



Severity of Pain and Anxiety before Chest Tube Removal among Patients post Cardiac Surgeries

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Abstract

Background: Cardiac surgery is a specialized area concerning the surgical treatment related to the heart and thoracic aorta. Chest tube removal is described as one of the worst memories that the patients experience during the perioperative period. **Aim of the study:** To assess severity of pain and anxiety before chest tube removal among patients post cardiac surgeries. **Design:** Descriptive research design was used to conduct this study. **Sample:** A purposive sample of 60 adult patients from both genders. **Setting:** The study was conducted in the cardio-thoracic intensive care unit at Fayoum University Hospitals. **Tools:** Three tools were used for data collection, Structured Interviewing Questionnaire, The Numerical Pain Rating Scale and Hamilton Anxiety Scale. **Results:** This study represented that high percentage of severe pain and anxiety for studied patient before chest tube removal. **Conclusion:** It can be concluded that, severe pain and anxiety before chest tube removal among patients post cardiac surgeries. **Recommendations:** Design nursing intervention program related to chest tube removal for each patient undergoing cardiac surgery.

Keywords: Cardiac surgery, Chest tube removal, Pain, Anxiety.

Introduction

Chest tubes removal (CTR) after cardiac surgery has been described as one of the worst experiences among these patients. The chest tubes are typically removed within 24-48 hours after surgery or when the excess air, blood, or fluid has been properly drained. Studies showed that moderate to severe pain has been reported by patients who experienced CTR and unfortunately their pain was managed very poorly. Psychological impacts from pain after surgery include the development of negative moods as fear and anxiety and decreased ability to establish or maintain relationships (**St-Onge et al., 2021**).

The severity of pain experienced by the patient is significantly influenced by various factors that increase or decrease the nociceptive threshold. These include the location of the surgery, its extent, the degree of tissue traumatization, and the direction of skin incision, preoperative anxiety level, and the analgesic techniques used in the perioperative period. Postoperative pain is a major factor aggravating the general condition of the patient (**Hernández-Avalos et al., 2021**).

Anxiety, fear, and other unpleasant emotional experiences are common among patients after cardiovascular interventional procedures that are primarily related to chest tube removal. Patients describe the procedure using words as "distressing" and "fearful". The higher anxiety may affect the prognosis and recovery of patients. Excessive anxiety delays recovery from disease; and patients with anxiety are likely to be more affected by further problems such as arrhythmia. In addition, the probability of death is higher in the first months after surgery (**Fasihizadeh & Nasiriani, 2020**).

Significance of Study

El-Sadek et al. (2022) stated that, after cardiac surgery, 86% of patients' experienced acute severe pain and 33% - 75% of them suffer from moderate to severe acute postoperative pain. Unrelieved postoperative pain can hinder patients' ability to cough and mobilize effectively, which leads to postoperative complications. The prevalence of anxiety after open heart surgery in patients has been reported to be 24.7 - 66%. After cardiac procedures, patients can experience high levels of fear and anxiety, as the surgeries are often complicated, risky and serious complications are possible (**Akhlaghi et al., 2021**).

Aim of the Study

The aim of this study is to assess severity of pain and anxiety before chest tube removal among patients post cardiac surgeries.

Research Question

What is severity of pain and anxiety before chest tube removal among patients post cardiac surgeries?

Research Design:

Descriptive research design was used to conduct this study. It is a type of research methodology that aims to describe or document the characteristics, behaviors, attitudes, opinions, or perceptions of a group or population being studied.

Setting

This study was carried out at the cardio-thoracic intensive care unit at Fayoum University Hospitals. The Cardiothoracic Intensive Care Unit consists of 1 section. This section contains two mechanical ventilators, three beds occupied with patients. The total number of nurses is: one head nurse, 12 Bedside nurses. Each bed has one monitor, one suction machine, four syringe pump, and two infusion pump.

