



THE EFFECT OF ACUPRESSURE ON SEVERITY OF PAIN AND LEVEL OF ANXIETY FOR PATIENTS POST CORONARY ARTERY BYPASS GRAFT

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ABSTRACT: *Background:* Experiencing moderate to severe anxiety and pain are common symptoms after cardiac surgery, which is very challenging to treat with medical treatment. Acupressure is promising because it's nonpharmacologic, has no apparent side effects, and has been used to improve postoperative outcomes. **Aim of this study:** This study aimed to evaluate the effect of acupressure on severity of pain and level of anxiety for patients post coronary artery bypass graft. **Design:** Quasi-experimental research design was used to achieve the aim of this study. **Setting:** This study was conducted at open heart surgery unit at Misr University for Science and Technology hospital and at Academic Institute for Heart Surgery Ain Shams University hospital. **Subjects:** A Purposive sample of 80 adult patients was included in the study. **Tools:** Three tools were used; structured interviewing questionnaire, Numerical scale of pain and State Trait Anxiety Inventory. **Results:** the 85% and 67.5% of the study group had severe pain and anxiety pre acupressure intervention compared to only 7.5% and 15% of them post intervention, while, about 75% of the control group had severe pain and anxiety pre intervention compared to 52.5% and 65% of them post intervention. There was high statistically significant difference between both groups regarding pain severity and anxiety level pre to post acupressure intervention. **Conclusion:** The study concluded that acupressure had a positive effect on reduction of severity of pain and level of anxiety post coronary artery bypass graft. **Recommendations:** It is recommended that nurses should consider using acupressure as an effective technique for pain and anxiety management in addition to drug therapy.

KEYWORDS: Acupressure, Anxiety, Pain.



INTRODUCTION

Coronary artery disease is a public health problem and is one of the leading causes of loss of quality of life, disability, and death worldwide. CAD is usually refer to the pathologic process affecting the coronary arteries (usually atherosclerosis) and can be a symptomatic and includes the diagnoses of angina pectoris, myocardial infarction (MI) and silent myocardial ischemia (Danaei et al., 2019); (Sawatzky and Naimark, 2019).

Coronary artery bypass graft surgery surgery is a common form of treatment for patients with coronary stenosis and more than 73 million surgeries are performed annually only in the United States. Despite achieving technical success for most patients, clinically significant morbidities such as cardiologic shock, dysrhythmia, gastrointestinal bleeding, pain, anxiety, and vital sign changes are common (Johnson et al., 2018); (Mohammad et al., 2019).

Coronary Artery Bypass Grafting as an open-heart surgery is a painful procedure due to sternum opening, tissue damage, inflammation in the incision area and mediastinal tube placement used to treat coronary heart disease. It diverts blood around narrowed or clogged parts of the major arteries to improve blood flow and oxygen supply to the heart (Bjornnes, 2016).

Anxiety is an important problem that can hinder the recovery of patients after cardiac surgery; thus, appropriate and adequate nursing interventions must be investigated. Anxiety is a considerable challenge that can indirectly increase postoperative pain and analgesic usage, decrease resistance against infection, prolong postoperative wound healing and increase the duration of hospitalization. So, the need for safe interventions for controlling patients' anxiety has been emerged such as complementary therapies (Yeh et al., 2019) ;(Schnabel et al., 2020).

Acupressure is a non-invasive massage technique that has been used for symptom management since ancient times and it is a complementary medicine method recognized by the World Health Organization (WHO). Acupressure consists of using fingers, palms, elbows, or special bands to apply pressure to exact points on the body (Chen and Wang, 2018).

Nurse's role in acupressure is to facilitate, advocate and promote best possible care for the patient. Nurses are required to take action in situations where patient safety and well-being are compromised. This includes notifying the prescriber of concerns and consulting with the health care team. Nurses are also accountable for advocating for policies and procedures about complementary therapies that are driven by patient safety (Dawson et al., 2020).

Significance of the study:

Coronary Artery Disease continues to account for one-third of all deaths in people over the age of 35. According to the 2019 update of the Heart Disease and Stroke Statistics, 15.5 million people in the United States have coronary artery disease. The prevalence of CABG surgery has been increased; the number of CABG surgeries performed in the U.S. was 519,000 in 2016. In addition, the estimates state that the numbers of CABG surgeries performed worldwide are more than 800,000 every year (Quan et al., 2018); (Ahmad and Batcha, 2020).



