Nursing, Menoufia University. Official written approval was obtained from the Dean of the Faculty of Nursing and forwarded to the director of the above-

mentioned settings to conduct the study. Oral consent was obtained from all studied participants who met the inclusion criteria after informing them about the purpose and nature of the study. All collected data were strictly confidential and were used for scientific purposes only.

Data collection phase:

- Data collection for the study was carried out over 4 months from March 2020 to June 2020.
- After introducing herself, the researcher gave each participant a brief explanation of the study's objectives and the type of questionnaire they would need to complete.
- The researcher collected data through interviews with participants who agreed voluntarily to participate in the study
- The sample was drawn from patients waiting for open-heart surgery
- This study is quasi-experimental and was conducted in the open heart surgical department and open heart surgical intensive care unit of Menoufia University Hospital, and Teaching Shebin EL-Kom Hospital from March 2020 to June 2020. According to 2020 data from the hospital where the study was conducted, 100 patients underwent open-heart surgery. The sample size was calculated at a power of 80% and a confidence level of 95%, with the following equation

$$N = 2SD^2 [Z\alpha/2 + Z\beta]^2 / d^2$$

So total calculated sample was 80 participants divided into two groups study group and a control group each group with 40 participants.

The researcher visited Menoufia University Hospital and Teaching Shebin EL-Kom Hospital three days a week (Sunday, Monday, and Tuesday) for 4 months (from March 2020 to June 2020). One hour within three days/week from 10 AM to 11 PM. until the researcher reached the required sample size according to the formula. The data in the current study was collected through three

phases: assessment phase, implementation phase, and evaluation phase.

Assessment phase:

- The developed nursing intervention includes psycho-education combined with relaxation techniques and massage therapy. The goal of nursing intervention is to reduce fear, PTSD symptoms, and pain by increasing the patient's knowledge and helping participants to demonstrate relaxation techniques. The control group received only routine care that consisted of all nursing, medical, and emergency care services as needed. The study group received routine care in addition to the developed nursing intervention.
- The sample was drawn from patients waiting for open-heart surgery at Menoufia University Hospital and Teaching Shebin EL-Kom Hospital. The participants have approached the pre-surgical meeting that took place 1 – 4 weeks before the patient undergoes their open-heart surgery. Patients were approached by the researcher and given information related to the study and its requirements. If individuals agreed to take part, they then should be included in the assessment phase, implementation phase, and evaluation phase. The meeting took approximately one hour during which the researcher outlined the study and explained the requirements of the intervention. After signing the consent form, the participants were asked to complete the used tools (Semi-structured interviewing questionnaire, Surgical Fear Questionnaire (SFQ), Davidson Trauma Scale, and pain scale) for the study group and control groups.
- The semi-structured interviewing questionnaire, Surgical Fear Questionnaire (SFQ), Davidson Trauma Scale, and pain scale) were completed by participants before they administered the developed nursing intervention. The participants were given individualized education and pre-operative care according to their needs. Individual interviews with patients were conducted to determine demographic data (e.g., age, gender, and educational status), any information the patient may not have been given, and anxiety sources (e.g., being away from family, risk of death, pain, discomfort, and loss of privacy).

Implementation phase:

The investigator applied the implementation phase according to the following:

Pre-surgery (preoperative) intervention includes:

1- Education for Post-Traumatic Stress Disorder (PTSD):

It included a discussion of PTSD and covered the potential symptoms, triggers, and etiology. Further details arising after open-heart surgery and treatment in the ICU were also discussed. Emphasis is placed on assisting participants to understand the disorder concerning the medical surgery. Furthermore, the aim of psycho education in this condition was to help the patients view their symptoms as part of a normal reaction to trauma.

2- Education for pain:

It included a discussion of pain and covered the potential symptoms and etiology. Further details of pain arising after Open heart surgery and treatment in the ICU were also discussed. It included relaxation techniques to reduce the symptoms of pain. Relaxation techniques (progressive muscle relaxation & imagination) were discussed and demonstrated and then introduced in audio format, which required the participants to learn and practice progressive muscle relaxation, and imagination for one week.