Subjects

A purposive sample of 60 adult patients from both genders before chest tube removal among cardiac surgeries patients.

Inclusion criteria

- Age from 18 to 60 years old.
- Hemodynamically stable patients without any cardiac medication.
- Patients who have one or two mediastina or pleural chest tubes.
- Chest tube removal for the first time.

Exclusion criteria

- Patients with Mechanical ventilation support.
- Unconscious or cognitively impaired patients.
- Infected chest tube site.
- Patients undergoing Redo or re-open heart surgery
- Hand amputation, diseases (arthritis), inflammations.
- Edema, burn wound, lesion or fractures in hands.
- Patients with Communication problems.
- Patients with drug abuse or alcohol addiction.
- Patients with history of chronic pain.

Tools of data collection

Tools of data collection were used to achieve the purpose of the current study. The collection of data was achieved by the following tools:

Tool I: Structured Interviewing Questionnaire

This tool adapted form (*Sumithra, 2017*) and modified by researcher by changing the arrangement and editing some of words. It is consists of the following two parts:

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Part 1: Demographic data to cover the personal data and the characteristics of the studied patients as (age, gender, education level, occupation, marital status, smoking and body mass index).

Part 2: Health related information which includes type of surgical procedure, type of chest tube and duration of chest tube insertion before and after intervention.

Tool II: The Numerical Pain Rating Scale

It is adopted from (*McCaffery & Beebe, 1989*). It used to measure the severity of pain before, immediately, 5, 10, 15 and 30 minutes after chest tube removal. This is scale that ranged from (0 -10). In this tool, a score of zero indicates no pain, 1- 3 indicates mild pain, 4 - 6 indicates moderate pain, 7 - 9 indicates sever pain, while a score of 10 presents the worst pain imaginable.

Tool III: Hamilton Anxiety Scale

It is adopted from (*Hamilton, 1988*). It used to measure the severity of anxiety before and after intervention. The scale consists of 14 items; each item was scored on a scale of 0 (not present) to 4 (severe).

Operational Design

The operational design includes preparatory phase, content and face validity of the modified tool and reliability, pilot study and fieldwork.

Preparatory phase

It includes reviewing of related literature, and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to develop tools for data collection.

Tools validity and reliability

Tool validity: It was applied to evaluate each of the used tools according its degree of representing the variable to be tested, as well as the tool over all appropriateness for use in examining the variable within the proposed study population.

Reliability was tested to determine the extent to which the questionnaire items are related to each other. The Cronbach's alpha test, the model of internal consistency, was used for the analysis. The researcher used a valid reliable standard tool. Statistical equation of Cronbach's alpha reliability coefficient normally ranges between 0 and 1; higher values (more than 0.7) denote acceptable reliability.

Pilot study

The pilot study aims at testing feasibility and applicability of each tool. It was carried out on 10% of the study subject chosen for the study setting previously mentioned. The subject included in the pilot study was included in the main study sample as no modifications were made in the tool.

Ethical consideration

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- Ethical approval obtained from the scientific research, Ethical committee of faculty of Nursing - Helwan University.
- The study facilitation letter to conduct the study was received from the department of postgraduate studies at faculty of Nursing –Helwan University and sent to the director of Fayoum University hospital.
- An official permission was obtained from the administrative authorities of the selected hospital for the current study.
- The researcher assured confidentiality of data for every selected Patient involved in the study sample by using codes to identify participants instead of names or any other personal identifiers.
- The researcher obtained an oral and written consent from the studied patient after explaining the purpose and objectives of the study.
- The participation is voluntary, that patients they have the right to withdraw from the study at any time without giving any reason.

Field work

During this phase; the researcher visited the selected setting regularly, three days per week. And selected patient regarding inclusion exclusion criteria and after that assign them to either a study group or a control group randomly. Concerning health care needs, each patient was assessed individually and data collection was filled by the researcher in the morning or afternoon shifts after surgery by using Tool (I) Structured Interviewing Questionnaire was filled for the studied patients by the researcher. Also severity of pain and anxiety was assessed by using Tool (II) The Numerical Pain Rating Scale and Tool (III) Hamilton Anxiety Scale. It took around five to ten minutes for each patient.

