

# Effectiveness Of a Multimedia Educational Programme Regarding Preparation For Hospitalisation On Anxiety, Pain Intensity And Selected Post-Operative Complications Among Children Undergoing Elective Abdominal Surgery

Sumathi P V

## How to cite this article:

Sumathi P V, Effectiveness Of a Multimedia Educational Programme Regarding Preparation For Hospitalisation On Anxiety, Pain Intensity And Selected Post-Operative Complications Among Children Undergoing Elective Abdominal Surgery. *Int J Pediatr Nurs.* 2020;6(2):89–95.

## Abstract

Surgery creates a series of traumatic and stressful events in children. The present study evaluated the effectiveness of a multimedia educational programme on anxiety, pain intensity and selected post-operative complications among children undergoing elective abdominal surgery. The study was conducted in a Tertiary care Hospital, Ernakulam, Kerala. Experimental pre-test post test control group design was adopted for the study. Purposive sampling was adopted and the children between the age group of seven and fifteen years were randomly and equally assigned to control (n=50) and experimental (n=50) conditions. Multimedia educational programme was given to each of the parent- child dyad in the experimental group and the control group received routine care. Tools used were anxiety rating scale, numeric pain rating scale, respiratory and wound assessment scales. Findings of the study revealed that the baseline variables were homogeneously distributed in both the groups. There was a significant reduction in anxiety (post test 1  $t= 3.90$   $p< 0.001$ , post-test 2,  $t= -3.86$   $p,0.0001$ ) and pain intensity ( $p< 0.0001$ , Mann Whitney U 124.50) of children in the experimental group. It also found a significant improvement of respiratory status ( $p< 0.0001$ , Mann Whitney U 365.50) and wound status ( $p< 0.0001$ , Mann Whitney U 345.50) of children in the experimental group. There was a significant association of pre-test anxiety of children undergoing elective abdominal surgery with gender ( $\chi^2 =7.70$ ,  $p, <.05$ ). The results suggests that providing multimedia educational programme for children along with their parents had significantly reduced anxiety at various points of time, pain intensity and thereby preventing respiratory and wound infections.

**Keywords:** Anxiety; Children; Multimedia; Pain; Surgery.

## Introduction

Hospitalisation and surgery have negative influences on children. It is estimated that around 60–65% of children experience pre-operative anxiety.<sup>1</sup> and 67% may develop postoperative negative behavioral changes.<sup>2</sup> People with high preoperative anxiety tend to report more pain, use more medication for pain, stay in the hospital longer and report more anxiety and depression during their recovery than patients with less preoperative fear.<sup>3</sup> Most common post-operative complications in children are post-operative nausea and vomiting followed by respiratory complications leading to

hypoxia. The effects of surgical response provoke a negative nitrogen balance and catabolism, delay wound healing and cause post-operative immunosuppression.

Children experiencing surgical procedures require both psychological and physical preparations. Literature reveals the effectiveness of various preparation programs using filmed modelling<sup>4</sup>, therapeutic play<sup>5,6</sup> three types of educational materials (a board game, a video or a booklet),<sup>7</sup> video distraction<sup>8</sup> and smart phones<sup>9</sup> in reducing anxiety of children undergoing surgery.

Pain and anxiety are interrelated. Anxiety reduction programs are also found to be helpful in reduction of pain perception<sup>10</sup>. Educational materials which includes usage of non-pharmacological pain relieving methods are found to be effective in reduction of pain in children after surgical procedures.<sup>11</sup> In a study conducted to

**Author Affiliation:** Associate Professor, Lisie College of Nursing, Ernakulam-682 018, Kerala, India.

**Corresponding Author:** Sumathi P V, Associate Professor, Lisie College of Nursing, Ernakulam-682 018, Kerala, India.

**E-mail:** [sumathi.pvs@gmail.com](mailto:sumathi.pvs@gmail.com)

assess the effectiveness of play activities on post-operative outcome of children undergoing general abdominal surgery in a tertiary care centre in Kerala found that significant reduction in the pain perception, negative behavioral manifestations wound infection and respiratory complications.<sup>12</sup>

It is also noticed that most interventions in children are aimed at reduction of pain and anxiety. Other recovery variables are seldom studied. It is against this background the present study was conducted using multimedia educational program for children and their parents on outcome variables such as pain, respiratory status and wound status in addition to anxiety.