3- Education for fear:

It included a discussion of **fear** and covered the potential symptoms and etiology. Further details of fear arising before and after Open heart surgery, treatment in the ICU also discussed, and how to deal with **fear**

4- Relaxation techniques:

It included the application of progressive muscle relaxation and imagination techniques then introduced in audio format, which required the participants to learn and practice progressive muscle relaxation, and imagination for one week. The audio recording plays for approximately 25 minutes.

Post-surgery (post-operative) intervention includes:

- 1. Relaxation techniques: as mentioned above**
- 2. Massage therapy:** -before administering the massage. Comfortable positioning of the patient was ensured. The lights dimmed and the door closed. The massage was performed using moderate pressure. The researcher helped participants to learn and practice progressive muscle relaxation, imagination, and meditation. The audio recording plays for approximately 15 minutes.

Evaluation phase:

- The evaluation phase was done using the same tools (Semi-structured interviewing questionnaire, Surgical Fear Questionnaire (SFQ), Davidson Trauma Scale, and pain scale) for the study group and control groups.

Statistical Analysis:

The SPSS (Statistics Package for Social Science) statistical package, statistical package version 22 was used to enter and analyze the data. Graphics were done using the Excel program.

Quantitative data were presented by mean (X) and standard deviation (SD). It was analyzed using the student t-test for comparison between two means, and ANOVA (F) test for comparison between more than two means. Tables containing frequency distributions, figures, and percentages were used to convey qualitative data. The chi-square (2) test was used to analyze it. However, the Fisher Exact test (if the table included four cells) or Likelihood Ratio (LR) test was utilized if the anticipated value of any cell in the table was less than 5. (if the table was more than 4 cells). The level of significance was set as a P value <0.05 for all significant tests.

Results

Table (1) Demonstrates that there was no significant difference between the study and control groups regarding demographic characteristics with $p > 0.05$. As regards gender,

70% of the participants in the study group were males. In the study group, 80% of the participants were married and more than half (55%) of the participants in the study group were illiterate. 67% of the participants in the study group were from rural residences and 42% were employees.

Table (2) Shows the medical history of the studied subjects. There was no significant difference between the study and control groups regarding either diagnosis or chief complaints with $p > 0.05$.

Table (3) Highlights the efficacy of the nursing intervention on the total heart rate score, respiratory rate, O₂ saturation, and pain severity mean score pre-intervention (on admission), post-intervention (pre-surgery, and post-surgery) among patients in study and control groups. Post-intervention results revealed a highly significant improvement ($p < 0.0001$). Among the study group, the Total Heart Rate Mean score decreased from 81.7

± 5.1 on admission to 74.5 ± 3.3 post-intervention (pre-surgery). In addition, among the study group, the total Heart rate mean score almost remained the same mean value post-intervention (post-surgery) (74.5 ± 3.4), and comparing this mean heart rate with that of the control group (74.5 ± 3.4 VR 81.2 ± 5.2). This result revealed a highly significant difference ($p < 0.0001$). Similar patterns were observed regarding the post-intervention total respiratory rate mean scores, O₂ saturation mean score, and pain severity mean scores.

Fig.1: Concerning surgical fear mean score, post-intervention results revealed a highly significant improvement ($p < 0.0001$) in mean surgical fear. Among the study group, the total surgical fears mean score was decreased from 78 pre-interventions (on admission) to 42.9 (post-intervention) pre-surgery. In addition, among the study group, the total surgical fear mean score post-intervention (post-surgery) was decreased to (20.9), and comparing this mean surgical fear with that of the control group (20.9 VR 34.6). This result revealed a highly significant difference with ($p < 0.0001$).

Fig.2: As regards PTSD symptoms mean score, results revealed a highly significant improvement with ($p < 0.0001$). Among the

study group, the total PTSD symptoms mean score was decreased from 63.9 pre-intervention (on admission) to 41.9 (post-intervention) pre-surgery. In addition, among the study group, the total PTSD symptoms mean score post-intervention (post-surgery) was decreased at this (20.4), and comparing this mean PTSD with that of the control group (20.4 VR 35.2). This result revealed a highly significant difference ($p < 0.0001$).

Fig.3: Concerning pain severity mean score, post-intervention results revealed a highly significant improvement with ($p < 0.0001$). Among the study group, the total pain severity mean score was decreased from 8.2 (pre-intervention) on admission to 5.9 post-intervention (pre-surgery). In addition, among the study group, the total pain severity mean score post-intervention (post-surgery) was decreased to a level (3.4), and comparing this mean pain severity with that of the control group (3.4 VR 6.9). The result revealed a highly significant difference with ($p < 0.0001$).

