

Effect of Therapeutic Play on Reducing Preoperative Anxiety among Children undergoing Cardiac Surgery

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Abstract: Minimizing the level of anxiety can be managed through good preparation of children before the surgery or any stressful medical procedures. The study aimed to evaluate the effect of therapeutic play on reducing preoperative anxiety among children undergoing cardiac surgery. Design: A quasi-experimental research design with a one-group pre/post-test was utilized. Sample: - A convenient sample of 50 children undergoing cardiac surgery participated in the current study. Setting: The study was conducted at the intensive care unit at Sohag University Hospital and Heart Institution in Sohag City. Tools: A structured interview questionnaire and the Spielberg State Anxiety Scale for Children (STAIC). Results: Preoperative anxiety scores regarding STAIC were lower among school age children after therapeutic play intervention than before. Highly statistically significant differences were detected between the total mean score of STAIC in the pretest and posttest before surgery ($P=0.000$). Conclusion: The current study concluded that therapeutic play was very effective in decreasing preoperative anxiety among school age children undergoing cardiac surgery. Recommendations: Establishing preoperative therapeutic play for children undergoing cardiac surgery and their parents is very important for the preparation of the child and their parents for surgery.

Keywords: cardiac surgery, children, therapeutic play, preoperative anxiety.

1. INTRODUCTION

Heart Surgery operations are considered one of many reasons that cause anxiety for the children. This anxiety and stress are related to separation, loss of control, pain, a strange environment, and unfamiliar environmental during the preoperative period in children when confronted with surgery (Aytakin et al., 2016).

There are 60% of children suffer from anxiety during preoperative period (Vagnoli et al., 2015). Excessive anxiety and stress can cause physical and psychological health problems for children and be associated with negative behaviors and make them unable to cope with surgery and may also inhibit their post-operative recovery (Li et al., 2015 and Rice et al., 2018).

So, these children need to be well prepared before surgical operations and focus on reducing their anxiety level (Kain and Caldwell, 2015). These preparation methods include many forms as film modeling, picture books, and rehearsals, visit the operating room and the presence of 1 of the 2 parents during the induction of anesthesia, use of music as a distraction, and play activities (Brewer et al., 2016).

Therapeutic play is included a group of activities formed regarding age, cognitive development, and health status to promote the psycho-physiological well-being of children before surgery and was effective for a child to help him to cope with a stressful situation. **He et al. (2015)** conducted a study for 95 children to know the effect of play implementation on minimizing preoperative anxiety and postoperative pain in children undergoing surgery. They concluded that therapeutic play implementation is useful for children before surgery.

Also, an Egyptian study conducted by **Sabaq and El-Awady (2012)** who examine the effect of preoperative preparation on anxiety level among 120 children undergoing surgery and concluded that the nursing personnel should practice the preoperative therapeutic play beside their routine care. The nurse plays an important role in children's preparation through therapeutic play, teaches them about this method of orientation, and prepares a child for carrying out surgical procedures.

Significance of the study:

Children are more liable for stress and anxiety due to a lack of knowledge and explanation about these procedures, a lack of perceived control, and a lack of pain management (**Darbyshire, 2014**). **Neeraja, (2016)** reported that more than half of children undergoing operations develop significant anxiety before their surgery. Thus, therapeutic play can help to distract their mind from pain and in the healing process. It allows the child to 'play out' feelings and problems and learns more about the operation and is in contact more with the natural environment the child (**Welesley, 2007**).

Aim of the study

The study aimed to evaluate the effect of therapeutic play on reducing preoperative anxiety among children undergoing cardiac surgery.

Research hypothesis:

Children who use therapeutic play will have lower anxiety preoperative scores than before.

2. SUBJECTS AND METHODS

Research design:

A quasi-experimental research design with a one-group pre/post-test was utilized, which used to reduce problems that having no control and group comparison that is to measure the same dependent variable through one group of participants before (pretest) and after (posttest) treatment by measuring scores before and again following treatment, then compare the differences between pretest and post-test scores. The advantage of this design is that can compare scores after treatment to score on the same measure in the same sample before the treatment. The disadvantage of this design is that the one group design doesn't include a no-treatment control group as a usual comparison group and therefore is still prone to many threats to internal validity (**Lauren, 2020**).