#### *Statement of the problem*

Effectiveness of a multimedia educational program for children and their parents regarding preparation for hospitalisation on anxiety, pain intensity and selected post-operative complications among children undergoing elective abdominal surgery in a selected hospital of Kerala.

#### *Objectives*

The objectives of the study were to assess the level of anxiety, pain intensity, respiratory status and wound status of children undergoing elective abdominal surgery, evaluate the effectiveness of multimedia educational program on anxiety, pain and selected post-operative complications and to determine the association of anxiety of children undergoing elective abdominal surgery with selected demographic variables.

#### *Hypothesis*

- H1: There will be a significant difference in the mean post test anxiety scores of children undergoing elective abdominal surgery between the control and experimental group.
- H2: There will be a significant difference in the mean pain scores of children undergoing elective abdominal surgery between the control and experimental group.
- H3: There will be a significant difference in the mean scores of respiratory status among children undergoing elective abdominal surgery between the control and experimental group.
- H4: There will be a significant difference in the mean scores of wound status among children undergoing elective abdominal surgery between the control and experimental group.
- H5: There will be a significant association between

pre-test anxiety scores of children undergoing elective abdominal surgery and selected variables.

#### *Intervention*

This included a multimedia education program with video, audio, text and pictures. The video is a documentary which covers the pre-operative, intra operative and post-operative period of children undergoing surgery. It emphasized how to provide care before during and after surgery and parental guidance. The content also included general information regarding hospital admissions, routines, discharge procedure and the role of parents. Specific information regarding surgery, members of surgical team, orientation to operating theatre, anaesthesia, pre-operative holding area, recovery room and post-operative ward were included. Pre-operative exercises which includes turning, deep breathing and coughing exercises, extremity exercises, pre-operative procedures including skin and bowel preparations and intravenous cannulisation are also shown in the program. The exercises are demonstrated through the program and time was allowed to perform the same by the child during the program. Post-operative care which includes immediate post-surgical events, pain management, ambulation, oral intake wound care and nutrition are also explained.

The program was developed by reviewing related literature, discussion with experts and incorporating the real life situation of children undergoing surgery and their parents. The objectives of the video sessions were identified and the outline of the content areas prepared. Further content validity was established by ten experts in the field of psychology, paediatric nursing and paediatric surgery. The video was developed in the regional language (Malayalam) and was validated by subject experts and five children and their parents (target audience). Apart from the input of the researcher, editing of the audio and video were done by technical experts in multimedia. The duration of the program was 30 minutes.

#### **Materials and Methods**

A quantitative approach experimental pre-test post test control group design was adopted for the present study. The study was conducted in a Tertiary care Hospital, Ernakulam, Kerala. After getting ethical clearance certificate from the Institutional ethical committee, a formal written permission to conduct the research study was obtained from the

Director of the concerned Hospital, Ernakulam. Purposive sampling was adopted and the children between the age group of 7 and 15 years were randomly and equally assigned to control (n=50) and experimental (n=50) conditions.

Data collection was done over a period of eleven months. Informed consent from the parents and assent from children were taken. All tools were validated by experts and reliability established. Parents were interviewed to collect the demographic data and clinical data was obtained from records. A pre measurement of anxiety was done by administering the anxiety rating scale to the child (Day 1). This tool consists of 36 items under five headings prepared by the investigator. The areas included are general anxiety, physical symptoms, separation anxiety, hospital related anxiety and surgery related anxiety. All items are marked on a 4 point scale (1-Not at all, 2-Somewhat, 3-Moderate and 4-Very much). Higher scores indicate greater anxiety.

