

## Effect of Preoperative Play Interventions on Post Surgery Anxiety

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**Objective:** Many studies have shown that the level of postoperative distress and anxiety in children is associated with the amount of anxiety during the pre operative period. In this study, we compared the effect of pre-operational attending in a playroom and using play activities on the level of anxiety increment after surgery in an intervention and a control group of Iranian children.

**Method:** In a clinical trial, 75 children aged 5 to 12 enrolled in the intervention and the control group. The anxiety symptoms were assessed using State-Trait Anxiety Inventory for Children, Revised Children's Manifest Anxiety Scale, and Yale modified Pre operative Anxiety Scale. The mean differences of pre and post operative anxiety scores were calculated and compared using the ANCOVA statistical method.

**Results:** The two groups had similar demographic characteristics except for age which was higher in the control group. The baseline anxiety score was lower in the intervention compare to the control group and was statistically significant. There was a significant reduction in the trend of anxiety increment after surgery in the intervention group in comparison to the control group.

**Conclusion:** Attending in playrooms and using play activities may reduce the trend of increment in the anxiety level induced by surgical procedures.

### Key Words:

*Anxiety, Child, Play and play things, Preoperative care, Postoperative period*

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Many studies have shown that postoperative distress and the level of anxiety are associated with the level of anxiety in pre operative period and during induction of anesthesia in children (1). Further, the post operative recovery is more complicated in children with higher preoperative level of anxiety (2) Children have some developmental limitations in cognitive capacities, self-control, and greater dependency to the caregivers, so they are more vulnerable to the operational stress and anxiety than adults (3). Children frequently experience anxiety at the time of separation from their parents and the time of anesthesia induction (4) Pediatric anxiety is associated with a high incidence of post operation separation anxiety, fear, eating problems and nightmares (5). Accordingly, the psychological effect of anesthesia and surgery is an important concern. Parental presence (6), preoperational pharmacological regimen and preparation programs are the current methods that are utilized to reduce anxiety (7, 8); the previous studies have shown their efficacy and desirability. However, these methods have some limitations. The administration of premedication is refused by children and is also limited by its side effects (5). Parental presence may increase children's anxiety because

parental distress and anxiety could be uncontrollable during the preoperative period (9). Pre operation preparation programs also have some limitations including the time constrain and the increased cost of preparation programs (1). On the other hand, many of these studies have been performed in elective hospitalized children surgery but recently there is a trend towards day surgery which has shortened the period between admission and surgery. Furthermore, in short-term surgical procedures, children are admitted to the hospital in the morning and will be discharged after operation in the afternoon and this is challenging for the professionals to perform a suitable preoperational program for children and parents to reduce their anxiety. It seems that the therapeutic play may reduce the child's stress and anxiety. Many studies tested the anxiety reduction effects of therapeutic plays in pre operation period. Visintainer (1975), Zahr (1998) and Li (2007) evaluated the effect of systemic psychological preparation (3, 10, 11), therapeutic play for preschool and school age children and discovered their effectiveness. However, these kinds of interventions need professional involvement and more funds. Children's attendance in a playroom using toys and watching CD cartoons may reduce their anxiety before the anesthesia induction. These evidences show

that surgery procedures are stress factors which increase post operative level of anxiety. These evidences also show that the play activities can reduce the anxiety level in children. In this study, the effect of using a pre operation playroom and free play activities was compared with the traditional educational interventions on children's post operation anxiety in a children hospital in Iran.

## Materials and Methods

The study was carried out in the surgery unit of Children Medical Center in Tehran. The aim of our study was to compare the increment of the anxiety level induced by surgical procedures. Our control group consisted of children receiving traditional preparation information and the intervention group included children receiving playing programs.

### Participants

All the participants were children aged 5 to 12, being admitted for a short-term day surgery. Children with the current neurological or other chronic medical problems such as epilepsy, asthma, diabetic mellitus, hematological problems and also children with psychiatric problems including mental retardation, depressive and bipolar disorders and any kinds of psychotic disorders were excluded from the study. The included participants were enrolled into the intervention and the control group. The children and the child psychiatry fellow who was responsible for data collection was aware of the intervention allocation of the study participants and the study was not blind. The ethic committee of Teheran University of Medical Sciences approved the study and informed parental consent was obtained.

### Group selection

As we intended to compare the effect of traditional routines (in the absence of a playing room) with a new intervention program (after a playing room set up) on post operative anxiety scores, and having had no playing room in the surgery unit of Children Medical Center, we selected the control and intervention groups in two different time periods: before and after a playing room establishment.

The control group was selected before establishing the playing room. They received traditional routines which included usual information about the procedure from the surgeons and an instruction sheet on preparation for the surgery.

The intervention group was selected after establishing the playing room. In addition to the traditional program, they received a new intervention which was playing with toys. It was not possible to select both the control and interventional groups simultaneously due to ethical and practical limitations.