In Egypt, CABG surgery is performed for about 300,000 patients each year. In 40 to 60 percent of cases, the postoperative period of coronary artery bypass grafting is associated with negative effects of the procedure that lead to psychological symptoms such as anxiety and depression, as well, postoperative pain is intense or moderate, prevailing after extensive surgery (Said et al., 2021) ;(Noor et al., 2022).

In parallel to the increase of the number of cardiovascular disease and cardiac surgeries, the number of studies about the use of complementary therapies for patients care has increased. Acupressure is promising as it's an on pharmacologic, not reliant on funds, has no apparent side effects and is highly tolerable in a variety of population. So, the aim of this study was to evaluate the effect of acupressure on severity of pain and level of anxiety for patients post coronary artery bypass graft (Barnes et al., 2019).

Aim of the Study

This study aimed to:

Evaluate the effect of acupressure on severity of pain and level of anxiety for patients post coronary artery bypass graft through:

1. Assessing severity of pain and level of anxiety for patients post coronary artery bypasses graft.
2. Implementing acupressure technique for patients post coronary artery bypasses graft.
3. Evaluating the effect of acupressure on severity of Pain and level of anxiety for patients post coronary artery bypasses graft.

Research Hypothesis:

The current study hypothesized that:

- The acupressure technique will have a positive effect in reduction of pain severity among patients post coronary artery bypasses graft.
- The acupressure technique will have a positive effect in reduction of anxiety level among patients post coronary artery bypasses graft.

I) Technical item:

The technical item includes research design, setting, subjects and tools for data collection.

Research design:

Quasi-experimental research design was utilized to conduct this study. Quasi-experimental design aims to establish cause and effect relationship between independent and dependent variables. However, a quasi-experiment does not rely on random assignment. Instead, subjects are assigned to groups based on non-random criteria (Janssen and Kollar, 2021).



Setting:

This study was conducted at open heart surgery unit at Misr University for Science and Technology (MUST) hospital and open heart surgery unit affiliated to Academic Institute for Heart Surgery Ain Shams University hospital.

Open heart surgery unit at MUST hospital is located at 2nd floor of hospital, it contains 7 beds, 7 ventilators, 7 monitors and 1 emergency carts, the unit receives about 15 to 20 patients suffering from coronary artery disease monthly.

Open heart surgery unit at Academic Institute for Heart Surgery affiliated to Ain Shams University hospital is located at 8th floor in hospital, it contains 15 beds, 16 ventilators, 17 monitors and 2 emergency carts, About 20 to 25 patients with coronary artery disease are admitted to the unit monthly.

Subjects:

A Purposive sample of 80 adult patients from the previously mentioned departments was included in the study.

Inclusion criteria:

- Newly admitted and conscious patients.
- Extubated from mechanical ventilator patients.

Exclusion criteria:

- Patients with hand and arm fracture.

Sample size calculation:

The sample size was calculated by adjusting the power of the test to 80%, and the confidence interval to 95% with a margin of error accepted adjusted to 5% using the following equation:

$$n = \frac{N \times p(1-p)}{\left[\left[N - 1 \times \left(d^2 \div z^2 \right) \right] + p(1-p) \right]}$$

$$N \times p(1-p) = 100 \times (0.5 \times (1-0.5))$$

$$N - 1 = (100 - 1)$$

$$d^2 / z^2 = 0.0025 / 3.8416$$

$$p(1-p) = 0.5 \times (1-0.5)$$

$$N = 79.5 = 80$$

N= Community size

z= Class standard corresponding to the level of significance equal to 0.95 and 1.96

d= The error rate is equal to 0.05

p= Ratio provides a neutral property = 0.50 (Suresh and Chandrashekar, 2012).



Based on the above equation, the sample size is 80 patients participated in this study. They were divided randomly into two groups, study and control groups.