Multimedia educational program was given to each of the parent-child dyads in the experimental group during the preoperative period (10-12 hours before surgery) for 30 minutes using laptop (Day 1). A short debriefing was done soon after the intervention. Post intervention anxiety was assessed using the same scale in children after one hour of intervention (Day 1). After the surgery when the child is fully awake after anaesthesia pain was assessed using numerical pain rating scale (Day 2). Respiratory status was assessed on the first post-operative day by using respiratory assessment scale (Day 3) which includes respiratory rate, heart rate, temperature, SpO<sub>2</sub>, use of accessory muscles, adventitious breath sounds (wheeze, rhonchi, and crackles), cough and presence of peripheral cyanosis which is observed, measured and scored on a three point rating scale. The deviations in these parameters are focused with respect to respiratory infection. Score of 1 indicates normal, 2 indicates mild to moderate deviation

*Anxiety*

**Table 1** Mean, mean rank, sum of ranks and Mann Whitney U value of pre anxiety scores of children undergoing elective abdominal surgery between control and experimental group.

Group	Pretest anxiety			Mann Whitney U Value	p-value
	Mean	Mean Rank	Sum of ranks		
<b>Control (n=50)</b>	76.92	51.06	2553	1222.00	0.847
<b>Experimental (n=50)</b>	76.40	49.94	2497		

Table 1 shows that the mean pre anxiety score in the control group was 76.92 and the experimental group was 76.40. Both the groups were similar as the computed Mann Whitney U value is not significant at p < .05.

from normal and 3 indicates severe deviation from normal. Higher scores indicate greater deviation from normal. Anxiety was again assessed on the first post-operative day using the anxiety rating scale (Day 3). Wound assessment was performed on the eighth post-operative day (Day 10) using the wound assessment scale which includes the wound parameters such as skin colour, exudate formation, approximation, peri wound skin and necrotic tissue which is observed and scored on a five point rating scale. The deviations in these parameters are focused with respect to wound infection by observation. All these measurements are done in the control group except for the intervention. Routine care was given to the control group.

**Results**

*Section 1 :Sample characteristics*

The mean age of the sample was 10.93 ± 2.49. Most of the children were male (60%). Majority were studying in classes from 6-10 (65%). Most of them underwent appendectomy (67%). Majority of children had previous history of hospitalisation (73%). Eighty per cent of children in both the control and experimental group had no previous history of surgery.

*Section 2: Evaluation of effectiveness of multimedia educational program*

Pre-test anxiety scores were tested for homogeneity using Mann Whitney u test as the distribution did not follow normality. Independent sample t test was computed to assess the significant difference in the mean post anxiety scores. For pain, respiratory status and wound status as the distribution of scores were not normal Mann Whitney U test was computed to assess the significant difference in the mean scores between the control and experimental groups.

**Table 2:** Mean, Standard deviation 't' value and p-value of post anxiety scores of children undergoing elective abdominal surgery between control and experimental group.

Group	Control (n=50)		Experimental (n=50)		df	t value	p-value
	Mean	SD	Mean	SD			
Post test 1	79.54	20.18	65.26	16.20	98	3.90	0.001
Post test 2	74.58	19.05	61.12	15.63	98	-3.86	0.0001

n=100

From table 2 it is inferred that there is a significant difference in the post test1 and post test 2 anxiety scores of children undergoing elective abdominal surgery between the control and experimental group. This indicates, Multimedia educational program is effective in reducing anxiety of children undergoing elective abdominal surgery.

### Pain intensity

**Table 3** Mean, Mean rank, sum of ranks and Mann Whitney U value of pain scores of children undergoing elective abdominal surgery between control and experimental group .

Group	Pain Score			Mann Whitney U Value	p-value
	Mean	Mean Rank	Sum of Ranks		
Control (n=50)	7.00	73.01	3650.5	124.50	0.0001
Experimental (n=50)	3.00	27.99	1399.5		

n=100

From table 3 it is clear that the obtained Mann Whitney test value is 124.50 showing very high significance (p=0.0001) for pain scores. This indicates, Multimedia educational program was effective in reducing the intensity of pain in children undergoing elective abdominal surgery.

