

Evaluating the Effects of a Supportive intervention Program on the Post-operative Pain and Anxiety in Preschool Children

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Abstract

Background: One of the most important actions in taking care of the hospitalized children is to control their pain and anxiety. The aim of this study was to investigate the effects of a supportive program on pain and anxiety of children undergoing surgery through using distraction to educate them in different concepts (preschool educational concepts, coping skills, problem-solving techniques and life skills).

Methods: In this Quasi Experimental study, 64 3-6-years-old children admitted to Imam Hossein Children's Hospital in Isfahan were selected by convenience sampling methods and were divided into two groups (n=32). TPPS checklist and Piyeri Anxiety Inventory were used for data collection. In order to distract the mind, a supportive intervention program was performed for the experimental group 24 hours after surgery, in a 45-minute session. Data analysis was performed using SPSS software version 21.

Results: After the intervention, both mean scores of pain and severity of anxiety in the experimental group were significantly lower than those of the control group and also than those of the same group before the intervention (P <0.05).

Conclusion: The proposed supportive intervention program is an appropriate non-pharmacological method for reducing pain and anxiety that considers various aspects of children's physical, mental and emotional needs along with their evolutionary growth.

Key Words: Anxiety, Pain, Preschool children.

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1- INTRODUCTION

Pediatric surgery is a prevalent practice around the world which can lead to painful, stressful and traumatic situations for children (1). At least 60% of children undergoing surgery will report moderate to severe pain on the first day after the surgery (2). More than 61% of children suffer from negative effects such as nightmare and fear of hospitalization during their hospitalization and surgery (3); and face complications such as anxiety (4). Anxiety causes a variety of physiological, emotional, and behavioral symptoms (5) and can affect children's physical, personal, and emotional growth (6). When stress and pain management is inadequate in children, performing stressful and aggressive treatment procedures can lead to post-traumatic stress symptoms, adverse reactions, and maladaptation during subsequent treatment visits (7).

The use of analgesics and bio-behavioral interventions, known also as non-pharmacological interventions, is essential for the prevention and effective treatment of pain and anxiety. Most of these interventions, by interrupting the cycle of pain, fear, anxiety and stress, prevent their occurrence and contribute to the treatment process as well (2). These interventions can reduce the use of analgesics and narcotics which may cause complications such as respiratory distress, cough, addiction, and dependence. Among the most important non-pharmacological interventions are cognitive-behavioral therapy methods such as distraction (8). Playing, familiarization programs and psycho-educational interventions can also be referred to as methods of pain and anxiety control.

The positive effect of distraction on the pain of dressing change in 3-6-years-old children and the positive effect of playing on pain reduction in hospitalized children have been confirmed by researchers (9). A

systematic review of various articles has also positively evaluated the effectiveness of play therapy in preparing children for painful or anxious treatments (10). Murphy Jounez, however, has declared that play therapy has no effect on anxiety and depression in diabetic children (11). Preparation programs such as distraction through using visual and auditory presentations have been shown to affect the anxiety and behavioral changes of children undergoing elective surgery (12). Similarly, familiarizing the patients with the hospitalization process by visual-conceptual maps and face-to-face methods has been effective in reducing children's fear and anxiety (13). However, Sotoudeh et al. have reported that psycho-educational interventions did not affect the pain of children after tonsillectomy (14). Another study also revealed that pre-anesthesia information had no effect on reducing children's anxiety (15).

With regard to the effectiveness of the interventions including the educational ones in controlling pain and anxiety of children and the significance of education in preschool age, there is a gap in the results of previous studies. Moreover, hospitalization can sometimes provide an appropriate educational opportunity for children (2). Accordingly, the researcher aimed to investigate whether using a program pursuing educational goals in preschool age, can be effective in controlling pain and anxiety of children.

Therefore, this research was conducted to evaluate the effects of a supportive intervention program based on the education of concepts and acquisition of the skills on pain and anxiety, required for the preschool children. Since painful therapies increase anxiety and decreased anxiety can lead to pain relief, we decided to investigate the effects of this program on both pain and anxiety of children.