Tools for data collection:

Three tools were used to collect data of this study as follow:

Tool (I): Structured interview questionnaire (Appendix I):

It was developed by the investigator based on literature review (*Knight et al., 2020*); (*Ferris, 2017*); (*Algadiem et al., (2016)*). It was written in English language and filled by investigator. It included the following two parts:

Part (I): Demographic characteristics of the patients:

This part was used to assess demographic characteristic of the studied patients such as: age, gender, marital status, level of education, occupation and residence.

Part (II): patient's medical history:

This part was used to assess past health history of the studied patients as history of chronic disease, duration of chronic disease, history of obesity, history of previous heart surgery and family history of heart surgery. Patients' current medical history included causes of undergoing CABG surgery, duration of diagnosis, signs and symptoms of disease and duration of extubation from mechanical ventilator, as well as, it included assessment of patients' life style practices as daily exercises, smoking, its duration and number of cigarettes per day.

Tool (II): Numerical scale of pain (Appendix II):

It was adopted from (**Jensen and McFarland, 1993**). It was used to assess pain severity among patients post CABG surgery.

Scoring system of numerical scale:

The scores were distributed on 0 to 10 points scale:

- Score from 1 to 3 indicated mild pain.
- Score from 4 to 6 indicated moderate pain.
- Score from 7 to 10 indicated severe pain.

Tool (III): State Trait Anxiety Inventory (STAI) (Appendix III):

This tool was adopted from (**Spielberger, 1970**). It was used to assess anxiety level. It consists of 40 items that are divided into two subscales; each subscale included 20 items. State anxiety subscale (1–20) items and the trait anxiety subscale (21–40). The state anxiety subscale assesses patient's feelings in certain conditions. The trait anxiety subscale assesses patient's feelings in routine typical situations that everyone experience on a daily basis.



Scoring system

The item scoring ranged from one to four. Score 1 for not at all, score 2 for little, score 3 for some what and score 4 for very much. The total score ranged from 40 (the lowest possible anxiety) and 160 (the highest possible anxiety) and was categorized as:

- Score of 40–79 indicated mild anxiety.
- Score of 80–119 indicated moderate anxiety.
- Score of 120–160 showed severe anxiety.

The scoring for anxiety absent items was reversed on state trait anxiety inventory. the reversed scored items included: items 1,2,5,8,11,15,16,19 and 20 (state anxiety scale) and items 21,23,26,27,30,33,34,36 and 39 (trait anxiety scale).

Operational Definitions:

Acupressure: pressure applied by the thumbs, fingers, and hands on the surface of the skin at key points (active acupressure).

Validity:

The developed tool was formulated and submitted to five experts of medical surgical nursing at Faculty of Nursing, Helwan University to assess the content validity. The expertise reviewed the tool for clarity of sentences, relevance, accuracy, comprehensiveness, simplicity and applicability and minor modification were done.

Reliability:

Reliability is the extent to which the same answers can be obtained using the same instruments more than one time of proposed tools. Cronbach's alpha reliability coefficient normally ranges between 0 and 1. Higher values of Cronbach's alpha (≥ 0.7) denote acceptable reliability. The composite reliability values for the state trait anxiety inventory were 0.732 for state anxiety and 0.858 for trait anxiety (Seok et al., 2018).

Ethical considerations:

An official permission to conduct the proposed study was obtained from the scientific research ethics committee at faculty of nursing Helwan University. Participation in the study was voluntary and subjects were given complete full information about the study and their role before signing the informed consent. The ethical considerations included explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information, where they weren't be accessed by any other party. Ethics, values, culture and beliefs were respected.



II-Operational item:

The operational design included preparatory phase, pilot study and field work.

A- Preparatory Phase:

- It included reviewing of related literature, and theoretical knowledge of various aspects of the study using books, articles, internet, periodicals and magazines to develop data collection tool.
- During this phase the investigator had attended a training course at academy of Chinese medical training and human resources development in Cairo. The investigator attended the course for 5 months in the period from 1, March 2021 to 30, July 2021.
- The training course titled “acupressure and diagnosis with Chinese medicine” the course included 2 levels, as well, theoretical and practical sessions. The investigator had obtained a certification of the course after passing both theoretical and practical exams.