Table (4) Shows that, among the study group, there was significant positive correlations between PTSD symptoms and pain severity ($r = 0.37$, $p < 0.01$), as well as SF

($r = 0.51$, $p < 0.001$). However, this pattern was not observed in the control group.

Table (5) demonstrates that there were no statistically significant differences between the total score of surgical fear post-intervention and the study group's age, gender, occupation, residence, and educational level ($p > 0.05$). Regarding their marital status, there was a statistically significant difference between it and their post-intervention total score of surgical fear; single patients demonstrated a higher percentage of moderate surgical fear (50% VR (6.2%) than than married participants with ($p < 0.01$).

Table (6) Shows that there were no statistically significant differences between the study group' age, gender, marital status, residence, and educational level and the total score of PTSD post-intervention with ($p > 0.05$). Concerning their Occupation, there was a statistically significant difference between occupations and their total score of PTSD post-intervention. Manual workers showed a higher significant percentage of moderate PTSD levels (77.8% VR 54.5%, 41.2%, and 0%) than Housewives, Employees, and participants who were not working with ($p < 0.04$).

Table (1): Distribution of the studied subjects according to their demographic characteristics (N = 80)

demographic characters	Studied groups				P-value	
	Study group.		Control group.			
	N0.	%	N0.	%		
Age (years): 25 -34 Years	1	2.5	3	7.5	LR=1.1, P=0.57 NS	
35 – 44 Years	7	17.5	7	17.5		
45 & more Years	32	80	30	75		
Gender	Male	28	70	26	65	X2=0.22, P=0.63 NS.
	Female	12	30	14	35	
Marital status	Single*	8	20	7	17.5	X2=0.08, P=0.77 NS
	Married	32	80	33	52.5	
Residence	Rural	27	67.5	30	75	X2=0.55, P=0.45 NS
	Urban	13	32.5	10	25	
Education	Illiterate./Read & Write	22	55	22	55	LR=0.0, P=1.0 NS
	Technical Edu.	14	35	14	35	
	University/Postgraduate	4	10	4	10	
Occupation	Housewives	11	27.5	12	30	LR=0.10, P=0.90 NS
	Manual workers	9	22.5	8	20	
	Employees	17	42.5	17	42.5	
	Not work	3	7.5	3	7.5	
Total	40	100	40	100		

Not significant at $p > 0.05$

Highly significant < 0.0001

Table 2: Frequency and distribution of medical history of the studied subjects (N=80)

Medical history data		Studied groups				P-value
		Study group.		Control group.		
		N0.	%	N0.	%	
Diagnosis:	CABAG	22	55	19	47.5	LR=0.73, P=0.94 NS.
	Mitral valve repair	8	20	9	22.5	
	Aortic valve repair	4	10	5	12.5	
	Tricuspid valve repair	5	12.5	5	12.5	
	Atrial Septal defect	1	2.5	2	5	
The chief complaints:	Difficulty breathing	8	20	8	20	LR=2.9, P=0.71 NS
	The feeling of heartbeats	3	7.5	4	10	
	Chest pain	3	7.5	3	7.5	
	All of above	26	65	25	62.5	
Total		40	100	40	100	

Not significant at $p > 0.05$ Highly significant < 0.0001

Table 3: Total heart rate, respiratory rate, oxygen saturation, and pain severity mean scores among the study and control groups pre-intervention (on admission), post-intervention (pre-surgery, and Post-surgery)

