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Effectiveness of a pre-operative educational programme on pain and respiratory status of children undergoing elective abdominal surgery

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Abstract
Pain is inevitable when a child undergoes surgery. General anaesthesia and surgery directly affect the respiratory system. The present study is aimed to determine the effectiveness of a pre-operative educational programme on pain and respiratory status of children undergoing elective abdominal surgery. An experimental research with post test only control group design was adopted to conduct the study. Purposive sampling technique was adopted to select the subjects. Sample size was 73, of which 34 children were randomly assigned to the experimental group and 39 children to the control group. Children between the ages of 7 and 15 waiting for elective abdominal surgeries and who were able to read the local language (Malayalam) were selected. The experimental group received the pre-operative educational programme whereas the control group received routine care. Pain was rated using numerical rating scale on the day of surgery and respiratory status was assessed using respiratory assessment scale on the first post operative day. The mean pain score and respiratory status score were lesser in the experimental group compared to the control group. The calculated t values for pain and respiratory status were 13.33 and 7.61 respectively which were statistically significant at $p<.001$. The pre-operative educational programme was found to be effective in reducing pain and preventing respiratory complications.

Keywords: educational programme, pain, respiratory status, elective abdominal surgery

Introduction

Pain is often regarded as an inevitable consequence of operative procedures. Effective treatment of postoperative pain is important to improve clinical outcome and comfort especially in children. Untreated postoperative pain, especially in thoracic and upper abdominal surgeries, decreases respiratory motion and the cough reflex and prevents expectoration of secretions and the risk of atelectasis and postoperative pulmonary complications increases.

Pain assists us in avoiding physical harm, but unrelieved pain may be inherently harmful both psychologically and physiologically. Failure to intervene early in children's pain may lead to impairment in functioning and disruption in families. Unaddressed pain heightens anxiety and fear, which, in turn, increases perception of pain [1]. Treating pain reduces anxiety during procedures, and can decreases the need for physical restraints, reduces anxiety regarding subsequent procedures, and prevents short and long term consequences of inadequately treated pain.

Pain management is achieved by the use of non pharmacological methods also. Most often nurses use these techniques in relieving pain in children. A study was done to describe nurses' use of selected non pharmacological methods in relieving 8-12-year-old children's postoperative pain in hospital. The study revealed that emotional support, helping with daily activities and creating a comfortable environment were reported to be used routinely, whereas the cognitive-behavioural and physical methods were used less frequently [2].

In a survey of Chinese nurses guidance to parents in children's post-operative pain relief revealed that the most commonly guided non-pharmacological methods were distraction, positive reinforcement, comforting/reassurance, positioning and relaxation [3]. In a randomized controlled trial which used therapeutic play intervention reported a significant reduction in the post operative pain [4]. Serious gaming, an active distraction, together also reported to reduce the pain behaviour in children aged 5-12 years during wound care. A study was done to test how distraction influences pain, distress and anxiety in children during wound care. Sixty participants aged 5–12 years were randomized to three groups: serious gaming, the use of lollipops and a control group. Self-reported pain, distress, anxiety and observed pain behaviour were recorded in conjunction with wound care. Serious gaming, an active distraction, reduced the observed pain behaviour and self-reported distress compared with the other groups. A sense of control and engagement in the distraction, together, may be the explanation for the different pain behaviours when children use serious gaming [5].

Surgery and general anaesthesia directly affect the respiratory system. Postoperative pulmonary complications occur after upper abdominal surgery. Pulmonary complications of post-operative paediatric abdominal surgery observed in the studies were atelectasis, pneumonia, pleural effusion, pneumothorax, chylothorax, and diaphragmatic paralysis; whereas the first two aforementioned complications are the common ones [6]. A study reported that incentive spirometry, deep breathing, and intermittent positive-pressure breathing were equally more

effective than no treatment in preventing post-operative pulmonary complications following abdominal surgery [7].

A study documented an incidence of atelectasis (detected via radiograph) of 42% in control subjects versus 27% in patients treated postoperatively with physical therapy including deep-breathing exercises. The incidence rate declined further, to 12%, in patients who received additional preoperative instruction in the breathing exercises [8].

A study showed the effects of breathing exercises taught by physical therapists to 40 postoperative upper abdominal surgery patients aged between 10-15 years at USA. The experimental group received the breathing exercises in addition to the incentive spirometry, balloon blowing (pop- up toys) ultrasonic nebulisation, and routine instructions by nurses in deep breathing and coughing provided for the control groups. A 38 percent post-operative pulmonary complication rate was found for the control group. The experimental group, whose subjects were instructed and monitored by physical therapists, had only a 16 percent complication rate. The Post-operative pulmonary complications were defined as temperature higher than 38.5° C, radiographic changes, or abnormal breath sounds [9].