B- Pilot study:

A pilot study was conducted to test feasibility and applicability of the study tools. It was carried out on 10% of total study subjects (8). There were no modifications of tools and the patients included in the pilot study were included in the main study group.

C- Fieldwork:

- 1- Data collection was started and completed within six months, from beginning of August 2021 to the end of January 2022. The investigator visited the study setting four days weekly.
- 2- The studied patients were divided randomly into 2 equal groups (study and control) groups. The study group received acupressure treatment while control group received routine treatment for management of pain and anxiety.

a) Assessment phase:

- In this phase the investigator collected data from both groups (study and control) starting with control group to prevent contamination of the sample.
- Data collection was begun with structured interview questionnaire which included demographic characteristics and patient’s medical history, which took 10 minutes. After that the investigator assessed pain severity and level of anxiety pre intervention using numerical scale of pain and state trait anxiety inventory. This took 30 minutes.

b) Planning phase:

- Open heart surgery unit at MUST hospital and open heart surgery unit affiliated to Academic Institute for Heart Surgery, Ain Shams University hospital were informed about the acupressure intervention.
- Patients who agreed to participate in the study were interviewed individually to explain the purpose of study prior to any data collection.



c) Implementation phase:

- 1- For the study group, patients received acupressure intervention by the investigator.
 - After CABG surgery and immediately after completing recovery from anesthesia, removal of the tracheal tube, and stability of the vital signs within 6 to 7 hours post-surgery,
 - Bilateral pressure was applied on the organs at the LI4 point which is located about the back part of the hand between the first and second metacarpal bones and almost along the radial bone and PC-6 point, also known as "neiguan" or "inner pass", which is located about three fingers below the inner wrist for 8 to 20 minutes in 10-second pressure and 2-second resting periods for each point.
 - The applied pressure was about 3–5 kg, such that the patient could feel warmth, numbness, and weight.
- 2- For the control group, patients received routine treatment for management of pain and anxiety.
- 3- In both groups, pain severity and anxiety level were assessed immediately within 10 minutes after pressure and touch are applied.

d) Evaluation:

During this phase the investigator collected data from both groups for reassessment using the same tools of data collection after applying acupressure technique for study group.

III-Administrative item:

An official approved was obtained from the dean of the faculty of Nursing Helwan University and directors of open heart unit at MUST university hospital, and director of academic institute for heart surgery Ain Shams University hospital, to carry out this study, explaining the purpose of the study and requesting the permission for data collection.

IV-Statistical item:

The data were collected and coded, then the collected data were organized, analyzed using appropriate statistical significance tests using the computer Statistical Package for Social Science (SPSS), version 24. Data were presented using descriptive statistics in the form of frequencies and percentages.

Degrees of significance of results were considered as follow: P value > 0.05 Not significant (NS), P value ≤ 0.05 Significant (S), P value ≤ 0.01 Highly Significant (HS) (Siregar, 2021).

- Standard deviation (SD) & arithmetic mean (\bar{X}) for quantitative data: age.
- Frequency and percentage for qualitative data: gender
- Chi-square test used to compare between two or more groups.



RESULTS


Table (1): Comparison between study and control groups regarding their demographic characteristics (N=80).

Items		Study group (n=40)		Control group (n=40)		X ²	P- Value
		N	%	N	%		
Age (in years)	18-40	3	7.5	1	2.5	1.735	0.420
	41-60	32	80.0	36	90.0		
	>60	5	12.5	3	7.5		
	Mean ±SD	50.88±9.02		51.30±6.32			
Gender	Male	27	67.5	24	60.0	0.487	0.485
	Female	13	32.5	16	40.0		
Marital status	Single	1	2.5	2	5.0	0.487	0.922
	Married	33	82.5	31	77.5		
	Divorced	5	12.5	6	15.0		
	Widow	1	2.5	1	2.5		
Educational level	Don't Read and write	5	12.5	2	5.0	2.489	0.477
	Read and write	6	15.0	5	12.5		
	Secondary	9	22.5	14	35.0		
	University	20	50.0	19	47.5		
Occupation	Not work	7	17.5	10	25.0	0.931	0.818
	Worker	12	30.0	10	25.0		
	Employee	15	37.5	13	32.5		
	Retired	6	15.0	7	17.5		
Residence	Rural	7	17.5	14	35.0	3.164	0.075
	Urban	33	82.5	26	65.0		