Heart rate, respiratory rate, and O2 saturation		Studied groups				P-value
		Study group.		Control group.		
		Mean± SD		Mean± SD		
Mean total Heart rate score:	pre-intervention (on admission)	81.7± 5.1		83.8±5.5		P=0.07
	post-intervention (pre-surgery)	74.5±3.3		81.2±5.2		P<0.0001
	post-intervention (post-surgery)	74.5±3.4		81.2±5.2		P<0.0001
Mean total respiratory rate score	pre-intervention (on admission)	29±1.9		29.7±2.8		P=0.22
	post-intervention (pre-surgery)	25.7±1.2		27.9±1.9		<0.0001
	post-intervention (post-surgery)	22.6±1.2		26.5±1.4		<0.0001
O2 saturation	pre-intervention (on admission)	96.4±0.5		96.5±0.59		0.45 NS
	post-intervention (pre-surgery)	97.4±0.54		96.4±0.84		<0.0001
	post-intervention (post-surgery)	98.6±0.50		96.7±0.92		<0.0001
Pain severity	pre-intervention (on admission)	8.2±0.74		8.0±0.76		0.37
	post-intervention (pre-surgery)	5.9±0.72		6.9±0.83		<0.0001
	post-intervention (post-surgery)	3.4±0.80		6.9±0.83		<0.0001
Total		40	100	40	100	

Not significant at $p > 0.05$ Highly significant < 0.0001

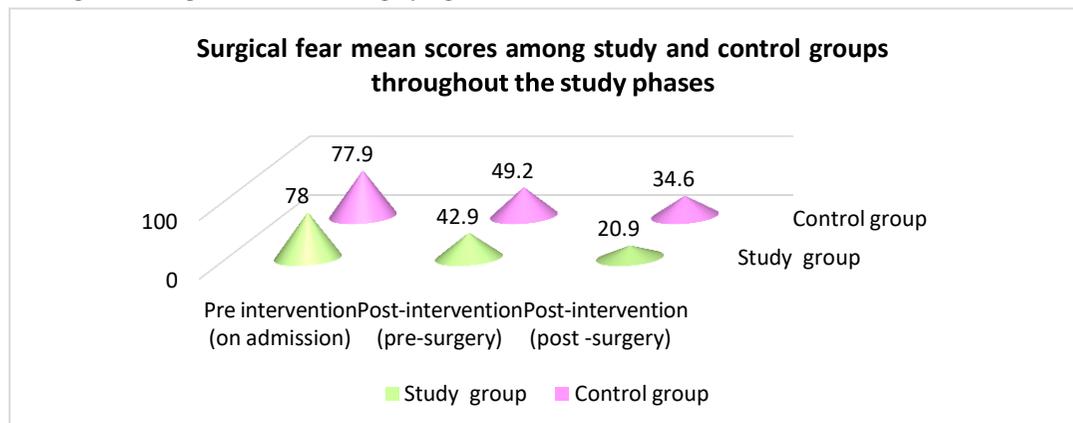


Fig.1: Comparison between mean scores of surgical fear among study and control groups pre-intervention (on admission), post-intervention (pre-surgery, and Post-surgery) (N=80)

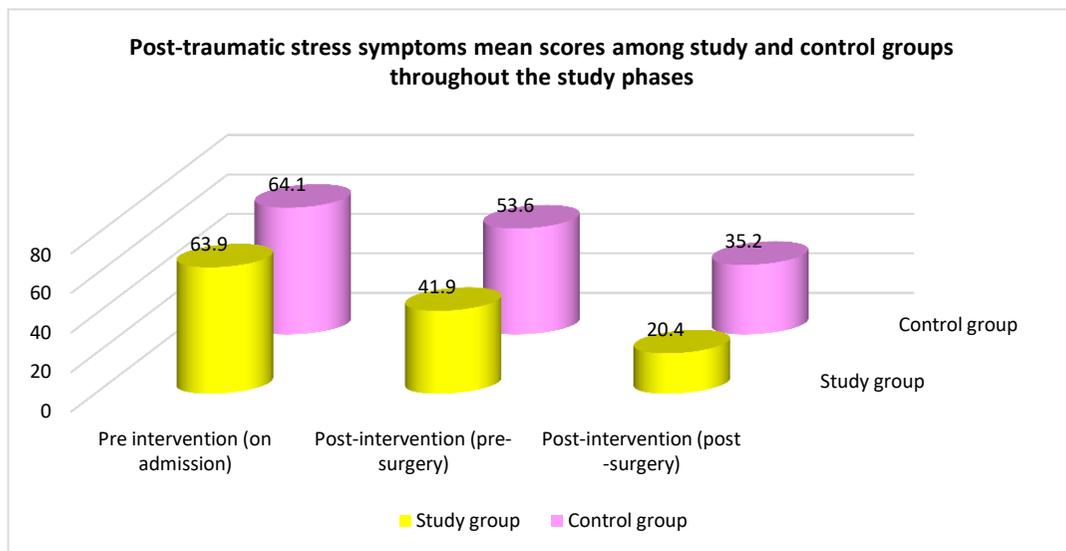


Fig.2: Comparison between the mean score of post-traumatic stress symptoms among study and control groups pre-intervention (on admission), post-intervention (pre-surgery, and Post-surgery) (N=80)