**Table 4:** Mean, Mean rank, sum of ranks Mann Whitney U value and p value of respiratory status scores of children undergoing elective abdominal surgery between control and experimental group.

Group	Respiratory status score			Mann Whitney U Value	p-value
	Mean	Mean Rank	Sum of Ranks		
Control (n=50)	12.66	68.19	3409.50	365.50	0.0001
Experimental (n=50)	10.44	32.81	1640.50		

n=100

Clearly depicts that the obtained Mann Whitney test value is 365.50 showing very high significance (p=0.0001) for respiratory status scores of children undergoing elective abdominal surgery between the control and experimental group. This indicates, Multimedia educational program is effective in improving the respiratory status and preventing complication among children undergoing elective abdominal surgery.

### Wound status

**Table 5:** Mean, Mean rank, sum of ranks Mann Whitney U value and p value of wound scores of children undergoing elective abdominal surgery between control and experimental group.

Group	Wound score			Mann Whitney U Value	p-value
	Mean	Mean Rank	Sum of ranks		
Control (n=50)	6.26	68.60	3430.00	345.50	0.0001
Experimental (n=50)	5.22	32.40	1620.00		

n=100

From table 5 it is evident that the obtained Mann Whitney test value is 345.00 showing very high significance (p= 0.0001) for wound scores of children undergoing elective abdominal surgery between the control and experimental group. Therefore, it is inferred that there is a significant difference in the wound scores of children undergoing elective abdominal surgery between the control and experimental group.



*Association of pre test anxiety scores of children undergoing elective abdominal surgery with selected demographic variables*

Association of pre test anxiety scores of children undergoing elective surgery with selected

demographic variables was computed using Pearson Chi-square test. The selected variables are gender, age, class of study, type of surgery, previous history of hospitalisation, previous history of surgery, education of parent, previous experience of parent in child’s hospitalisation and previous experience of parent in child’s surgery. Only gender

**Table 6:** Chi square value, degrees of freedom and p-value of pre test anxiety scores of children undergoing elective abdominal surgery with gender

Gender	Pre test anxiety			χ <sup>2</sup> value	df	p-value
	Mild f	Moderate f	Severe f			
Male	35	23	2	7.70	2	0.02
Female	15	18	7			

n=100

From the table it is evident that gender has a influence on the pre test anxiety scores of children undergoing elective abdominal surgery.

had a influence on the pre test anxiety scores of children undergoing elective abdominalsurgery.

anxiety directly affects child anxiety. That may be the reason for significant reduction in anxiety in the experimental group.

**Discussion**

In the present study among 100 children, the pre test anxiety revealed that 47.9% had mild anxiety, 42.7% had moderate anxiety and 9.4% had severe anxiety. From researches it is estimated that around 60–65% of children experience pre operative anxiety<sup>1</sup>. The present study supports this finding as majority of children experienced varying levels of anxiety. Anxiety levels may differ according to the culture, ethnic background, setting, education of parents and developmental stage of the child and the type of surgery. In the present study it was observed that older children were found anxious if they are anticipating an examination within few days after the surgery.

The present study found that there was a significant reduction in the pain perception of children in the experimental group compared to the control group. Randomized controlled trial on the effect of pre-operative digital versatile disc (DVD) on 123 parent-child dyads in a Canadian pediatric hospital day-care surgery unit, post operative pain was significantly lower among the intervention group compared with the control group.<sup>15</sup> Effect of play activities on post operative outcome of children undergoing general abdominal surgery showed that the mean pain perception was found to be more in control group (4.933) compared to experimental group (3.993) (t 6.640 p<0.001).<sup>12</sup> In the present study the difference was due to the reason that the experimental group used distraction methods like deep breathing techniques and counting numbers and playing with hand held mobile games which were some of the techniques which were taught to them for managing pain. Supporting the wound while turning, coughing and also during ambulation were practiced by them. Children can be easily distracted and learning and practicing these techniques helped them to manage pain in the intervention group.