Setting:

The study was conducted at the intensive care unit affiliated with Sohag University Hospital, Egypt, and Heart Institution in Sohag City, this setting was selected due to the high prevalence of children in the selected settings, and also it serves the biggest region of the population from both rural and urban areas. The intensive care unit affiliated with Sohag University Hospital involves two rooms, and each room is occupied by five patient beds. The intensive care unit in Heart Institution involves four rooms, and each room is occupied by six patient beds.

Subjects:

A convenient sample of 50 children undergoing cardiac surgery participated in the current study

Inclusion criteria included:

- (1) Children aged from 6–12 years able to speak.
- (2) Children undergoing cardiac surgery for the first time.
- (3) Children in the preoperative period (the day before surgery).

Exclusion criteria included:

- (1) Children with neurological health problems.
- (2) Children with mental problems

Tools of data collection:

Two tools were used to collect the data of the study as the following:

Tool (I): Structured interview questionnaire: it was developed by the researchers (pre/post format). It included two parts which included eight items:

Part I: It included four items about personal data about the child's age, sex, level of education, and residence.

Part II: It included four elements related to the disease history of the children, such as diagnosis, date of admission, previous hospitalization, and previous hospitalization times.

Tool (II): State-Trait Anxiety Inventory for Children was developed by **Spielberger (1970)** to measure transitory anxiety state in children their ages from 6 to 14 years. The scale consists of 20 statements that ask children how they feel at a particular time. Scale statements are categorized under five subscales (sadness, worry, fear, uncertainty, and anxiety). Children were instructed to respond according to how they felt about their surgeries. Children respond to the STAIC by selecting one of the three alternatives (rarely, sometimes, and often). Response categories were assigned values of one, two, and three.

Scoring system:

The total scores are a summation of the item scores; the total scores were 60. For statistical purposes, scores ranged from 20 to 30 were considered low anxiety, 30–40, indicating average; 40–50, indicating above average; and 50–60 suggesting a very high level of anxiety. The scale was translated into Arabic, and then back-translated into English by **El Samman et al. (2009)**. The translation was judged and tested for its content validity by nine experts in pediatric nursing and psychiatric nursing fields

Validity and reliability of the tools:

The content validity of the tools tested for clarity, comprehensiveness, appropriateness, and relevance and reviewed by five experts in pediatric nursing, pediatric surgery, and psychiatric nursing field to test the content validity before using it in the study. Modifications were done according to the panel judgment to ensure clarity of sentences and appropriateness of the content. The Cronbach's α test was used to assess the reliability of the tool which was 0.90, the reliability coefficients' α between items of STAIC was 0.86.

Administrative Approval

Official permission was obtained through an issued letter from the Dean of Faculty of Nursing, Sohag University to the Directors of intensive care unit affiliated to Sohag University Hospital, Egypt, and Heart Institution in Sohag City to conduct this study. The aim of the study was explained and the expected outcomes from the implementation of the study were included in this letter to obtain permission to collect the research data.

A pilot study

A pilot study was conducted on 10% of the sample (five) children having preoperative anxiety undergoing cardiac surgeries. The clarity and testing of the feasibility of the research process needed for modifications were done to develop the final form of the tools. Children involved in the pilot study were included in the study.

Fieldwork:

The study included 50 children and accompanied by their mothers as a caregiver and present in the assessment day before the operation and on the day of surgery.

The researchers attended the previously mentioned setting of the study two days / a week from 9 am to 11 pm. Data collected through a period of 6 months from July 2020 until October 2020. Data was collected from the studied mothers through interviewing questionnaires. Tool II was used by the researchers twice; as pre and Post-intervention.

Children and their mothers received routine information preparation, 1 day before the day of surgery. It included pre and postoperative care and information regarding fasting time, hygiene, vital signs, control of losing teeth, dressing and wound care, using analgesic drugs to relieve pain post-surgery. Therapeutic play intervention one day before the surgery was received plus the routine care. The therapeutic play intervention was used in the current study included structured activities, designed to prepare the children psychologically before surgery according to their developmental stage. The therapeutic play was implemented with children and their mothers and accompanied their children at all times to watch these activities.