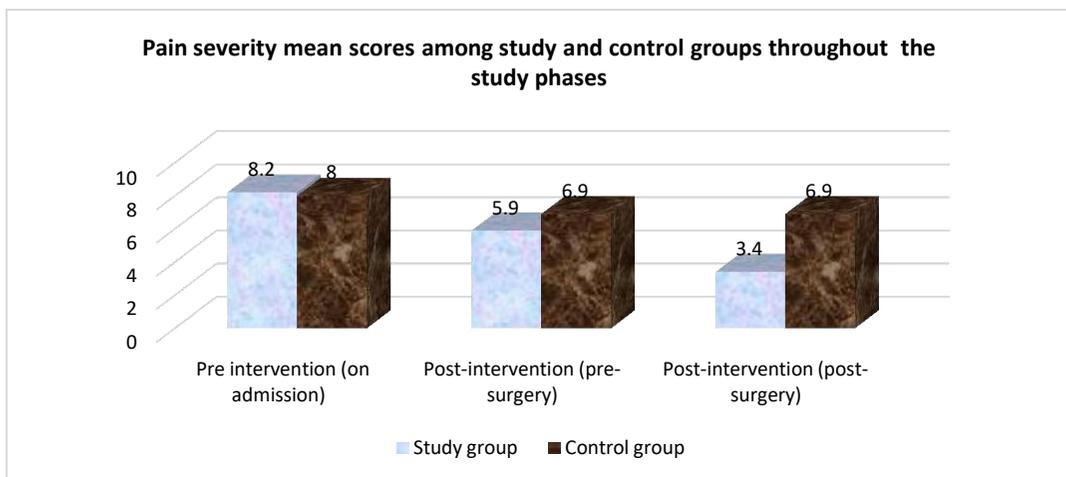


Fig.3: Comparison between the mean score of pain severity among study and control groups pre-intervention (on admission), post-intervention (pre-surgery and Post-surgery) (N=80)

Table 4: Correlation coefficient between total Surgical fear, post-traumatic stress syndrome, and Pain among study and control groups post-intervention (N=80)

Items	Post-intervention (N=80)							
	study group (n=40)				Control group (n=40)			
	Pain severity		Surgical Fear		Pain severity		Surgical Fear	
	r	p	r	p	R	p	r	p
PTSD	0.37	0.01**	0.51	0.001**	0.04	0.80	0.08	0.96
SF	0.22	0.17	1		0.17	0.29	1	

SF= Surgical fear

PTSD= Post Traumatic stress symptoms

Not significant at p > 0.05

Highly significant < 0.0001

Table 5: Relation between study group's demographic characteristics and their surgical fear post-intervention

The surgical fear post-operative nursing intervention program demographic characteristics		Total No.	Groups of the surgical fear post-operative nursing intervention program					
			Low surgical fear (< 24)		Moderate surgical fear (24 - 48)		Chi-square	
			N	%	N	%	X ² / LR	P-value
Age (years)	25 - 34 years old	1	0	0	1	100	5.5	0.06 NS
	34 - 44 years old	7	5	71.4	2	28.6		
	≥ 44 years old	32	29	90.6	3	9.4		
Gender	Male	28	24	85.7	4	14.3	0.03	0.84 NS
	Female	12	10	83.3	2	16.7		
Education	Illit. /R&W	22	20	90.9	2	9.1	3.4	0.33 NS
	Technical Edu.	14	12	85.7	2	14.3		
	University/Postgraduate	4	2	50	2	50		
Occupation	Housewives	11	10	90.9	1	9.1	2.3	0.51 NS
	Manual workers	9	8	88.9	1	11.1		
	Employees	17	13	76.5	4	23.5		
	Not work	3	3	100	0	0		
Marital status	Single	8	4	50	4	50	Fisher	0.01 Sig.
	Married	32	30	93.8	2	6.2		
Residence	Rural	27	21	77.8	6	22.2	Fisher	0.15 NS
	Urban	13	13	100	0	0		
Total		40	34	85%	6	15%		