Results

Table (1): Frequency and percentage distribution of demographic characteristic for Patients post Cardiac Surgeries before chest tube removal (N: 60):

Variables	Study Sample (N=60)	
	No.	%
Age (years)		
18-30 years	4	6.7%
31-40 years	19	31.7%
41-50 years	5	8.3%
51-60 years	32	53.3%
Mean ±SD	53.4± 4.5	
Gender		
Male	41	68.3%
Female	19	31.7%
Level of education		

Illiterate	5	8.3%
Secondary	21	35%
University	34	56.6%
Occupation		
Unemployed	24	40.0%
Non professional	14	23.3%
Professional	22	36.7%
Marital status		
Single	8	13.3%
Married	48	80.0%
Divorced	3	5.0%
Widow	1	1.7%

Table (1) illustrates that the mean age of the studied patient's ware (51.4 ± 4.5). Majority of the studied patients were males (68.3%). As regards to educational level for patients the majority of them completed university education (56.6%), as regards to occupation majority of the studied patients were Unemployed (40%). Also Majority of the patient in were married (80%).

Table (2): Frequency and percentage distribution of Body Mass Index for Patients post cardiac surgeries before chest tube removal (N=60):

Variables	Study Group (N=60)	
	No.	%
BMI (kg/m^2) mean \pm SD	24.4 \pm 2.1	
BMI group	No.	%
Normal	3	5%
Over weight	30	50%
Obesity grade I	27	45%

Table (2) illustrates it also show mean of body mass index of the studied patient's ware (24.4 ± 2.1). With high percentage of overweight grade I was noticed among studied patient (50%).

Table (3): Frequency and percentage distribution of smoking habit for Patients post cardiac surgeries before chest tube removal (N: 60):

Variables	Study Sample (N=60)	
	No.	%
Smoking		
Yes	24	40%
No	24	40%
Ex-smoking	12	20%
Type of smoking		
Cigarettes	24	40%
Smoking index		
Number of cigarette /day	29.6±6.9	
Duration of smoking (years)	17.8±2.9	
Smoking index	496.8±146.1	
Heavy smoker		
Yes	24	40%

Table(3) illustrates it The table showed that all the smoking patients were heavy smokers with a percentage of 40% With high mean of smoking index were found among smoking patients (496.8±146.1).

Table (4): Health related information for Patients post cardiac surgeries before chest tube removal (N: 60):

Variables	Study Group (N=60)	
	No.	%
Type of surgery		
Valve	33	55%
CABG	27	45%
Type of chest tube		
Pleural	7	11.7%
Mediastinal	28	46.7%
Both	25	41.6
Duration of insertion		
1-2 days	32	53.3%

2-3 days	23	38.3%
More than 3 days	5	8.4%

Table (4) illustrates that the majority of the studied patients had undergone valve surgery (55%). It also illustrates that (46.7%) in the studied patients had mediastinal chest tube. Regarding the duration of insertion most of them between 1 and 2 days (53.3%).

Table (5): Assessment of severity of pain and anxiety before chest tube removal for Patients post cardiac surgeries before chest tube removal (N: 60):

Variables	Study Group (N=60)	
	No	%
Pain		
Moderate	7	11.7%
Sever	53	88.3%
Anxiety		
Moderate	1	1.7%
Sever	59	98.3%

Table (6) shows that high percentage of severe pain and anxiety for studied patients (88.3%, 98.3%) respectively before chest tube removal.