Not -significant ($p>0.05$) χ^2 =chi-square test

Table (1): shows that, 80.0% and 90.0% of study and control groups were in age group 41-60 years with mean age 50.88±9.02 and 51.30±6.32 respectively. In relation to gender, 67.5% and 60.0% of the studied groups were males. Regarding to marital status, 82.5% and 77.5% of them were married, while, 50.0% and 47.5% of them had university education respectively. Also, 37.5% and 32.5% of the studied groups were employee and 82.5% and 65.0% of them were from urban residence respectively. There were no statistically significant differences between both groups regarding all items of demographic characteristics.

**Table (2): Comparison between study and control groups regarding their past health history (N=80).**

Items		Study group n=40		Control group n=40		X ²	P-Value
		N	%	N	%		
Chronic disease 	Hypertension	27	67.5	32	80.0	2.952	0.163
	Diabetes	19	47.5	15	37.5		
	Cancer	2	5.0	4	10.0		
	COPD	4	10.0	7	17.5		
	Stroke	2	5.0	0	0.0		
	Cardio vascular disease	25	62.5	17	42.5		
	Renal disease	1	2.5	1	2.5		
Duration of chronic disease	0 > 3 months.	0	0.0	0	0.0	0.000	1.000
	4 > 6 months.	0	0.0	0	0.0		
	One year.	0	0.0	0	0.0		
	More than one year.	40	100.	40	100.		
History of obesity	Yes	24	60.0	28	70.0	0.879	0.348
	No	16	40.0	12	30.0		
Previous heart operation	Yes	35	87.5	37	92.5	0.556	0.456
	No	5	12.5	3	7.5		
Family history of heart surgery	Yes	22	55.0	25	62.5	0.464	0.496
	No	18	45.0	15	37.5		

Not -significant (p>0.05) x²=chi-square test

Table (2): illustrates that hypertension was the most common chronic disease in 67.5% and 80.0% of study and control groups respectively and 100% of both groups complained from chronic disease for more than one year. 60.0% and 70.0% of the studied groups respectively had past history of obesity. 87.5% and 92.5% of them respectively had history of heart surgeries, while, 55.0% and 62.5% respectively had family history of heart surgeries. There were no statistically significant differences between both groups regarding their past health history.



Table (3): Comparison between study and control groups regarding their current medical health history (N=80).

Items		Study group n=40		Control group n=40		X ²	P-value
		N	%	N	%		
Cause for CABG surgery	Angina.	7	17.5	1	2.5	14.546	0.961
	Multi vessels stenosis.	23	57.5	18	45.0		
	Coronary artery stenosis.	9	22.5	11	27.5		
	Valvular heart replacement.	4	10.0	1	2.5		
	Ventricular aneurysm.	3	7.5	3	7.5		
	ST-elevation myocardial infarction	2	5.0	5	12.5		
	Myocardial ischemia.	4	10.0	3	7.5		
	Severe left main stem artery stenosis.	11	27.5	9	22.5		
	Acute occlusion right coronary artery	4	10.0	4	10.0		
	Non-ST-elevation myocardial infarction	3	7.5	5	12.5		
	After a failed percutaneous coronary intervention.	12	30.0	13	32.5		
Duration of diagnosis (in months)	<12	24	60.0	36	90.0	9.600	0.062
	≥12	16	40.0	4	10.0		
	Mean ±SD	10.18±6.45		5.30±3.79			
Signs and symptoms of diagnosis	Chest pain.	38	95.0	39	97.5	12.546	0.761
	Chest heaviness.	35	87.5	35	87.5		
	Arm and leg numbness.	7	17.5	4	10.0		
	Upper abdomen pain.	19	47.5	19	47.5		
	Syncope.	2	5.0	0	0.0		
	Shortness of breathing.	36	90.0	37	92.5		
	Fatigue.	30	75.0	33	82.5		
	Palpitations.	3	7.5	1	2.5		
	Abnormal heart rhythms.	6	15.0	4	10.0		
	Vomiting.	22	55.0	28	70.0		
Dizziness.	16	40.0	17	42.5			
Duration of extubation from mechanical ventilator	<1 days.	35	87.5	36	90.0	0.125	0.723
	>3days.	5	12.5	4	10.0		