Table 6: Relation between study group's demographic characteristics and their PTSD Post-intervention (N=40)

PTSD Post-operative nursing intervention program		Total NO.	Groups of PTSD Post-operative nursing intervention program					
			Low PTSD (< 20)		Moderate PTSD (20 - 41)		Chi-square	
			N	%	N	%	X ² /LR	P-value
Age (years)	25 - 34 years	1	0	0	1	100	1.5	0.46 NS
	34 - 44 years	7	4	57.1	3	42.9		
	≥ 44 years	32	16	50	16	50		
Gender	Male	28	15	53.6	13	46.4	0.47	0.49 NS
	Female	12	5	41.7	7	58.3		
Education	Illit./R&W	22	12	54.5	10	45.5	2.5	0.46 NS
	Technical Edu.	14	5	35.7	9	64.3		
	University/Postgraduate	4	3	75	1	25		
Occupation	Housewives	11	5	45.5	6	54.5	9.7	0.04 Sig.
	Manual workers	9	2	22.2	7	77.8		
	Employees	17	10	58.8	7	41.2		
	Not work	3	3	100	0	0		
Marital status	Single	8	4	50	4	50	0.0	1.0 NS
	Married	32	16	50	16	50		
Residence	Rural	27	14	51.9	13	48.1	0.11	0.73 NS
	Urban	13	6	46.2	7	53.8		
Total		40	20	50%	20	50%		

Discussion

The majority of techniques used to lessen anxiety, PTSD symptoms, and discomfort in patients having open-heart surgery are focused on medication intervention. The researcher's effort in the current study was to investigate the effect of nursing intervention on fear, post-traumatic stress symptoms, and pain among patients undergoing open-heart surgery **Mirbagher et al., (2019)**. According to the study's findings, there was statistically significant differences in fear, posttraumatic stress symptoms, and pain means scores pre-intervention (on admission), post-intervention (pre-surgery, and post-surgery) among patients in study and control groups.

Nearly three-quarters of the study group's members were male, according to their demographic characteristics. This result is in concordance with **Linnemorken et al., (2020)**. A study carried out at Norway entitled "Prevalence of Posttraumatic Stress Symptoms and Associated Characteristics among Patients with Chronic Pain Conditions in a Norwegian University Hospital Outpatient Pain Clinic found that 63% were men". In the study group, more than three-quarters of the participants were married and the minority were single. In Egypt, **Hassanin et al., (2020)**. a study about "Demographics, clinical characteristics, and outcomes among hospitalized patients with heart failure across

different regions of Egypt who found relatively the same result.

The study group had more than half illiterate participants. Contrary to a research conducted in Colombia by **Sepúlveda-Sepúlveda-Plata et al., (2018)**. Regarding "Effectiveness of a Nursing Intervention to Control Fear in Patients Scheduled for Surgery," it was noted that the majority of patients (84%) had at least a secondary education. Two third of the participants in the study group were from rural residences and more than one-third were employees. Similar to this finding, **Hassanin et al., (2020)** carried out a study in Egypt (2020) who came to roughly the same conclusion. Similarly, **Reaza & Rodríguez (2019)**. In a study conducted in Spain regarding "Effectiveness of nursing educational interventions in managing post-surgical pain. Systematic review" found that neither the diagnosis nor the primary complaints differed significantly between the study and controls groups.

It was evident that patients in the study and control groups had significantly different mean values for total heart rate, respiratory rate score, O₂ saturation, and pain severity pre-intervention (on admission), post-intervention (pre-surgery, and post-surgery). **Mirbagher et al., (2019)**. according to a study conducted in Iran on the "Effect of music on postoperative physiological parameters in patients undergoing open heart surgery". "who confirmed that no significant difference was observed between the mean of Physiological parameters in the experimental and control groups before intervention. However, a significant difference was found between the mean of systolic blood pressure and pulse rate in the experimental and control group at 30 minutes after music therapy while no significant difference was observed between the mean of respiratory rate, SPO₂ in the experimental and control group at 30 minutes after music therapy.

