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# Effect of Relaxation Technique on Stress, Anxiety and Pain Perception among Postoperative Heart Surgery Children

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## Abstract

Open heart surgery can affect children in various ways, ranging from treatable disorder without long - term consequences to life-threatening condition. **Aim:** It was to evaluate the effect of relaxation technique on stress, anxiety and pain perception among post-operative heart surgery children. **Study design:** Quasi experimental design.

**Settings:** This study was carried out in cardiac intensive care unit, and cardiac surgery wards which affiliated to Ain Shams University Hospitals. **Subject:** purposive sample Composed of 42 children undergoing cardiac surgery in the previously mentioned settings. **Tools**: Tools of data collection were: **I Children 's Characteristics Sheet**: to assess the children's characteristics ,**II Perceived Stress Scale (PSS):** to assess the level of stress in children pre/post relaxation technique , **III Anxiety Scale:** to assess the level of anxiety in children pre/post relaxation technique ,

**IV Numeric Pain Rating Scale**: to assess the level of pain perception in children pre/post relaxation technique**.**

**Results:** Statistical significant difference was observed post relaxation technique intervention regarding children's stress, anxiety and pain perception undergoing open heart surgery**.**

**Conclusion:** It can be concluded that, relaxation technique was effective on decrease stress, anxiety, and pain perception among postoperative heart surgery children.

**Recommendations:** Adequate time and specialized area should be offered to the child undergoing open heart surgery to learn and practice the relaxation technique. Further studies should be done to investigate the effect of other relaxation techniques on the management of postoperative stress ,anxiety and pain perception with open heart surgery children.

***Keywords:*** perception, open heart surgery, postoperative anxiety, relaxation technique, and children.

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# 1. INTRODUCTION

Cardiac surgery is a common interventional procedure for correction of congenital heart diseases. It is accompanied by postoperative pain and anxiety **(Sendelbach et al., 2016).** Over the past 20 years, open heart surgery become one of the most commonly performed surgical procedures in the United States 98.000 require valve procedures**(Davies, 2015).**

Anticipation of cardiac surgery is a source of great stress to the pediatric patient. The child will be anxious and fearful and often have many unanswered questions.

This anxiety usually increases with the admission to the hospital and the immediacy of surgery, which can affect the postoperative recovery and risk for physiological complications **(Smeltzer and Bare, 2014).**

There is little doubt that pharmacological management of postoperative pain can be effective; however, there are times when pain medication may be contraindicated because of its effects on the cough reflex and respiratory center. Moreover pain is more than just a sensory experience, thus the pharmacological management alone may be inadequate **(Roykulcharoen and Good, 2014).** Inadequate pain control coupled with an uninhibited stress response during the postoperative period lead to tachycardia, hypertension, vasoconstriction, increased catabolism and impaired immune response. **(Liu et al., 2015 and Kaplan et al., 2016).**

Nursing management of pain includes physical, cognitive (focuses on pediatric patient's beliefs, perception, attitudes, expectations, control, and cognitive coping), behavioral (targets actions under the patient control), and pharmacological therapies. Being familiar with these techniques and the types of pain for which they are effective helps the nurse decide which ones to use, when to initiate them, what outcomes to expect, and how to teach them to patients **(Craven and Hirnle, 2017).**

Postoperative recovery is influenced by child anxiety, or by psychological procedures which they have undergone preoperatively. Typically, children who have undergone anxiety-reduction or coping skills training preoperatively have been found to be less anxious, or to report less pain or bodily discomfort postoperatively; in addition, objective measures including the duration of their postoperative stay and their requests for analgesic medication may be reduced. These effects are widely regarded as showing that the stressfulness of surgery has been reduced, with consequent benefit for the pediatric patient (Walker, 2013).