### Measures

The anxiety of all the participants was assessed using the following measures:

1) Yale Preoperation Anxiety Scale (YPAS): The YPAS is an observational instrument, which can be used to measure children's anxiety during perioperative period and the induction of anesthesia in children aged 5-12 (12). Kain et al (1997), in a study, obtained the validity of the modified version of (m-YPAS) against a recognized gold standard for anxiety assessment (STAIC) (13). According to their study, m-YPAS showed good to excellent observer reliability ( $\kappa_w=0.68-0.86$ ) and good concurrent and construct validity. Therefore, it can be used to measure children's anxiety during the perioperative period. The English version of m-YPAS was used in this study.

2) State-Trait Anxiety Inventory for Children (STAIC): The STAIC consists of two separate self-report scales to assess state anxiety (20 items) and trait anxiety (20 items) (13, 14). Its internal consistencies, test retest validity, concurrent and also the constructive validity supported the utility of this measure.

3) Revised Children's Manifest Anxiety Scale (RCMAS): The RCMAS is a 37-item scale to assess children's anxiety symptoms. The RCMAS has found to have satisfactory psychometric properties (13, 14). In our study, we used the Persian version of the STAIC and the Iranian validated RCMAS, which were used for the Iranian population repeatedly (15, 16).

### Procedure

The both groups received similar preoperational information, but the intervention group was invited into a playroom with their parents before the operation. The playroom used in this study was a child friendly environment with a range of toys, storybooks, and a LCD-TV with a DVD player to provide gender, age and developmentally appropriate playing activities. Children stayed in the room and played with toys for at least half an hour before going to the operation room for surgical procedures.

A child and adolescent psychiatry fellow explained the purposes of the study to the parents and invited them to participate in the study. If they agreed, written consent was obtained. Both the children and their parents had the right to withdraw from the study any time they wished and were assured about the confidentiality of their information. The data collection was performed based on the following steps: At first, demographic characteristics including sex, age, education, parents' level of education and occupation were accomplished. Past history of medical problems such as history of epilepsy, head trauma, and hospitalization and also the psychiatric problems were accomplished too. In the second step, the children who had the inclusion criteria were evaluated for the State-trait anxiety and manifest anxiety scores according to their reports. The state-trait anxiety and the children manifest anxiety scores were measured once at the baseline. This information was obtained for the intervention and control groups in the playing room when the subjects were playing and in the waiting room respectively. At the next step, before entering the operation room, we evaluated pre

operative anxiety scores based on our observation of anxiety signs using the modified Pre-operative Anxiety Scale (m-YPAS). In the final step, after surgery and the complete recovery of anesthesia, post operative anxiety scores were measured again using m-YPAS. All the information was obtained by a child and adolescent psychiatry fellow.

**Data analysis**

For data analysis, the Statistical Package for Social Science (SPSS) software version 14 for windows was used. Chi Square was used to find the significance of differences in comparison of non-parametric data. In each group, the base line anxiety scores and before-after differences of preoperative anxiety were compared using independent sample T test and the paired t-test respectively. We compared the discrepancies of pre and post operation anxiety scores between the two groups using ANCOVA statistical method.

**Result**

**Demographic characteristics**

The participants consisted of 75 children, 64% male (n=48) and 36% female (n=27) with the mean age of 7.84±1.99. The participants were allocated in the intervention (n=36, mean age 7.34±1.8) and the control group (n=39, mean age 8.29±2). The mean age difference between the two groups was statistically significant (p=0.039). The sex distribution between the intervention (55.6% male & 44.4% female) and the

control group (71.8% male & 28.2% female) was the same (p=0.158). Socioeconomic status of the parents including educational level and occupation were similar too. No significant statistical differences were observed on the past histories of medical and psychiatry problems between the two groups.

The intensity of anxiety symptoms based on State – Traits Anxiety Inventory, Children Manifest Anxiety Scale and m-YPAS was compared at the base line. These results are demonstrated in Table 1.

Before and after operation anxiety for each group was compared separately and the data shows that m-YPAS mean score in the intervention group increased from 34.07± 8.80 to 34.30±8.78 after operation (p=0.607). This proportion for the control group was in turn 71.66 ±12.65 and 72.64±11.16 (p=0.261). We also compared these scores between males and females in the both groups. In the intervention group, the discrepancy in anxiety mean scores before and after the operation in boys and girls was -0.25± 1.97 and -1.06±4.48 respectively (p=0.233). In the control group, this discrepancy was 1.78±5.55 and -1.06± 4.48 (p=0.139). Table 2 shows the comparison of anxiety mean scores variances in the participants based on gender groups.