Routine information regarding post surgical are either delivered verbally or in written form in paediatric facilities in Kerala. A comprehensive programme on pain management and respiratory exercises is necessary in reducing complications post operatively. Literature reveals a number of interventions are found to be effective. So there is a need to evaluate the effectiveness of pre-operative educational programme on pain and respiratory status of children undergoing elective abdominal surgery.

Statement of the problem

A study to assess the effectiveness of a pre-operative educational programme on pain and respiratory status of children undergoing elective abdominal surgery in a selected tertiary care hospital in Ernakulum, Kerala.

Objectives

1. Assess the pain intensity of children undergoing elective abdominal surgery.
2. Assess the respiratory status of children undergoing elective abdominal surgery.
3. Evaluate the effectiveness of pre-operative educational programme on pain and respiratory status of children undergoing elective abdominal surgery.

Hypotheses

H_1: There will be a significant difference in the mean pain scores of children undergoing elective abdominal surgery between the control and experimental group.

H_2: There will be a significant difference in the mean respiratory status scores of children undergoing elective abdominal surgery between the control and experimental group.

Delimitations

- Pain is assessed only by self report.
- Respiratory status is assessed only by inspection, auscultation, and pulse oximetry and by checking vital signs.

Intervention

This included a multimedia education programme with video, audio, text and pictures. The video is a documentary which covers the post-operative period of children undergoing surgery. The programme has non pharmacological pain management techniques such as comfortable positioning, supporting the wound while turning, coughing and during other movements. Diversional activities such as playing hand held video games, watching television, counting numbers and taking deep breaths during pain episodes. Pre-operatively after admission to the ward each child is taught these techniques through the programme. Respiratory exercises include deep breathing and coughing exercises, frequent turning in the bed and early ambulation. Deep breathing techniques are practiced pre operatively and asked to perform post operatively every hourly when the child is awake. The programme was developed by reviewing related literature, discussion with experts and incorporating the real life situation of children undergoing surgery. 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 (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 programme was for 10 minutes.

Materials and methods

An experimental research with post test only control group design was adopted to conduct the study. The study was conducted in the paediatric wards of a tertiary care hospital in Ernakulum, Kerala. Purposive sampling technique was adopted to select the subjects. Sample size was 73, of which 34 children were randomly assigned to the experimental group and 39 children to the control group. Children between the ages of 7 and 15 waiting for elective abdominal surgeries and who were able to read the local language (Malayalam) were selected.

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. Data collection was done over a period of eleven months. Data was collected after the admission of the child to the ward which is the day before surgery. Informed consent from the parents was taken. Prior to the data collection, the investigator familiarized her with the subjects and explained to them the purpose of the study. The investigator obtained full co-operation from the participants and assured their confidentiality.

Each mother was interviewed to collect the demographic data which consisted of information such as age, gender and class of study. Type of surgery was taken from clinical records. The

intervention was given after the pre assessment. The programme was administered to each of the children individually using laptop. Debriefing was done after the intervention and a return demonstration of the techniques were conducted. Post operatively on the day of surgery when the child is fully awake pain score is assessed using numerical pain rating scale. Score 0 indicates no pain,1 to 3 mild pain,4 to 6 moderate pain and 7 to10 severe pain. Children were encouraged to use the non pharmacological techniques which they learnt pre operatively.

Respiratory assessment was done on the first post operative day using respiratory assessment scale which includes respiratory rate, heart rate, temperature, SpO2, use of accessory muscles, adventitious breath sounds, cough and presence of peripheral cyanosis which is observed, measured and scored on a three point rating scale by the investigator and graded as no infection, mild, moderate and severe infection. Total score is 30. Scores 10 - 14 indicates no infection, 15 - 19 mild respiratory infection, 20-25 indicates moderate respiratory infection and 26-30 severe respiratory infection. The collected data were analysed using descriptive and inferential statistics

Results

Section 1: Sample characteristics

Results showed that among the children 30.1% belonged to 7 to 10 years, 69.9% were in the age group of 11 to 15 years. The mean age of the sample was 11.46 years. Of the subjects 61.6 % were males and 38.4 % were females. Among the subjects 24.7% were studying in lower primary class, 41.1% in upper primary class and 34.2 % in high school. Both control and experimental group subjects were homogenous in terms of age (χ^2 =1.98), gender (χ^2 =0.97) and education (χ^2 =0.59).