Psychological stress and anxiety from open heart surgery evokes physiological responses (release of adrenaline and non adrenaline), which may have an unfavorable effect, especially if prolonged. The emotionally disturbed pediatric patient may experience a great problem with vomiting, urinary retention, pain and restlessness during the postoperative period **(Vingerhoets,2015).**

Children undergoing cardiac surgery often experience traumatic situations related to their care and may be at risk for developing posttraumatic stress disorder (PTSD) which includes disorganized or agitated behavior, recurrent or distressing thoughts, repetitive play, nightmares, sleep disturbance, and difficulty concentrating. The observation that PTSD in children after cardiac surgery is associated with a longer stay in the ICU which is frightening place for young children , the lights are usually on continuously and sleep patterns are disrupted. The child is isolated from family members and friends, is confronted with many different caregivers, and is subject to a variety of invasive and non-invasive procedures **(American Psychiatric Association,1994)** .

Relaxation is one of the cognitive behavioral therapies of pain, its goal is to change patient's

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perception of pain, alter pain behavior and provide patients with greater sense of control over their pain **(Roykulcharoen and Good, 2014).**

Methods of relaxation techniques are deep breathing exercise, progressive muscle relaxation, meditation, taking a nap, taking a warm bath, getting a massage, day dreaming, praying, reading, and simple work or hobbies **(Taylor et al., 2015).**

Relaxation techniques, which can be useful pain relief measures, usually involve a combination of a quite environment, a comfortable position, a passive attitude, and a focus of concentration such as a word, sound, or breathing pattern. Relaxation can counteract the effect of fight- or- flight response and promote mental and physical freedom from tension and stress. Physical and mental tension can aggravate any pain. Relaxation techniques involves a lot of techniques such as, deep breathing exercise, meditation, progressive relaxation, autogenic (passive progressive relaxation), and biofeedback **(Van Fleet, 2017).**

Methods for relieving post operative anxiety have ranged from a simple informational visit, to complex programs of relaxation, imagery, meditation and hypnosis. Therefore it is essential to evaluate the effect of relaxation technique on the post operative stress , anxiety and the postoperative pain among pediatric patients undergoing open heart surgery **(Hadj et al., 2016).**

**Significance of the study:**

In 2014, approximately 300 children underwent open heart surgery at Ain Shams University Hospitals **(Operating room records, 2015).**

In addition to the incidence rate of open heart surgery in Egypt is 5-6% per 100.000 of children population, there are 243 deaths annually among Egyptian children due to open heart surgery. This ranks Egypt as the second country in the world in this regards, preceded by Japan which tallies up to 447 deaths **(World Health Organization Statistical Information system, 2017).**

## Aim of the Study:

Aim of this study is to evaluate the effect of relaxation technique on stress , anxiety and pain perception among post operative heart surgery children .This aim was achieved by:

-Assessing children's stress, anxiety and pain perception after 48 hours postoperatively.

-Advising children to apply relaxation technique.

-Evaluating children's stress, anxiety and pain perception immediately after finishing the relaxation technique.

## Hypothesis:

The relaxation technique which are applied by children after 48 hours postoperatively, will improve their postoperative stress , anxiety and pain perception.

# Subject and Methods

## I. Technical Design:

It included research design, setting, subject and tools of data collection.

## Research design:

A quasi- experimental design was utilized to conduct the study.

## Research settings:

This study was carried out in intermediate cardiac intensive care unit, and cardiac surgery wards which affiliated to Ain Shams University Hospitals.

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## Research subject:

Purposive sample composed of 42 children undergoing cardiac surgery from the previously mentioned settings within 5 months period under the following criteria:

**-Inclusive criteria**:

- children age 6-18 year (children at this range of age can understand and implement the relaxation technique) , regardless their gender or educational level.

**- Exclusive criteria**:

-Children with acute or chronic diseases.

-Children with mental disabilities.

## Tools of data collection:

The data was collected through using the following tools:

**I Children 's Characteristics Sheet : -**
This sheet covered the characteristics of the children as regards age, gender, educational level, residence area and type of operation|.

**II Perceived Stress Scale (PSS) :(Pre/post relaxation technique):** Adapted from **Cohen & Janicki-Deverts (2012),** it is a self-report scale used to measure the degree to which the child experiences psychological stress. Items were designed to assess feelings of being overwhelmed and being unable to control or predict events in one's life. PSS consists of 10 questions. The questions were translated to Arabic language.

The questions in this scale were ask the child about his/ her feelings and thoughts and the child was asked to indicate by circling how often he/ she felt or thought a certain way. (Response values: 0=never, 1 =almost never, 2=sometimes, 3=fairly often; 4=very often).