2- MATERIALS AND METHODS

2-1. Study design and population

This quasi-experimental study with pre-test and post-test design and control group was conducted in 2019. The sample of the study consisted of 3-6-years-old children admitted to Imam Hossein Hospital in Isfahan, Iran, who met the inclusion criteria. These children were admitted to the hospital for the first time and underwent gastrointestinal surgery (appendectomy, hernioraphy).

Inclusion criteria were having full consciousness, no growth retardation or mental retardation, accompanied by a parent, no history of surgery, and no malignancy and other chronic diseases. Exclusion criteria included the illness of the child during the intervention for any reason and using anti-anxiety drugs or analgesics before or during the intervention based on the child's medical record.

Given the fact that several children were hospitalized in one room and the intervention should be performed on the children's bed as well as the impossibility of transferring them to a private room and separating them from each other, it was almost impossible to prevent the exchange of information. Additionally, as we were evaluating the variable of anxiety in children, the lack of intervention in some children could affect this variable. As such, the samples could not be randomly divided into the intervention and control groups. Therefore, sampling was performed by using convenience sampling method among the children who were eligible to enter the study. With the aim of comparing pain and anxiety factors in the two selected comparison groups, and considering the confidence interval of 95%, the test power of 80% and $d=0.7$, the sample size was calculated to be 32 cases in each group.

2-2. Instruments

The data collection tool in this study was a demographic information questionnaire including age, sex, type of surgery, and history of hospitalization.

Piyeri's visual anxiety self-assessment tool for children has five cartoon faces with a numerical scale ranging from 1 to 5(16). This tool was invented by Piyeri in 1990 and its reliability has been reported as $r=0.77$ (17). The Iranian version of this tool was also designed and its reliability was measured. The correlation coefficient of the tool was calculated to be $r=85\%$ (18).

Pain intensity was assessed by the TPPPS pain measurement checklist adapted for toddlers and preschool children. The validity and reliability of this scale were evaluated by Sali et al. in 1992 and Cronbach's alpha was reported to be 88%. The reliability of the Iranian version was also evaluated and the Pearson correlation coefficient was reported as 81% (19).

2-3. Clinical interventions

In this study, the samples were selected through convenience sampling from the hospitalized children who underwent surgery and were eligible to enter the study, and were examined in two groups of control and intervention. To prevent the exchange of information, the control group was examined first until the required number was completed. Then, the intervention group was intervened and evaluated. Before the intervention, the researcher introduced himself to the parents of the children and explained the objectives and procedure of the research. The consent form was also completed by the participants. 24 hours after surgery and before any intervention, anxiety and then pain were measured as the pre-test by Piyeri scale and Toddler-preschool-post operative pain scale (TPPPS).

In the intervention group and after the pre-test, an initial conversation was conducted

to assess the children's level of growth and determine their level of understanding in order to diagnose their mood for better cooperation. This conversation took place by observing the child and asking questions such as their name, age, favorite stories and plays, and so on. Then, while maintaining appropriate and person-to-person communication, the supportive intervention was performed for about 45 to 60 minutes by the researcher (6).

The intervention was performed taking into account the educational program taken from the books used in kindergartens and the contents approved by the Welfare Organization and the Ministry of Education. The program included concepts in biology, science and math and had advantages such as transferring life experiences and skills to the child, developing self-confidence and increasing problem-solving skills, creativity and the pleasure of working by hand. In order to adjust the topics to the evolutionary age and cognitive development of children, the content of these books was approved by 5 faculty members of the School of Nursing and Midwifery of Isfahan University of Medical Sciences.

To begin the intervention, a doll that was tailored to the mood, taste and gender of the child was chosen as a role model. The child began to play with the doll. A game such as teaching science or math concepts was performed which could help knowing about body parts, strengthening life skills, developing self-confidence, increasing verbal skills, problem-solving skills, and creativity. The program focused on the game and the use of distraction-based techniques such as storytelling, jigsaw puzzle, and so on. For better participation, the activities were selected in a variety of ways based on the child's interests. Then, giving the doll to the children, they were asked to tell the story they liked to the doll and share their feelings, desires and experiences with the doll considering a

role for it. Emotional discharge was performed by the balloon of emotions, while various emotions and the appropriate ways for dealing with them were also introduced. At the end of the session, that doll was given to the child as a gift. One hour after the intervention, the child's anxiety score and pain intensity were measured as the post-test (20). In the control group, no intervention was performed and the children received only routine cares and 1 hour later, their anxiety and pain were measured again with the mentioned instruments as the post-test.