The activities regarding the therapeutic play include preoperative tour visit to the operation room, a manikin demonstration by the researcher, and a return demonstration by the children on preoperative procedures. The child and the mother were visited the reception area, operation room, recovery room, observing equipment which is in this area such as the operating table, monitoring machines, operating lamp. Then after demonstration of the procedures on the manikin, the researcher with the child and mother came back again to the unit and entered a room where a pediatric manikin with the size similar to a 6–8-year-old child was ready for demonstration. The activities such as measuring vital signs, blood pressure cuff to the manikin's arm, attaching a stethoscope to the manikin's chest, use of oxygen catheter, placing the mask on the manikin's face, placing identification bracelet, ventilator and providing intravenous therapy were done by the researcher. Then the child was encouraged to touch the various equipment and was invited to demonstrate the activities on the manikin under the supervision of the researchers. 1 hour is spent finishing the therapeutic play.

The data collection in the current study was included two phases: on the day of preoperative assessment (pre-intervention) and the day of surgery before operation (post-intervention). On the day of preoperative assessment, demographic data and anxiety scores of children were collected. On the day of surgery, the state anxiety level of children was again assessed before surgery.

Ethical considerations:

Written informed consent was obtained from the mothers of children after the objective of the study was explained to the mothers and their children. The researcher informed the participants that, the study was voluntary, they were allowed to not participate and they had the right to withdraw from the study at any time, without giving any reason. Moreover, they were assured that their information would be confidential and used for research purposes only.

Statistical analysis:

Data entry and statistical analysis were performed using SPSS for Windows, version 20. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables and mean and SDs for quantitative variables. Differences between the two means tests (t-test) were used. Chi-square (χ^2) test of significance was used to compare proportions between qualitative parameters. Pearson's correlation coefficient (r) test was used to assess the degree of association between two sets of variables. Statistical significance was considered at P-value <0.05.

Results:

Table (1): Showed that more than half (54%) of the children's age ranged from 6 to 8 years, and their mean age was 6.26 ± 1.46 years. It is noticed from the same table that three quarters (75%) of the children were male, whereas 25% of them were female, and (34%) of children was in the first-grade primary education.

Figure (1): Demonstrated that (63%) of children living in rural areas and 37% of them were from urban areas.

Figure (2): Illustrated that the nearly three quarters of school-age children (73%) had a history of the previous hospitalization.

Figure (3): Clarified that two fifth of the school-age children (40%) were diagnosed with patent ductus arterioles followed by atrial septal defects (30%).

Concerning the STAIC among school-age children undergoing cardiac surgery, **Table 2** highlighted that the total mean score of STAIC among children before using the therapeutic play intervention was 44.3 ± 4.2 and decreased to 22.2 ± 1.1 after implementation of the therapeutic play. A highly statistically significant difference was detected between the total mean score of STAIC in the pretest and after the therapeutic play intervention ($t=34.9, P=0.0001$).

Table (3): Showed that 70% of children had high anxiety on STAIC and more than one fifth (23%) had high anxiety levels in the pretest, whereas the level changed to low anxiety among 73% of them after therapeutic play intervention before surgery.

Table (4): Showed that, level of significance ($P\text{-value} < 0.001$) suggested by the Paired t-test and the mean pre-test total anxiety score before therapeutic play was 48.5, and the mean post-test anxiety score was noticed to be 23.3. The decreasing in anxiety score after therapeutic play intervention was significant (Mean = 25.2).

Table (5): Illustrated that there were statistically positive significant correlations found between children's preoperative level of anxiety and their diagnosis and residence, on the contrary, there were no statistically significant correlations observed between the children's preoperative level of anxiety and their age, sex, and their previous hospitalization.

Table (1): Frequency and percentage distribution of the school-age children according to their characteristics (n=50)

Personal characteristics	No	%
Age (Yrs.)		
• 6 - 8	27	54.0
• 8-10	18	36.0
• 10 -12	5	10.0
Mean± SD 6.26±1.46		
Gender		
• Male	38	75.0
• Female	12	25.0
Educational level		
• First grade	17	34.0
• Second grade	15	31.0
• Third grade	8	17.0
• Fourth grade	5	10.0
• Fifth grade	3	5.0
• Sixth grade	2	3.0