**III Anxiety Scale : (Pre/post relaxation technique)**: It was used to assess anxiety accompanying post operative pain of children undergoing cardiac surgery Pre/Post relaxation Technique . Anxiety scale as a state is an Arabic version derived from state- trait anxiety inventory for children by **Spielbeger,(1970)** and modified by **Ebrahim(1985) .** It is aimed at collection of data concerning the anxiety state of children pre/post practice of relaxation technique .. Anxiety scale consist of 21 statement and measures all aspects of anxiety as following:

| Parameters | Statement's Number |
|---|---|
| 1-Felling of sadness. | 9,12,13,14,17 |
| 2-Muscular Tension. | 2,4,5,7 |
| 3-Confusion. | 1,6 |
| 4-Ego weakness. | 3,6,8 |

The items were summed, the anxiety level was divided into:

No anxiety 0

Mild anxiety 1-< 8

Moderate anxiety 8-< 15

Severe anxiety 15-≤ 21

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**IV Numeric Pain Rating Scale**: **(Pre/post relaxation technique):**

It was designed by **Savedra etal., (1993).** The researcher explained to the child that this straight line has two ends, one end is(0) which mean that child feels no pain and the other end is (10)which means the child feels the worst pain .Then the researcher asked the child pre/post practice of relaxation technique to choose number that best describes his own pain, after that pain intensity of children was divided into:

No pain 0 , mild pain 1-3, moderate pain 4-6, sever pain 7-9, worst pain 10

**Validity and reliability:**

The tools tested for its content validity by group of five experts in the pediatric nursing. The required modification was carried out accordingly. Testing reliability of the study tools was done by Cronbach alpha, the result was 0.84 for stress scale.

## II. Operational Design:

**Preparatory Phase:**

During this phase, a review of the literature was done through reviewing the available national and international related literature to be oriented with various aspects of the research problem and to develop the study tools .The researcher also visited the selected places to be acquainted with the personnel and the study settings.

**Ethical Consideration:**

Ethical approval was obtained from children prior to data collection. The studied children were informed about the purpose and the expected outcomes of the study and they were assured that the study was harmless and their participation was voluntary and they have the right to withdraw from the study at any time without giving any reason. They were also assured that, anonymity and confidentiality will be guaranteed, as well the gathered data used for the research purpose only. Ethics, values, culture and beliefs were respected.

**Pilot study:**

A Pilot study was carried out included 10% of the studied children (4 children) to test the applicability and feasibility of the study tools, modification was done according to the results of the pilot study. Children included in the pilot study were excluded from the main study sample since some modifications were done in the form of rephrasing for some statements. The final form of the tools was then obtained and the time needed for completing each tool was also determined.

**Field Work**

The actual field work was carried out over a period of 5 months from June 2018 up to the end of October 2018.

The researchers were available in the study settings daily to implement the study as available children who satisfied the inclusive criteria. The actual field work was divided into four phases:

1- **Assessment phase: (1 month)**

In this phase, the researchers were using the constructed tools in collecting the pre assessment data, purpose of the study and its expectations were explained by the researchers to the studied children before starting interviewing and data gathering. The characteristic data sheet was filled by the researcher. The pre assessment time needed to fill in tools ranged between 20- 30 minutes.

2- **Planning phase: (1 month)**

- After determining objectives of relaxation technique with the children about its effect , relaxation technique was designed on the light of the literature review and modified to meet the actual children needs. **(Goldberg et al., 2002 and Keltner et al., 2007).**

### 3- Implementing phase: (2 month)

Pre-operatively the researchers began to communicate with heart surgery children (every child individually) to discuss the importance of relaxation technique to relive their stress , anxiety and pain perception after surgery , then the researchers taught the children the steps of deep breathing relaxation technique and meditation relaxation technique and ask every child to apply these steps pre-operatively.

Post-operatively after 48 hours of heart surgery (because doctors give sedative for children post-operative heart surgery to be sleep most the time for 48 hours to avoid feeling of severe pain) the researchers assessed children's stress , anxiety and pain perception , then ask the children to apply the steps of deep breathing relaxation technique and meditation relaxation technique within 30 minutes for every child. The total number of sessions for all children were 42 sessions which took 21 hours.