The main aim of this study was to compare two groups of children: 1) those who received no pre-operative intervention with the purpose of anxiety reduction (just the traditional preparation information) and consequently experiencing a high level of anxiety and 2) those who received additional anxiety reduction interventions (play room) and thus having a reduced

**Table 1. Comparison between groups anxiety scores at baseline**

Anxiety Scores	Intervention group		Control group		t	P-value
	Mean	SD	Mean	SD		
	State – Trait Anxiety scores	52.80	1.95	70.46		
Children manifest anxiety scores	28.84	1.32	33.09	4.72	4.89	<0.001
Pre operative Anxiety	34.07	8.80	71.66	12.65	14.81	<0.001

**Table 2. Comparison of anxiety means score variances between two gender groups**

Anxiety Scores	Boys		Girls		t	P-Value	
	Mean	SD	Mean	SD			
	Case	State – Trait Anxiety scores	52.10	1.59			53.62
Children manifest anxiety scores		28.68	1.49	29	1.15	-0.66	0.513
Pre operative Anxiety		33.33	9.53	35	8	-0.55	0.580
Post operative Anxiety		33.08	9.78	35.83	7.37	-0.93	0.357
Control	State – Trait Anxiety scores	69.89	6.65	71.90	5.00	-0.90	0.371
	Children manifest anxiety scores	33.26	4.89	32.66	4.52	-0.315	0.755
	Pre operative Anxiety	69.28	12.08	77.72	12.58	-1.98	0.060
	Post operative Anxiety	71.07	11.36	76.66	10.02	-1.42	0.162

level of pre-operative anxiety. Accordingly, the baseline anxiety scores difference is statistically significant between the two groups. Therefore, to compare the mean differences of anxiety, we should control the effect of the baseline anxiety differences and also the effect of age difference which might have a confounding effect on the results. Thus, score changes between pre and post operation anxiety were calculated for each group separately and then the between group score changes were compared using ANCOVA statistical model to control the effect of pre operative level of anxiety (State – Trait Anxiety, Children Manifest Anxiety and the pre operation anxiety) and the age as covariates. According to the results, the between group difference was statistically significant ( $P=0.032$ ,  $f=4.84$  &  $df=1$ ).

## Discussion

The current study has evaluated the effectiveness of preoperative attending of children in a child friendly playroom on postoperative anxiety. This study is unique in the Iranian population and has not been performed up to now. In addition, few studies are available using this kind of interventions for the children who are candidates of a short-term day surgery. The findings of this study can be used in future planning to prevent perioperative anxiety and distress in children. According to the results, no statistically significant difference was observed between the two groups in demographic variables except for age, which was higher in the control group than the intervention group.

According to the results, the level of anxiety has increased in the both groups after surgery. This increment, however, was not statistically significant. The comparison of the anxiety scores including state-trait anxiety, children manifest of anxiety, pre and post operative anxiety shows that there was not a resemblance between the sex groups except for state – trait anxiety scores in the intervention group. Differences in other parameters between boys and girls were not statistically significant. The comparison of mean differences of anxiety score before and after surgery showed no differences between the sex groups in the intervention and the control group separately.

Although the elevation of anxiety in each group was not significant, after controlling the effect of age and the base line anxiety scores as covariant between the groups comparison was statistically significant; this shows that our intervention may reduce the trend of increment in anxiety level. Several studies have evaluated the efficacy of these kinds of interventions. In a study, the pre-operation music interventions were effective to reduce the level of anxiety during preoperational period in children<sup>1</sup>. This study shows that music have a beneficial effect in alleviating anxiety in the separation period. However, this kind of intervention is very expensive. Patel et al., in a randomized prospective study which compared the efficacy of three different methods in reducing children

anxiety in preoperational period, showed that handed-held video game can reduce anxiety more than parent presence and also more than the group with parent presence in addition to oral Midazolam administration (1). In a study on 203 school age children, Ho Cheung et al used a kind of therapeutic play one week prior to the surgery and compared the results with using traditional information (17). They reported that these kinds of interventions might be effective to reduce the anxiety level during pre and postoperative periods. Most of these interventions were used several days prior to the operation and necessitated the admittance of children in the hospital days before the surgery. In a study, Golden et al. determined whether giving a small toy to a child would decrease anxiety. Using m-YPAS, they found that the value of anxiety is lower in toy groups than no-toys group (5). The results of these studies are the same as our result.

These results demonstrated the efficiency of play activities in a playroom. However, this method had some limitations: The base line evaluation for the anxiety symptoms was performed before going to the operation room and we didn't have the anxiety level before entering the playroom. Therefore, we could not show the trend of changes. Because this study was not blind, this methodological limitation alarms us to interpret the results more cautiously. Conducting blind studies and the studies which can detect the trend of changes before children using the playroom, during play activities and after surgery are suggested.

## Conclusion

Attending a playroom and using play activities may reduce the trend of increment in anxiety level induced by surgical procedures in children.

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