Findings of the current study revealed that Multimedia educational program was effective in reducing anxiety of children undergoing elective abdominal surgery. Similar results were seen in a quasi- experimental study conducted to evaluate the effect of pre-operative preparation program on anxiety level<sup>13</sup> and a randomized controlled trial was performed in Amirkola Pediatrics Hospital, Mazandaran on 122 children (7-12 years of age) admitted for elective surgery on preoperative program using therapeutic play intervention.<sup>14</sup> In the present study since the intervention was given along with the parents, they were relieved of their anxiety and were well equipped to handle the child during pre, and post operative periods. Parental

In the control group 18% had mild respiratory infection. In a study on effect of play activities on post operative outcome of children undergoing general abdominal surgery revealed that there was a significant difference in the mean respiratory infection rate in the control group (3.883, SD 0.580)

and the experiment group (3.162, SD 0.433) ( $t = 5.546$ ,  $p < 0.001$ ).<sup>12</sup> In the present study in the experimental group children were willing for early ambulation and practicing deep breathing and coughing hourly which were taught to them through the multimedia educational program. Therefore its effectiveness needs to be commented.

In the control group 2% had mild wound infection. Effect of play activities on post operative outcome of children undergoing general abdominal surgery found that there was a significant difference in the mean postoperative wound complications in the control (6.367) and experimental (0.248) groups ( $t = 9.954$ ,  $p < 0.001$ ).<sup>12</sup> In the present study children were discharged with the dressings on. On the eighth post operative day the dressing was opened and sutures were removed. Multimedia educational program had information on care of child at home focusing on wound care and well balanced diet for wound healing and signs and symptoms of wound infection. Mothers would have followed the instructions and that may be the reason that none of them developed wound infection in the experimental group. Therefore the effectiveness of the program could be highlighted.

Association of anxiety of children undergoing elective abdominal surgery with demographic variables showed that there was a significant association with gender. ( $\chi^2 = 7.70$ ,  $p < .05$ ). In a study done by Ercan<sup>16</sup> on children undergoing surgery revealed that girls had significantly higher anxiety than boys in the pre operative period. Anxiety states are not universal. Factors associated with anxiety of child and mother may differ in different cultures and countries.

## Conclusion

The results of the present study provide empirical evidence of the benefits of incorporating multimedia educational programme in the pre-operative periods, thereby charting a path towards promoting holistic and quality care. It is anticipated that the findings will not only contribute to promoting the nurses' accountability and responsibility for caring their patients through evidence-based practice, but will also facilitate the development of more autonomy in the advancement of nursing practice.

## References

1. Brophy CJ, Erickson MT. Children's self statements and adjustment to elective

outpatient surgery. *Developmental and behavioral Paediatrics*.1990;11,13-16. Available from: <http://dx.doi.org/10.1097/00004703-199002000-00003>