**The instruction of the deep breathing relaxation technique included the following steps:**

- Stay in comfortable position
- Close eyes
- Calm down and relax body, relax from the toes to top of head.
- Take a breath from nose and keep child awareness. Exhale from the mouth whenever exhaling repeat one word or number inhale and exhale comfort and confidence
- Do these steps for 15 min try to keep body and muscles relax. Then open the child eyes slowly and don't move for some minutes.
- Continue alternating five to 10 times.

**The instruction of the meditation relaxation technique included the following steps:**

- Stay in quiet place and child down on back. With feet on the floor, bend knees and let them lean in together comfortably.
- Set a timer for time that the child will meditate. The researcher recommend starting with just 2 minutes at first, then increasing as child become more comfortable and his ability to focus grows.
- Place child hands on his belly, relax body, and listen to child breath. Don’t do anything to try to control breath- simply observe.
- Now, bring in some visualization. As exhale, picture an ocean wave breaking on the sand. As inhale, see it rolling back into the sea. With every inhale and exhale, watch the waves go in and out- the sound of child breath is the soundtrack to these waves going in and out, and will set the pace.
- If child mind wanders, bring himself back to the sound of his breathing and the images of the waves. Again, do not try to change child breathing in any way- simply match the motion of the waves to the sound of his breath.
- Lastly, expand the child's awareness to everything can hear and sense. Now reverse this process and come back, one step at a time to his breath.

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**4- Evaluating phase: (1 month)**

The same tools were used after the implementation of relaxation technique as an indicator to evaluate the effect of relaxation technique on children's stress , anxiety and pain perception post operative heart surgery.

## III Administrative Design:

A permission to conduct the study was obtained through the director's agreement of the study settings

## IV Statistical Design:

The collected data were organized, revised, scored, tabulated and analyzed using the number and percentage distribution. Statistical analysis was done by computer using the Statistical Package for Social Sciences (SPSS). Qualitative variables were compared using Chi-square test and quantitative variables were compared using Pearson correlation co efficient. The significance of the results was considered as follows: When P>0.05: it is statistically insignificant difference, while P< 0.05: it is statistically significant difference while P<0.001:it is highly statistically significant.

## RESULTS

**Table (1)** shows that (88.1%, 80.9% & 83.3%) of the studied children were in the age group 6-≤12 years, male and from rural areas respectively. while 54.7% of the them were in primary education. The same table reveals that 66.7% of studied children having atrial septal defect regarding their type of operation.

**Table (2)** clarifies that there was a highly statistical significant differences (p<0.001) between pre/post intervention of relaxation technique regarding studied children's stress level post-operatively .Where, 71.5% of studied children had severe and very severe stress post operatively pre intervention of relaxation technique compared with 69%of them had mild stress post intervention.

**Table (3)** illustrate that there was a highly statistical significant differences (p<0.001) between pre/post intervention of relaxation technique regarding studied children's anxiety level post operatively. Where, 76.2% of studied children had severe and worest anxiety post operatively pre intervention of relaxation technique compared with 64.2%of them had mild anxiety post intervention.

**Table (4)** clarifies that 69.2% of studied children had severe pain perception post operatively pre relaxation technique intervention compared with 76.2% of them had mild pain perception post relaxation technique intervention with highly (p<0.001) statistical significant differences between pre/post relaxation technique intervention.

**Table (5)** shows positive correlation between post-operative anxiety of studied children and their stress (p<0.001) after implementation of relaxation technique.

**Table (6)** reveals positive correlation between post-operative pain perception of studied children and their anxiety & stress p=0.013 p=0.010 respectively after implementation of relaxation technique.

**Table (7)** clarifies positive correlation between post-operative children' anxiety & stress and their level of education p=0.021 & p=0.001 respectively. Also, there is positive correlation between post-operative children' pain perception and their age p=0.017.