Between patients in the study and control groups, there was found to be a highly significant difference in the mean surgical fear scores pre-intervention (on admission), post-intervention (pre-surgery, and post-surgery). This is in line with **Sepúlveda**

et al., (2018). In their study, "Effectiveness of a Nursing Intervention to Control Fear in Patients Scheduled for Surgery," conducted in Colombia, the researchers found that nursing interventions in preoperative education and anxiety effectively reduced control fear in patients scheduled for surgery. They also found statistically significant differences between the group that received structured nursing information and the group that did not.

It was found that patients in the study and control groups had significantly different mean PTSD scores pre-intervention (on admission), post-intervention (pre-surgery, and post-surgery). According to the study, this may be connected to the idea that stress reduction and psychological relaxation can be achieved through a nursing psychoeducational intervention that emphasizes bodily relaxation, body awareness, and deep breathing exercises. In light of this, a study by **Birk et al., (2019)**. which was done in the United States and was titled "Early therapies to prevent PTSD in survivors of life-threatening medical events: A systematic review". In conclusion, there were differences between the early therapies targeted at patients who are at high risk for developing PTSD and early interventions directed at all patients exposed to acute medical events in terms of the strength of the evidence.

It was noticed that there was a highly significant difference in pain severity mean scores pre-intervention (on admission), post-intervention (pre-surgery and post-surgery) among patients in study and control groups. In this regard, a study was carried out by **Kisaarslan, and Aksoy (2020)**. There were significant differences in the mean pain severity values in the intervention group, who underwent progressive muscle relaxation (PMR) exercise between 0 and 3 days, according to the study "Effect of Progressive Muscle Relaxation Exercise on Postoperative Pain Level in Patients Undergoing Open Renal Surgery: A Nonrandomized Evaluation." On the other hand, **Elizabeth et al., (2018)** American study, "Effects of an Integrative Nursing Intervention on Pain in Critically Ill Patients: A Pilot Clinical Trial," revealed that the intervention group

saw a significant decline in the incidence and ratings of pain.

According to the current study result, there were significant positive correlations between total PTSD and pain severity as well as surgical fear. More recently it has been suggested that the relationship between chronic pain and comorbid PTSD and depression. This may be modulated by the individual's perception of injustice. This is in agreement with a study done by **Linnemorken et al.**,

(2020). which found PTSD was linked to more severe pain, higher degrees of impairment, psychological distress, pain catastrophizing, and perceived injustice, higher levels of exhaustion, and difficulty sleeping. This indicates that when the PTSD decreased, pain severity and the surgical fear decrease post interventions.

The study group's age, gender, place of residence, educational level, and overall degree of surgical fear & PTSD post-intervention did not show any statistically significant correlations. An investigation conducted in Norway by **Linnemorken et al.**, (2020), in line with this finding, found no correlation between participants' age, sex, and screening positive for PTSD. Additionally, there was a statistically significant correlation between participants' marital status and the overall level of surgical fear following the intervention; single patients had a higher percentage of moderate fear than married participants. According to the study, this may be connected to the psychological support that married people receive from their partners.

There was a statistically significant relationship between occupations and their total level of PTSD Post-intervention, Manual workers showed a higher significant percentage of moderate PTSD levels than Housewives, Employees, and participants who were not working. From the researcher's point of view, this may be related to the worrying of manual workers about expenses and family care due to temporary disability following Open heart surgery. Similar to this, **Linnemorken et al.**, (2020) observed that the participants were married and currently working

Currently working were likewise strongly associated with PTSD.

The results of the current study supported the hypotheses of the study which stated "Patients undergoing open-heart surgery who received nursing intervention pre and post-open heart surgery (in the study group) demonstrated low surgical fear, low PTSD & low pain on post-intervention compared to those who received only routine care (control group)."

Conclusion:

Nursing intervention including (psychoeducation, relaxation technique, and massage therapy) had a highly statistically significant positive effect on reducing pain, PTSD, and fear among patients with open-heart surgery.

Recommendations:

Because of the importance of the psychological factors, the current guidelines recommend systematic screening for mental symptoms and comorbidities in people who have undergone open-heart surgery. Nursing intervention should be carried out pre and postoperative to reduce fear, post-traumatic stress symptoms, and pain among patients undergoing open-heart surgery.

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