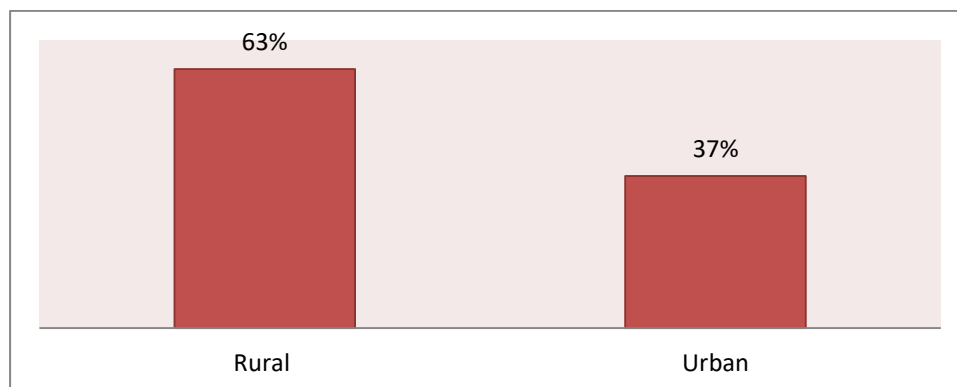


Figure (1): Percentage distribution of the school-age children according to their residence (n=50)

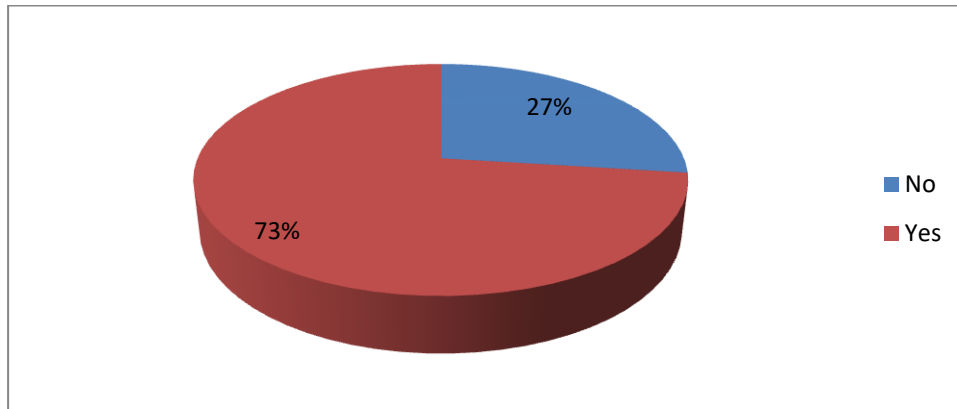


Figure (2): Percentage distribution of the school-age children according to their previous hospitalization (n=50)

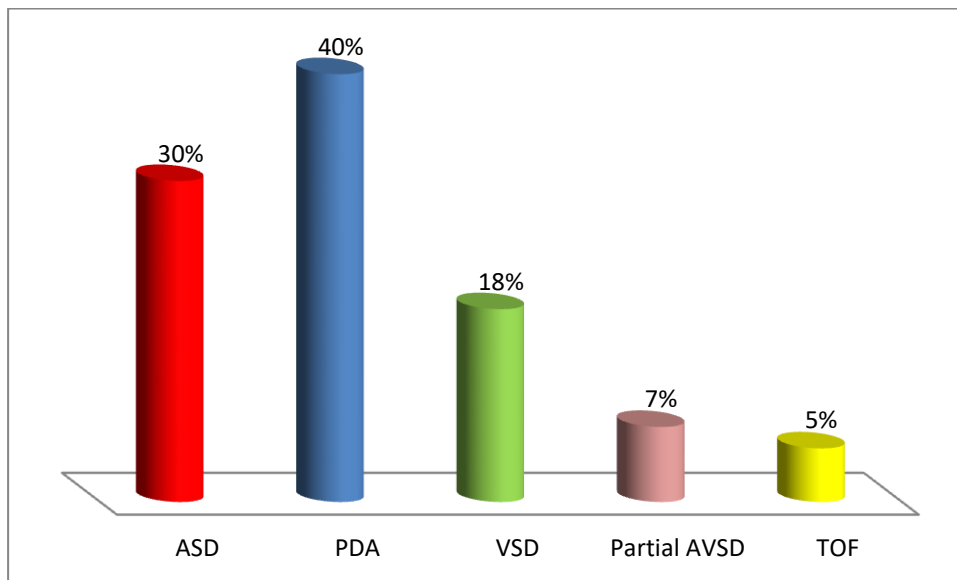


Figure (2): Percentage distribution of the school-age children according to their diagnosis (n=50)