2. K.Daaboul DG. Postoperative maladaptive behavioral changes in children. *Middle East J Anaesthesiol*. 2011 Jun;21(2):183-9. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/22435270>
3. Curtis AJ. *Health psychology*. Routledge Modular and Series, London & New York.2000.
4. Melamed B, Siegel LJ. (1975). Reduction of anxiety in children facing hospitalisation and surgery by use of film modelling. *Journal of Consulting and Clinical Psychology*.1975;43(4),511-521.<http://dx.doi.org/10.1037/h0076896>
5. Vaezzadeh N, Douki Z E, Hadipour A, Osia S, Shahmohammadi S, Sadeghi R, The Effect of Performing Preoperative Preparation Program on School Age Children's Anxiety. *Iranian Journal of Pediatrics*,2011;21(4):461-466. Available from: [ncbi.nlm.nih.gov PMID:PMC3446145](http://www.ncbi.nlm.nih.gov/PMC3446145)
6. FatemehGhabeli F, Moheb N, Nasab SDH, Effect of Toys and Preoperative Visit on Reducing Children's Anxiety and their Parents before Surgery and Satisfaction with the Treatment. *Process Journal of Caring Sciences*.2014; 3(1), 21-28. Available from: [doi:10.5681/jcs.2014.003](http://dx.doi.org/10.5681/jcs.2014.003).
7. Fernandes S. C, Arriaga P, Esteves F. Providing preoperative information for children undergoing surgery: a randomised study testing different types of educational material to reduce children's preoperative worries. *Health Educ Res* (2014)29(6):1058-1076. DOI:<https://doi.org/10.1093/her/cyu066>.
8. Mifflin KA, Hackmann T, Chorney JM. Streamed video clips to reduce anxiety in children during inhaled induction of anaesthesia. *Anesth Analg*. 2012 Nov;115(5):1162-7. Available from: [doi: 10.1213/ANE.0b013e31824d5224](http://dx.doi.org/10.1213/ANE.0b013e31824d5224). Epub Oct 9 2012. [Accessed 26th December 2017].
9. Lee JH, Jung HK, Lee GG, Kim HY, Park SG, Woo SC. Effect of behavioral intervention using smartphone application for preoperative anxiety in pediatric patients. *Korean J Anesthesiol*. 2013;65(6):508-18. Available from: <http://journals.tbzmed.ac.ir/JCS>. [Accessed 26th December 2017].
10. Setoodeh G, F Sharif F, A Faramarzi A, Tabatabaee HR. Effect of Pre- Operative Psycho-educational Interventions on Anxiety and Pain in Children Undergoing Tonsillectomy in Shiraz Southern Iran. *IRCMJ* 2010; 12(1):52- 57. Available from: <https://pdfs.semanticscholar.org/>.pdf [Accessed 17th December 2017].
11. Pölkki T, Vehviläinen-Julkunen K, Pietilä AM.

- Nonpharmacological methods in relieving children's postoperative pain: a survey on hospital nurses in Finland. *J Adv Nurs*. 2001 May;34(4):483-92. <https://www.ncbi.nlm.nih.gov/> . [Accessed December 10th 2017].
12. Thomas B, Effectiveness of play activities on the post operative outcomes of children undergoing general abdominal surgery. Unpublished Master of Nursing Dissertation, University of Calicut, 2007.
  13. Sabaq A.G El-Awady S. The Effect of Pre-Operative Preparation Program and Mothers Presence during Induction on Anxiety Level and Behaviour Change in Young Children Undergoing Elective Surgery. *Life Sci J* 2012;9(4):3798-3807. <http://www.lifesciencesite.com>.
  14. Vaezzadeh N, Douki Z E, Hadipour A, Osia S, Shahmohammadi S, Sadeghi R, The Effect of Performing Preoperative Preparation Program on School Age Children's Anxiety. *Iranian Journal of Pediatrics*, 2011;21(4):461-466. Available from: [ncbi.nlm.nih.gov](http://www.ncbi.nlm.nih.gov) PMID:PMC3446145.
  15. Chartrand J, Tourigny J, MacCormick J. The effect of an educational pre- operative DVD on parents' and children's outcomes after a same-day surgery: a randomised controlled trial. *Journal of Advanced Nursing*. 2017;73(3):599-611. Available from: [onlinelibrary.wiley.com / doi/10.1111/jan.2017.73.issue-3/issuetoc](http://onlinelibrary.wiley.com/doi/10.1111/jan.2017.73.issue-3/issuetoc).
  16. Ercan S. Relationship Between Psychological Preparation, Preoperative Anxiety, and Coping Strategies in Children and Adolescents Undergoing Surgery. Master's Dissertation, Middle East Technical University 2003. Available from: [citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.632.6492&rep=rep1..](http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.632.6492&rep=rep1..) [Accessed 10th January 2012].
- 
-