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**Table (1) Distribution of studied children according to their characteristics and type of operation.**

| Items | Total n=42 | |
|---|---|---|
| | No | % |
| **1-Age in years**<br>6<12<br>12≤18 | <br>37<br>5 | <br>88.095<br>11.9 |
| $\bar{x}$ ± **SD** | (9.7±1.97) | |
| **2- Gender :**<br>-Male<br>-Female | <br>34<br>8 | <br>80.9<br>19.1 |
| **3-Level of education :**<br>-Primary<br>-preparatory<br>-secondary | <br>23<br>15<br>4 | <br>54.7<br>35.7<br>9.5 |
| **4-Residence:**<br><br>-Rural<br>-Urban | <br><br>35<br>7 | <br><br>83.3<br>16.7 |
| **5-Type of operation:**<br>-Atrial Septal Defect (ASD)<br>-Ventricular Septal Defect (VSD)<br>-Mitral Valve Replacement (MVR) | <br>28<br>13<br>1 | <br>66.7<br>30.9<br>2.4 |

**Table (2): Distribution of studied children according to their total post-operative stress level pre /post relaxation technique.**

| Total Stress level | Total n=42 | | | |
|---|---|---|---|---|
| | Pre intervention | | Post intervention | |
| | No | % | No | % |
| **-Mild** | **3** | **7.1** | **29** | **69.0** |
| **-Moderate** | **9** | **21.4** | **11** | **26.1** |
| **-Severe** | **12** | **28.6** | **1** | **4.1** |
| **-Very severe** | **18** | **42.9** | **1** | **4.1** |
| $\bar{x}$ ± **SD** | **45.84** | | | |
| P value | p - 0.001** | | | |

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**Table (3): Distribution of studied children according to their total post-operative anxiety level pre /post relaxation technique.**

| Total anxiety level | Total n=42 | | | |
|---|---|---|---|---|
| | Pre intervention | | Post intervention | |
| | No | % | No | % |
| **Mild** | **2** | **4.8** | **27** | **64.2** |
| **Moderate** | **8** | **19** | **7** | **16.6** |
| **Severe** | **11** | **26.2** | **5** | **11.9** |
| **Worst** | **21** | **50** | **3** | **7.1** |
| $\bar{x}$ ± SD | **37.36** | | | |
| **P value** | **p < 0.001**** | | | |

**Table (4): Distribution of studied children according to their total post-operative pain perception level pre /post relaxation technique.**

| Total Pain perception level | Total n=42 | | | |
|---|---|---|---|---|
| | Pre intervention | | Post intervention | |
| | No | % | No | % |
| **Mild** | **2** | **4.7** | **32** | **76.2** |
| **Moderate** | **11** | **26.1** | **7** | **16.6** |
| **Severe** | **29** | **69.2** | **3** | **7.2** |
| $\bar{x}$ ± SD | **48.48** | | | |
| P value | **p < 0.001**** | | | |

**Table (5): Correlations between the studied children' anxiety and their stress post-operatively Pre/Post Implementation of relaxation technique .**

| Total children' anxiety | Total children' stress | | | |
|---|---|---|---|---|
| | Pre intervention | | Post intervention | |
| | r | P | r | P |
| Pre intervention | 0.251 | 0.031 | - | - |
| Post intervention | - | - | 0.706 | 0.001* |

*Correlation is significant at p< 0.05

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**Table (6): Correlations between the studied children' anxiety, stress and pain perception post operatively Pre/Post Implementation of relaxation technique.**

| Items | Children' pain perception | | | |
|---|---|---|---|---|
| | Pre intervention | | Post intervention | |
| | r | P | r | P |
| **- Children' anxiety** | | | | |
| Pre intervention | 0.193 | 0.015 | - | - |
| Post intervention | - | - | 0.598 | 0.013* |
| **-Children' stress** | | | | |
| Pre intervention | 0.055 | 0.104 | - | - |
| Post intervention | - | - | 0.695 | 0.010* |

*Correlation is significant at p< 0.05

**Table (7): Correlations between the studied children' anxiety, stress and pain perception and their characteristics post operatively**

| Children' Characteristics | Children' anxiety | | Children' stress | | Children' pain perception | |
|---|---|---|---|---|---|---|
| | r | P | r | P | r | P |
| -Age | 0.106 | 0.408 | 0.015 | 0.301 | 0.820 | 0.017* |
| -Gender | 0.424 | 0.061 | 0.050 | 0.084 | 0.203 | 0.081 |
| -level of education | 0.723 | 0.021* | 0.628 | 0.001* | 0.327 | 0.617 |