Table (2): Comparison between the total mean score of State-Trait Anxiety Inventory for Children among school-age children before and after therapeutic play intervention (n=50)

Items	Mean± SD	t	P
The total mean score of STAIC before the implementation of therapeutic play (pretest)	44.3±4.2	34.9	0.0001 **
The total mean score of STAIC after implementation of the therapeutic play	22.2±1.1		

*Statistically significant level at P < .0001

Table (3): Percentage distribution of level of anxiety among school-age children undergoing cardiac surgeries before and after therapeutic play intervention (n=50)

Anxiety level	Pre-intervention		Post-intervention	
	No	%	No	%
Low	0	0	37	73
Average	3	7	13	27
Above average	35	70	0	0
High	12	23	0	0

Table (4): Mean differences of anxiety among school-age children before and after therapeutic play intervention (n=50)

Item	Pre-intervention	Post-intervention	Differences	t	P
Mean stress score	48.5	23.3	25.2	8.519	0.001

Table (5): Correlation between preoperative anxiety level and personal data of school-age children (n=50)

Personal data of children (n=50)	preoperative anxiety	
	r	P
Age	-0.067	0.678
Sex	-0.106	0.451
Residence	-0.345	0.011*
Diagnosis	-0.371	0.0063*
Previous hospitalization	-0.108	0.442

3. DISCUSSION

Children who are confronted with surgical operations may experience anxiety before surgery and are needed to be prepared both physically and psychologically. Hence, the study aimed to evaluate the effect of therapeutic play on reducing preoperative anxiety among children undergoing cardiac surgery.

The results of the current study indicated that three-quarters of the children were male. These results are supported by the study conducted by **El-Moazena et al., (2018)**, and found in their study about the effect of play activities on children' preoperative anxiety level and fear undergoing abdominal surgeries among 50 children at the General Pediatric Surgical unit at Cairo University Specialized Pediatric Hospital that the high percentage of children was male. Similarly, **Aranha et al. (2017)** who examine the effect of preoperative preparation on fear and anxiety on 12 children undergoing surgery, and found that most of the children were boys.

The results of the present study indicated that the nearly three quarters of school-age children had a history of the previous hospitalization. This is related to their diagnosis that needs continuous follow-up and treatment.

The results of the current study indicated that highlighted that the total mean score of STAIC among children before using the therapeutic play intervention was decreased after implementation of the therapeutic play. This is indicated the importance and positive effect of therapeutic play intervention on minimizing anxiety levels among children before surgery. Also, seeing surgical procedures help the child to understand medical expressions and the way of application of the tools can be more accessible. Help children to see the real tools and using them on the manikin during therapeutic play helps to decrease that threat when using them. Return demonstration of the procedures by the child through therapeutic play, the unpleasant experiences are known through the play and are decreasing anxiety score before surgery.

The current study indicated that more than two-thirds of children had high anxiety on STAIC and more than one-fifth had high anxiety levels in the pretest, whereas the level changed to low anxiety among nearly three-quarters of them after therapeutic play intervention before surgery. This result is in the same line with **Fincher et al. (2012)** who studied the effectiveness of standardized preoperative preparation in reducing child and parent anxiety and found that around 50–70% of hospitalized children had severe anxiety before surgery. Children The same results were mentioned by **Nisha and Umarani (2013)** in their study about effect of play intervention in the reduction of anxiety among preoperative children and reported that children are more liable to anxiety due to their knowledge deficit about procedures.

The results of the present study revealed that the mean post-test anxiety score was noticed to be decreased after therapeutic play intervention. This result supports the proposed hypothesis of the current study and indicates the effectiveness of therapeutic play on the reduction of preoperative anxiety levels of school-age children. Also, it agrees with the study conducted by **Ghabeli et al. (2014)** about the effect of the toys and visits on reducing children's anxiety before surgery and their mothers' satisfaction with the care process and found that the mean anxiety scores were decreased.

These results were following the results conducted by **Noronha and Shanthi (2015)** who studied effectiveness of picture book on preoperative anxiety among children (6–12 years) in selected hospitals at Mangalore and they found that most of the children' mean scores of level of anxiety post-test was significantly lower than the mean scores of pre-test. In a

previous study by **Nisha and Umarani (2013)** about effect of play intervention in the reduction of anxiety among preoperative children on 60 preoperative school-age children in the age of 6–12 years to determine the effectiveness of play intervention on reduction of anxiety among preoperative children, the study results indicated that the mean score of the experimental group was lower than mean of the control group.