2-4. Ethical considerations

The study was conducted with the code of ethics (IR.MUI.RESEARCH.REC.1398.401).

2-5. Statistical analysis

Data were analyzed using SPSS version 21. Paired t-test was used to evaluate quantitative changes and independent t-test was used to compare the two groups. Chi-square test was used to compare the frequency distribution of the qualitative variable of sex between the two groups.

Wilcoxon test was used to evaluate the qualitative variable of anxiety severity and Mann-Whitney test to compare it between the two groups. The significance level of $P < 0.05$ was considered in this study.

3- RESULTS

3-1. Demographic information

The present study was conducted on 64 hospitalized children who had undergone surgery. The demographic information of these children is provided in **Table 1**. There was no statistically significant difference in the age and gender of the children in the two groups ($P > 0.05$).

3-2. Anxiety

Based on the results of Mann-Whitney test, no significant difference was observed between the two groups in terms of the children's severity of anxiety before the

intervention ($P > 0.05$). After the intervention, however, the severity of anxiety in the experimental group was significantly lower than that in the control group ($P < 0.05$). Wilcoxon test also showed that after the intervention the severity of anxiety in the experimental

group was significantly lower than that in the control group ($P < 0.05$). But, in the control group, no significant difference was observed between the measurements in the two points of time ($P > 0.05$) (**Table 2**).

Table-1: The main characteristics studied in both groups

Variables		Intervention group (N=32)	Control group (N=32)	P-value
Age (Mean± SD)		4.80±0.98	5.02±1.01	0.39*
Gender	Girl	11 (34.4)	9 (28.1)	0.59**
	Boy	21 (65.6)	23 (71.9)	

* t-test

** Chi-square test; SD: Standard Deviation

Table-2: Frequency distribution of the children's severity of anxiety in the two groups before and after the intervention

	Anxiety	Control group	Intervention group	P-value (Mann-Whitney)
Before	Very light	0 (0)	1 (3.1)	0.82
	Light	11 (34.4)	11 (34.4)	
	Moderate	15 (46.9)	14 (43.7)	
intervention	Intense	4 (12.5)	3 (9.4)	<0.001
	Excruciating	2 (6.2)	3 (9.4)	
	Very light	15 (46.9)	2 (6.2)	
After	Light	16 (50)	12 (37.5)	0.99
	Moderate	1 (3.1)	9 (28.1)	
	Intense	0 (0)	6 (18.8)	
intervention	Excruciating	0 (0)	3 (9.4)	<0.001
P-value Wilcoxon		<0.001	0.99	

3-3. Pain

According to the independent t-test, the mean score of pain was not significantly different between the two groups before the intervention ($P > 0.05$). However, after the intervention the mean score of pain in the experimental group was significantly lower than that in the control group ($P < 0.05$). Paired t-test revealed that the mean score of pain in the control group was not significantly different between the two measurements ($P > 0.05$). In the experimental group, however, the mean

score of pain after the intervention was significantly lower than that before the intervention ($P < 0.05$) (**Table 3**).

4- DISCUSSION

According to the results of the present study, the implementation of supportive intervention program has been effective in reducing pain and anxiety in hospitalized children undergoing surgery. Nowadays, the benefits of psychological interventions such as distraction, pre-intervention preparation and cognitive-behavioral coping techniques as well as effective

methods in reducing pain and anxiety in children who have been subjected to

aggressive actions are well recognized.