Discussion

Regarding the demographic characteristics of the studied patients, there were 60 patients in this study; the present study findings revealed that the mean age of the studied patients was (53.4± 4.5). Concerning gender, two thirds of the studied patients were males. In regard to educational level for patients, the majority of them completed university education. Concerning occupation, majority of the studied patients were unemployment. Furthermore, majority of the patients in both groups were married.

This finding was supported by **Sajedi-Monfared, et al (2021)** who reported in the study about "Cold therapy and respiratory relaxation exercise on pain and anxiety related to chest tube removal: A clinical trial" that in their study that the mean of age was 51.26. This finding was contradicted with **Elmetwaly & El Sayed (2020)** who reported in the study about "Chest Tube Removal: Efficacy of Cold Application and Breathing Exercise on Pain and Anxiety Level" that in their study that the mean of age was 37.85.

Concerning gender, two third of the present study were males. This finding may be due to more stress from heavy physical activities in males than females with limited ways to express emotional stress. Men are generally at greater risk of heart disease. The risk for women increases after menopause. The finding is concorded with **Elmetwaly & El Sayed (2020)** and **Mohammadi, et al. (2018)** who reported in the study about "Effects of cold application on chest tube removal pain in heart surgery patients". The pervious researchers reported that more than half of the studied patients were males.

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Regarding mean of body mass index, the present study revealed that half of the studied patient's overweight grade I was noticed among with a mean (24.4 ± 2.1). It is associated with an increased cardiovascular risk on the one hand of obesity itself and on the other hand of associated medical conditions (hypertension, diabetes and insulin resistance). On the same line emphasized that, **Aktaş & Karabulut (2019)** who reported in the study about "The use of cold therapy, music therapy and lidocaine spray for reducing pain and anxiety following chest tube removal" that in their study that the mean of body mass index was 27.83 ± 2.78 .

The current results found about showed that all the smoking patients were heavy smokers with high mean of smoking index were found among smoking patients (496.8 ± 146.1). This result was agree with **Jarrah, et al (2022)** who reported in the study about "The effect of slow deep breathing relaxation exercise on pain levels during and post chest tube removal after coronary artery bypass graft surgery" That three fifths of the participants were active smoker and heavy smokers.

Regards health related information the more than half of the studied patients had undergone valve surgery. The finding is contradicted with **Sajedi-Monfared, (2021)** and **Kunter & Gezer (2019)** who conducted that "The Effect of Cold Application before Breathing Exercises on Sternotomy Pain: A Quasi-Experimental Study". Both authors reported that more than half of the participants underwent coronary artery bypass grafting.

The current result illustrates that near to half of the studied patients had mediastinal chest tube. In accordance with present study **Chauhan et al (2021)** who conducted "A Study to Assess the Effectiveness of Cold Application versus Breathing Exercises to Reduce Pain and Anxiety during Chest Tube Removal among Postoperative Cardiac Surgery Adult Patient in CTVS Ward KGMU Lucknow" reported that the majority of the studied had mediastinal chest tube.

Based on the length of the chest tube insertion, most of those who participated in the study had it removed in a period ranging from one to two days. In the same line, **Sajedi-Monfared, (2021)** and **Elmetwaly & El Sayed (2020)** explained that most of those who participated had their chest tube removed in a period ranging from one to two days. The results of this study are not compatible with **Chauhan, et al (2021)**, who found out that near to three quarters of the participants removed the tube within 2-4 days.

Regarding to assess the severity of pain before removal of the chest tube, the current study indicated that high percentage of severe pain and anxiety for studied patients before chest tube removal. This finding in accordance with **Mazloun et al (2018)** " The impact of using ice on quality of pain associated with chest drain removal in post cardiac surgery patients: An evidence-based care" emphasized that more than three quarters of those who participated had severe pain before removing the tube and majority the had severe anxiety after removal.

Conclusion

It can be concluded that, severe pain and anxiety before chest tube removal among patients post cardiac surgeries.

Recommendations

Design nursing intervention program related to chest tube removal for each patient undergoing cardiac surgery.

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