Furthermore, a study by **Saharan et al. (2017)** about "Assess the Effectiveness of Play Interventions on Anxiety among Hospitalized Children in Selected Hospital of Yamuna Nagar" to assess and compare the anxiety level of hospitalized children before and after the administration of play interventions in the study group and concluded that play interventions are effective in reducing anxiety among hospitalized children.

In a study about the effect of play on reducing anxiety of hospitalization among school-age children which conducted by **El-Samman et al. (2009)** to evaluate the effect of play on reducing the anxiety of 90 hospitalizations among school-age children from the medicine and surgery wards in CUSPH, the study results indicated that the mean scores were which suggests high anxiety. After play interventions children in surgery wards had a low level of anxiety and the mean score was lower than before.

The current study revealed that there were no statistically significant correlations observed between the children's age and their preoperative anxiety level, sex, and their previous hospitalization. These results were supported by (**El-Moazena et al., 2018**) who found the same result following **Similarly, Nisha and Umarani (2013)** in their study about effect of play intervention in the reduction of anxiety among preoperative children and observed that no statistically significant relation between anxiety level and age of the study group. Besides, **Noronha and Shanthi (2015)** in their study about effectiveness of picture book on preoperative anxiety among children (6–12 years) in selected hospitals at Mangalore, they found that there was no significant association between the post-test preoperative anxiety scores with demographic variables among the study following **Nabavi et al. (2017)** who conducted a descriptive study about Investigating the relationship between anxiety of school-age children undergoing surgery and parental state-trait anxiety to examine the relationship between anxiety in 81 school-age children before surgery and parental state-trait anxiety and they found that no statistically significant relationship was observed between children' anxiety and their age.

Nazanin et al., (2011) in their study about "The Effect of Performing Preoperative Preparation Program on School Age Children's Anxiety" and **Tanaka et al., 2011** in their study about evaluations of psychological preparation for children Undergoing endoscopy, they confirmed the current results and found that state preoperative preparation programs can reduce children's anxiety, and the children who had therapeutic play as an intervention showed lower anxiety.

Prabhuswami et al., (2016) conducted a study about "Effectiveness of Play Therapy in Reducing Stress Among the Hospitalized Children (6-12 Years) Undergoing Surgery in Selected Hospitals Maharashtra" and concluded that in their study about effect of play therapy in minimizing stress among children (6-12 Years) before surgery in selected hospitals Maharashtra in Indian and reported that play therapy was very effective in minimizing anxiety among the children before surgery and **Rosalia et al., (2017)** who studied therapeutic play to prepare children for invasive procedures and found the same results.

Li et al., (2014), who studied the effectiveness and appropriateness of therapeutic play intervention in preparing children for surgery and **Pontes et al., (2015)** in their study to examine the association of therapeutic play and overestimated the effect of therapeutic play on the children's anxiety level and found that anxiety level was reduced after an intervention

He et al., (2015) conducted study about therapeutic play intervention in reducing perioperative anxiety, negative behaviors, and postoperative pain in children undergoing elective surgery and stated that there were positive effects among children's behavior who participated in the therapeutic play intervention and minimizing in anxiety scores after the intervention.

4. CONCLUSIONS

The study concluded according to the findings and research hypothesis that therapeutic play had lower anxiety preoperative scores among children than before. So, the therapeutic play among school-age children undergoing cardiac surgeries is an appropriate and effective method for reducing preoperative anxiety levels, and these results support the proposed current study hypotheses.

5. RECOMMENDATIONS

From the previous findings the following recommendations are suggested: -

- The knowledge and practice of nurses must be updated by the implementation of continuing education programs about the importance of preoperative therapeutic play.
- A playroom should be found in all hospitals that help all children undergoing surgery to reduce their anxiety.
- Establishing preoperative therapeutic play for children undergoing cardiac surgeries is essential for the preparation of the child for surgery.
- Establishing a comprehensive preoperative preparation program for children and their caregivers starting from admission, including therapeutic play.
- Further researches should include replication of this study and be generalized the findings to other pediatric-age groups, and other surgical clinical settings.
- Studying the effect of therapeutic play on a wide variety of other surgical disorders preoperatively.

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