✚ This variable is not mutually exclusive

Not -significant (p>0.05)



Table (3): reveals that multi vessels stenosis was the most common cause for CABAG surgeries in 57.5% and 45.0% of study and control groups respectively and 60.0% and 90.0% of both groups respectively were diagnosed less than 12 months. Chest pain and shortness of breathing were the main symptoms in 95.0% and 97.5% of the studied groups and 90% and 92.5% respectively. Also, 87.5% and 90.0% of both groups respectively were extubated from mechanical ventilation less than 1 day. There were no statistically significant differences between both groups regarding their current medical history.

Table (4): Comparison between study and control groups regarding their pain severity pre and post acupuncture intervention (N=80).

Pain severity	Pre- intervention					Post- intervention						
	Study group (n=40)		Control group (n=40)		X ² ₁	p-value	Study group (n=40)		Control group (n=40)		X ² ₂	P- value
	N	%	N	%			N	%	N	%		
Mild	2	5	4	10.0	4.305	0.116	12	30.0	6	5.0	19.289	0.000**
Moderate	4	10.0	6	15.0			25	62.5	13	32.5		
Severe	34	85.0	30	75.0			3	7.5	21	52.5		
Mean ±SD	7.02±1.23		5.95±1.27				4.15±1.09		5.65±1.16			

X²₁ between study and control groups pre-program

X²₂ between study and control groups post program

** Highly significant (p<0.001)

Table (4): shows that 85% of the studygroup had severe pain pre acupuncture intervention compared to only 7.5% of them had severe pain post intervention. While, 75% and 52.5 % of the control group had severe pain pre and post intervention respectively.

There was no statistically significant difference between the studied groups pre intervention at (p = 0.116). While, there was high statistically significant difference between groups post intervention at(p= 0.000).



Table (5): Comparison of study and control groups regarding their anxiety level pre and post intervention (N=80).

Anxiety severity	Pre- intervention					Post- intervention						
	Study groupn=40		Control groupn=40		X ² ₁	p- value	Study groupn=40		Control groupn=40		X ² ₂	P- value
	N	%	N	%			N	%	N	%		
Mild	2	5.0	3	7.5	1.247	0.536	16	40.0	4	10.0	21.986	0.000**
Moderate	11	27.5	7	17.5			18	45.0	10	25.0		
Severe	27	67.5	30	75.0			6	15.0	26	65.0		
Mean ±SD	126.62+8.91		128.70+7.27				87.40+8.34		119.95+3.95			

X²₁ between study and control groups pre-program

X²₂ between study and control groups post program

** Highly significance (p<0.001)

Table (5): shows that 67.5% of the study group had severe anxiety level pre acupressure intervention decreased to only 15.0% of them had severe anxiety post intervention. While, 75.0% and 65.0% of the control group had severe anxiety level pre and post intervention respectively.

There was no statistically significant difference between the studied groups regarding anxiety level pre intervention at (p =0.536), while, there was high statistically significant difference between both groups post intervention at (p=0.000).

Table (6): Relation between pain severity and anxiety level among the studied patients post acupressure intervention (N=80).

Pain severity	Anxiety level																					
	Study group					Control group																
	Mild	Moderate	Severe	X ²	P- value	Mild	Moderate	Severe	X ²	P- value												
N	%	N	%			N	%	N			%											
Mild	3	7.5	6	15.0	3	7.5	1	2.5	2	5.0	3	7.5	3.560	< 0.05*	1	2.5	2	5.0	3	7.5	0.791	0.034*
Moderate	12	30.0	11	27.5	2	5.0	1	2.5	3	7.5	9	22.5			1	2.5	3	7.5	9	22.5		
Severe	1	2.5	1	2.5	1	2.5	2	5.0	5	12.5	14	35.0			2	5.0	5	12.5	14	35.0		

* Significant (p < 0.05)



Table (6): reveals that there were statistically significant relations between pain severity and anxiety level within the study and control groups post acupressure intervention at ($p=0.058$ and 0.034) respectively.