Table-3: Mean scores of pain in the two groups before and after the intervention

Pain	Intervention group	Control group	t-test		
	(Mean + SD)	(Mean + SD)	t	df	P
Before intervention	3.22 (1.75)	3.62 (1.34)	1.04	62	0.30
After intervention	1.31 (1.20)	3.36 (1.36)	7.31	62	<0.001*
t-test (Paired-test)	t	9.41	0.33		
	df	31	31		
	P	0.74	<0.001*		

SD: Standard deviation

df: Degrees of freedom

* P< 0.05

Mikaeli et al. (8) evaluated the effects of distraction on reducing the chemotherapy-caused pain by watching cartoons and making bubbles on 48 children with cancer aged between 6 and 12 years. In their studies, Okha(21) and Mousavi(22) investigated the effect of distraction techniques by watching cartoons, playing with a tablet, or listening to music. They also showed that children who had used these methods reported less pain or anxiety than those in the control group. Yayan et al. (1) also found that playing was effective on the pain and anxiety of the parents of 130 6-12-year-old children undergoing surgery. In addition to the playing program, which was performed on the child's bed as in the present study, they also used techniques such as breathing exercises, massage, and watching movies. Ulan et al.(20). Also investigated the effect of postoperative play and found it effective in relieving children's pain.

Generally, the mentioned studies have shown the significant effectiveness of distraction and playing methods in reducing the severity of pain and anxiety and; are, thus, in line with the results of the present study. According to the gate control theory of pain, their pain gate is closed at the time of deviation (23).

In addition, distraction causes the children to change their focus from a source of fear

or anxiety to something neutral (24). In the present study, the child played an active role in the intervention process, because of which the distraction had involved several senses simultaneously, so that pain messages were ignored and not interpreted; thereby, reducing the feeling and perception of pain (8).

What was done in the present study was the implementation of a supportive interventional program that focused on educational aspects and acquisition of various skills such as coping skills, problem-solving skills and so forth in preschool children. In this program, story books, simple puzzles and toys such as Lego, balloons, etc. were used to teach concepts and help acquiring life skills and, hence, create distraction. These toys and plays, while being more available, are familiar to children both at home and in the kindergarten environment. The use of familiar toys helps the child cope better with stressful situations (7).

Talebi et al.(13), using visual concept maps and face-to-face method, evaluated the effect of a familiarization program about the hospitalization process on children. Shahrabadi (25) also investigated the effect of educational storybook and face-to-face training on reducing fear and anxiety of 6-9-year-old hospitalized children. According to Hetti Puglo, the

awareness of preoperative information through audio-visual presentations had a significant positive effect on reducing the anxiety of 5-12-year-old children who underwent elective surgery (12). Sotoudeh et al. (14) investigated the effect of psycho-educational interventions on the pain of 199 9-12-year-old children after tonsillectomy. This study was conducted in six subject groups with the presentation of a booklet and an educational video containing information about the admission process in the ward until discharge. The results of this study were not in line with ours. Different ages of children and methods of implementation are perhaps the reasons for the difference in the results of the two studies. Furthermore, it can be said that the reduction of children's anxiety in the present study was due to the distraction caused by playing and the active participation of the children in their favorite activities. Providing an appropriate situation for the child through playing, distraction helps to provide freedom, control and independence during play and reduces anxiety caused by threats and unusual situations (8).

4-1. Study limitations

Given the fact that several children were hospitalized in one room and the impossibility of transferring them to a private room and separating them from each other, randomization was almost impossible to prevent the exchange of information. The results of the present study are related to the preschool children and caution should be exercised in generalizing them to other age groups.

5- CONCLUSION

The results showed that the supportive intervention program used in this study had significant effects on reducing the severity of pain and anxiety among the children participating in this study. Given the longtime relationships of nurses with

children, these programs should be considered more by nurses; so that they would know more about other care needs of children, the need to observe the considerations that are necessary in child care and, most importantly, the need for the child to trust the nurse to cooperate better for further improvement. Implementing a supportive interventional program alongside other nursing cares enables nurses to take another step in understanding various methods of complementary care, especially with regard to pediatric nursing. Using familiar and available tools that are compatible with the capacity, ability and interests of children and benefiting from different distraction techniques, especially playing, one not only can pay attention to the rate of physical growth, cognitive development and fine motor skills in children, but also will be able to use a program for controlling children's pain and anxiety while teaching preschool practical concepts, strengthening the coping skills, and so on.

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