*Correlation is significant at p< 0.05

## Discussion

Open heart surgery is a stressful event for affected children , where they usually do not know what to expect before, during and after their surgical procedure. They are challenged by this emotional situation and often do not know how to deal with the difficulty of the circumstances which increase their stress and anxiety moreover their pain due to the surgical operation. **(Webb et al., 2017)**

This study aimed to assess the effect of relaxation technique intervention on stress, anxiety and pain perception among post-operative heart surgery children through assessing children's stress, anxiety and pain perception after 48 hours postoperatively, advising children to apply relaxation technique ,then reassess children's stress, anxiety and pain perception to evaluate the effect of relaxation technique intervention .

The finding of the present study **(table, 1)** revealed that; the mean age of the studied children was (9.7±1.97) the current study was supported by the study of **Rothrock and Smith (2013),** in united states, about cardiothoracic surgery in pediatric mentioned that two thirds of chronic heart disease children become critically ill in the school age period which ranged from 6-12 years of child's life, another third developed chronic illness in early childhood and had cardiac disease.

Also, the current findings supported by **Morsi (1997),** who study the effect of postoperative outcomes for children undergoing heart surgery, mentioned that the age of children was 7 to 16 years old. Those age groups were especially chosen starting from school age as children will be able to comprehend instructions.

The findings of the current study showed that more than two thirds of the studied children were male , while less than one third was female. This finding is in agreement by **Elsayed(2004),** who study teaching children undergoing minor surgery to cope with pain using relaxation techniques, reported that the mean main age of the studied children was(9.2±1.8) and more than half of them were male.

The current study showed that, more than three quarters of studied children were living in rural areas. The current findings were in agreement with **Ibrahim (2012),** who study impact of nursing management protocol on selected postoperative outcomes among children with open heart surgery, mentioned that, a high percentage of children were from rural areas. It could be interpreted that, as hospitals in rural areas are not well prepared to carry out this type of surgeries .The researcher point of view that the favorable national trends in chronic heart disease conceal persisting disparities for some regions and population subgroups such as children who lives in rural areas.

The current finding was supported by **Marino (2010)** who study stress, anxiety and pain strategies of children having post-operative related cardiac congenital anomalies, mentioned that less than three quarters of the studied subjects were living in rural areas this difference could be attributed to differences in research sample and setting.

Regarding the type of operation, the present study **(table, 1)** cleared that, two thirds of studied children were undergoing ASD correction. This finding is not in agreement with the findings of **Abd El Samiea (2011),** who study nurses' performance regarding care of children undergoing cardiac surgery, stated that, about more than one third of the studied children had VSD.

Also, **Lemanu et al., (2013)** who study, effect of preoperative exercise on cardio respiratory function and recovery after surgery, investigated the effect of preoperative intervention on postoperative outcomes in open heart surgery and reported that, cardiac disorders specially VSD, were the second cause of children's admission to the hospital at USA.

Regarding children's stress level post operatively, the present study **(table, 2)** cleared that there was a highly statistical significant differences ($p<0.001$) between pre/post intervention of relaxation technique .Where, more than two thirds of studied children had severe and very severe stress post operatively pre intervention of relaxation technique compared with nearly the same percentage of them but had mild stress post intervention.

This finding of the current study was supported by **Elassasy (2013),** who emphasize that there was a statistically significant difference between pre and post nursing intervention as perceived the normal physical and psychological disturbance.

Regarding children's anxiety level post operatively, the present study **(table, 3)** clears that there was a highly statistical significant differences ($p<0.001$) between pre/post intervention of relaxation technique. Where, three quarters of studied children had severe and worst anxiety post operatively pre intervention of relaxation technique compared with nearly two thirds of them had mild anxiety post intervention .The researcher point of view that anxiety and pain are major concerns not only for

children who undergo surgery , but also for their parents and health care professionals.

These findings are in agreement with findings of **Caunt, (1992)** and **Atsberger,(1995)** who found that relaxation techniques provide children with a strategy for reducing the stress**,** anxiety related to postoperative pain.