DISCUSSION

Experiencing moderate to severe anxiety and pain are common symptoms after cardiac surgery, which is very challenging to treat completely with medical treatment. Medical treatments used for relieving these symptoms have various side effects. Complementary medicine can be easier than medical treatment for the application, is not expensive method for symptom management. Therefore, in addition to medical treatment, the importance of complementary methods should be considered as well (Aygin, and Sen, 2019). So, the present study was conducted with the aim of evaluating the effect of acupressure on severity of pain and level of anxiety for patients post coronary artery bypass graft

The discussion of the findings is subcategorized into five main parts:

Part I: Demographic characteristics of the studied patients. **Part II:** Health history of the studied patients. **Part III:** Pain severity among the studied patients. **Part IV:** Anxiety level among the studied patients. **Part V:** Relation between the studied variables among the studied patients.

As regards to demographic characteristics of the studied patients, the study finding revealed the majority of study and control groups were in age group 41-60 years with mean age 50.88 ± 9.02 and 51.30 ± 6.32 respectively, this result could be due to that older adults are more likely than younger people to suffer from cardiovascular disease as aging can cause changes in the heart and blood vessels that may increase a person's risk of developing cardiovascular disease (El Khoudary et al., 2020).

This finding is consistent with Mohamed et al., (2019) who conducted a study about "epidemiological and clinical profile of acute coronary syndrome of Egyptian patients admitted to the coronary care unit, Al-Azhar University hospital, new Damietta" and found that the mean age of the patients was 55.6 ± 11.6 years.

Concerning gender, the present study results showed that about two thirds of the studied patients were males. This finding could be interpreted by the most common causes of coronary artery diseases are hypertension, diabetes and smoking which are more common in men so male have a higher rate of coronary artery disease than female (Talmor et al., 2022). This finding is similar to the result reported by Mansoorzadeh et al., (2018) in their recent study title "The effect of acupressure on anxiety and dysrhythmia in patients undergoing cardiac catheterization" and indicates that about half and more than half of the studied groups were males.

Regarding marital status, the present study showed that the majority of studied patients were married. This result can be explained by the age of the majority of the studied patients of 41 to 60 years that indicate marriage age according to Egyptian society culture. This finding matches with Marzieh et al., (2019) who conducted a study about "the effect of acupressure on physiological parameters of myocardial infarction patients" and reported that the majority



of the studied groups were married.

As related to the educational level, the present study results showed that half and about half of both groups had university education. This finding is contradicted with Vasokolaei et al., (2019) who compared the effects of hand reflexology versus acupressure on anxiety and vital signs in female patients with coronary artery diseases and demonstrated that more than one third of patients were illiterate.

Concerning occupation, the present study showed about one third of study and control groups were employee. This could be explained by the age of the majority of studied patients of 41 to less than 60 years and the educational level of about half of them, which qualified them to work. This finding is incongruent with Masoumeh et al., (2020) who conducted a study about “The effect of acupressure on the quality of sleep in patients with acute coronary syndrome in cardiac care unit” and reported that more than one third of patients were housewives.

Regarding to past health history of the studied patients; the present study showed that hypertension was the most common chronic disease in the majority of both groups and all of patients had chronic disease for more than one year. This could be interpreted by hypertension can be a major contributing factor for heart disease. This finding is congruent with Mostafa et al., (2021) who conducted a study about “Efficacy of deep breathing exercise on pain perception among coronary artery bypass grafting patients” and found that the majority of the studied population had hypertension and diabetes.

Considering history of obesity, two thirds of study and control groups had history of obesity, this finding could be interpreted by higher body mass index (BMI) is strongly linked to higher troponin levels and is a major risk factor for developing coronary artery disease (Talmor et al., 2022). This finding mismatches with Abdelaziz et al., (2020) who carried out a study about “The effect of early six-minute walking test post coronary artery bypass graft on walking tolerance and physiological parameters” and reported that more than half of the intervention and control groups had normal body mass index.

Regarding history of heart surgeries, the majority of study and control groups had history of heart surgeries, this result could be related to about one third of the studied patients underwent CABG after failed PCI, as well as, more than half of them had family history of heart surgeries. This finding is consistent with Yun and Hyojun, (2020) who conducted a study about “Effects of auricular acupressure on the quality of sleep and anxiety in patients undergoing cardiac surgery” and found that the majority of patients had a positive family history of past operative experience.

Considering present history, Multi vessels stenosis was the common cause for undergoing CABAG surgeries in more than half and about half of study and control group respectively and about two thirds and the most of both groups respectively were diagnosed less than 12 months. This finding goes in line with Mohamed, et al., (2019) who found that more than half of patients were diagnosed with ST segment elevation myocardial infarction (STEMI) with multi vessels stenosis.

Regarding signs and symptoms, Chest pain and shortness of breathing were the main symptoms in the most of study and control groups. This can be explained by pathophysiology of coronary artery disease when coronary arteries become partially blocked, it can cause chest



pain. This can be a mild, uncomfortable feeling similar to indigestion or a severe painful feeling of heaviness or tightness in the center of the chest, which may spread to the arms, neck, jaw, back or stomach (Pokorney et al., 2021). This finding is supported by Mohamed et al., (2019) who found chest pain was the most widely recognized clinical presentation. As well, it's consistent with Abdelaziz et al., (2020) who noted that more than half of the studied groups complained from dyspnea.

By assessing pain, the majority of the study group had severe pain pre acupressure intervention compared to only the minority of them post intervention. While, the majority and more than half of the control group had severe pain pre and post intervention respectively. This can be interpreted by mechanism of action of acupressure that causes low-frequency electrical stimulation of the skin sensory receptors, may cause endorphin release from the hypothalamus. In addition, norepinephrinergetic and serotonergic fibers may be activated (Atkins et al., 2021).

This finding is congruent with Rady and Eldeep, (2020) whose study aimed to assess the effect of progressive muscle relaxation technique on post-operative pain and quality of recovery among patients with surgeries and found that half of the study group had severe pain before the intervention while none of them had such pain intensity in the 3rd day after intervention. This is compared with about half and more than one third of the control group had experienced such severe pain before and in the 3rd day after the intervention respectively.

In the same context, there was no statistically significant difference between the studied groups pre intervention regarding pain severity, while, there was high statistically significant difference between groups post intervention. This result is in accordance with Narimani et al., (2018) in their study about "Effect of acupressure on pain severity in patients undergoing coronary artery graft: a randomized controlled trial" and stated that there was no significant difference between the study groups with regards to changes in the pain score in pre-intervention phase. Immediately after the intervention, the mean changes in pain score were significantly different.

Concerning to anxiety level, more than two thirds of the study group had severe anxiety level pre intervention decreased to only minority of them post intervention. While, the majority and about two thirds of the control group had sever anxiety level pre and post intervention respectively. This finding is supported by Vasokolaeiet al., (2019) who stated that after the acupressure intervention, the mean score of anxiety was reduced from more than half of the study group had severe anxiety level pre intervention to one third of them had sever anxiety post intervention.

This study results reveal that there were statistically significant relations between pain severity and anxiety level within the study and control groups post acupressure intervention. This finding is consistent with Farzaneh et al., (2019) who conducted a study about "The effect of cold application and lavender oil inhalation in cardiac surgery patients undergoing chest tube removal" and showed no significant correlation between anxiety and pain scores either before or immediately after chest tube removal.



CONCLUSION

On the light on the finding of the current study, it can be concluded that:

Finding of the current study concluded that there were no statistically significant differences between the study and control group regarding their demographic and medical data. There was statistically significant decrease in the severity of pain and level of anxiety after implementing acupressure in the study group compared to control group, this support the research hypothesis that acupressure technique had positive effect on reduction of pain severity and level of anxiety for patients post CABG.

RECOMMENDATIONS

Based on the results of the present study the following recommendations are suggested:

Recommendations for patients:

- It is recommended that nurses should consider using acupressure as an effective technique for pain and anxiety management in addition to drug therapy.
- Assess the effect of repetitive acupressure intervention on patients' health outcomes.

Recommendations for further research studies:

- Further research should be conducted to study the effect of acupressure on other symptoms among patients post CABG.
- Replication of the study on large sample to be able to generalize the study result.

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