It was emphasized by **Good,(1996)** that relaxation and music were effective in reducing anxiety and observed pain in the majority of studies.

Regarding the postoperative pain of studied children**( table 4)**, the present study revealed a highly statistical significant differences(P<0.001)between pre /post relaxation technique intervention. This finding is in agreement with finding of **Heffline,(1990)** who found that preoperative education of deep breathing relaxation enhance postoperative pain control.

Also **Good,(1995)** found that the majority of experimental subjects reported relaxation helpful for sensation and distress of pain .Additionally, **EL-Sayed,(1996)** found that practicing relaxation technique was significantly effective in coping with postoperative pain if children.

Moreover, **Polkki et al.,(2001) and Good et al.,(2001)**reported that nurses can safely recommend any of relaxation ,music , or their combination for pain control in both postoperative days and at both ambulation and rest .

On the other hand, **Seers and Carrol , (1998)** reported that relaxation should not be used as the main treatment for the management of acute pain . This was emphasized by **Good et al .,(1999)** who mentioned that physicians and nurses should encourage children to use relaxation and music as adjuvant to medication for postoperative pain control.

Regarding correlation between postoperative anxiety of studied children and their stress **(table,5)** , the present study revealed a positive correlation pre/post relaxation technique intervention. This finding is in agreement with finding of **McClowry,(2004)** who study the posttraumatic stress disorder in children after cardiac surgery and mentioned that stressful life events as an important correlate of child anxiety.

Regarding correlation between postoperative pain of studied children and their anxiety & stress **(table,6)** , the present study revealed a positive correlation **( r1=0.193, r2 =0.598)** and **( r1=0.055, r2 =0.695)** pre/post relaxation technique intervention respectively. This finding could be due to that relaxation technique effectively reduced postoperative pain of studied children and consequently reduced the accompanied anxiety and stress states.

These findings are emphasized by **Lindeman and Mc-Athie,(1999)** who reported that anxiety and stress are the most common emotions associated with postoperative pain. Moreover, pain is causing child to be anxious and stressful and if the pain was relieved, the anxiety and stress may be relieved.

Regarding correlation between postoperative pain perception ,anxiety , stress of studied children and their characteristics **(table 7),** the present study revealed positive correlation between children' postoperative pain perception and their age**( r= 0.820),** where older children were capable of practicing relaxation technique better than younger children , and consequently reduce their postoperative pain more effectively .These findings are emphasize by **Lindeman and Mc-Athie, (1999)** who mentioned that the younger child is less sensitive with his or her pain .

Meanwhile, **Bernardo etal., (1998)** found that younger children are highly fearful , distractible and sensitive, therefore they report pain higher than older children. Also, **Bronson et al.,(1993)** found that increasing age was associated with more direct and active coping with pain.

This difference in view of researchers could be due to the ability of the older children to express

their pain, verbalize their fear and interact with others compared to younger children.

This study revealed positive correlation between postoperative children's anxiety & stress and their level of education **( r**= 0.723**) & ( r**= 0.628**)** respectively**,** this finding could be due to that increase of cognitive development of educated children improves their active coping with anxiety and stress state.

**Finally** after relaxation technique interventions, the levels of stress, anxiety and pain perception among children postoperative heart surgery decreased significantly.

## 5. CONCLUSION

It was concluded from the present study that, relaxation technique (deep breathing exercise followed by meditation) was effective in reducing postoperative stress, anxiety and pain perception among pediatric patients underwent open heart surgery.

## 6.Recommendation

**In light of the findings of the present study, the following recommendations are suggested:**

• Early learning and practicing of relaxation technique by the pediatric patients prior to open heart surgery would increase its effect for the control postoperative stress, anxiety and pain perception.

- Adequate time and specialized area should be offered to the child undergoing open heart surgery to learn and practice the relaxation technique.
- Arabic pain assessment sheet must be designed and used for postoperative pain assessment after open heart surgery.
- Mass media through TV could play very important role in disseminating proper information about problems associated with postoperative stress ,anxiety & pain management , factors affecting pain perception, factors precipitating stress and anxiety.
- Further studies should be done to investigate the effect of other relaxation techniques on the management of postoperative stress ,anxiety , pain perception with open heart surgery children.

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