Section 1a: Clinical data of children

Clinical data on children based on the type of surgery is presented in the bar diagram. Both the groups were homogenous in terms of type of surgery. (Fisher's exact-0.80)

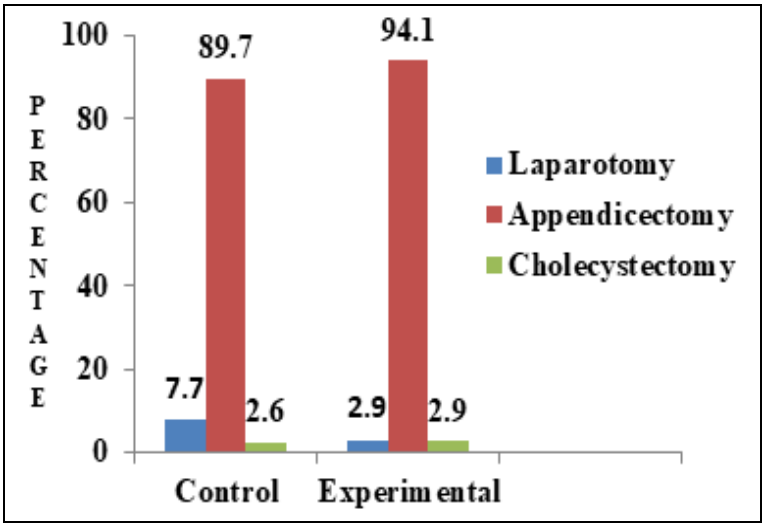

Fig 1: Percentage bar diagram showing the distribution of children based on pain scores in the control and experiment groups.

Section 2: Respiratory status of children

Table 1: Frequency distribution and percentage of children based on respiratory parameters in the control and experimental group n=73

Respiratory parameters	Control (n=39)		Experiment (n=34)	
	f	%	f	%
Respiratory rate/minute				
> 40/mt	0	0	0	0
> 31-40/mt	8	20.5	0	0
20- 30/mt	31	79.5	34	100
Heart rate/minute				
>130/mt	0	0	0	0
121-130/mt	5	12.8	1	3
80-120/mt	34	87.2	33	97
SpO_2				
< 95%	3	7.7	0	0
95-98%	23	59	3	8.8
99%	13	33.3	31	91.2
Temperature				
>99.7° F	8	20.5	2	5.9
98.7 – 99.6° F	23	59	5	14.7
98.6° F	8	20.5	27	79.4

Use of accessory muscle				
S/C and I/C retraction	0	0	0	0
Nasal flaring	2	5	0	0
No use	37	95	34	100
Wheeze				
Audible wheeze	0	0	0	0
Heard on auscultation	1	2.6	0	0
Absence	38	97.4	34	100
Crackles				
Extensive	0	0	0	0
Occasional	0	0	0	0
Absent	39	100	34	100
Rhonchi				
Extensive	0	0	0	0
Mild	10	25.6	1	3
Absent	29	74.4	33	97
Cough				
Intermittent	3	7.7	0	0
Occasional	13	33.3	8	23.5
Absent	23	59	26	76.5
Colour of the skin				
Cyanosis	0	0	0	0
Pale	4	10.3	0	0
Pink	35	89.7	34	100

Table 1 shows that in the control group 20.5% had tachypnoea,12.8% had tachycardia, 7.7% had saturation < 95%, 20.5% had fever, 25.6% mild rhonchi, 33.3% occasional cough, 7.7% intermittent cough and 10.3% had pale skin. In the experimental group 3% had tachycardia, 5.9 % had fever and 23.5% occasional cough indicating a marked reduction of symptoms in this group.

Table 2: Frequency distribution of children undergoing elective abdominal surgery based on the scores of respiratory status with respect to respiratory infection n=73

Respiratory status	Control (n=39)		Experimental (n=34)	
	f	%	f	%
Nil	31	79.5	34	100
Mild	8	20.5	0	0
Moderate	0	0	0	0
Severe	0	0	0	0

From the data in the Table 2 it is evident that in the control group 20.5% had mild signs of infection whereas in the experimental group none of them showed any signs of infection.

Section 3 Evaluation of effectiveness of preoperative educational programme

Effectiveness of preoperative educational programme on pain and respiratory status of children undergoing elective abdominal surgery was determined using independent sample t test.

Table 3: Mean, Standard deviation and 't' value of pain and respiratory status scores of children undergoing elective abdominal surgery between control and experimental group n=73

Group	Control (n=39)		Experimental (n=34)		df	t value	p-value
	Mean	SD	Mean	SD			
Pain score	6.62	1.09	3.12	1.14	71	13.33	0.0000***
Respiratory status score	13.05	1.74	10.56	0.82	71	7.61	0.0000***

***p – value < 0.001

Table 3 shows that the mean pain score in the experimental group was 3.12 as compared to the control group's mean of 6.62 and the mean respiratory status score in the experimental group was 10.56 as compared to the control group mean of 13.05.The calculated t values for pain and respiratory status were 13.33 and 7.61 respectively. Hence it can be inferred that the preoperative educational programme was effective in reducing pain and preventing respiratory complications.

Discussion

The present study revealed that the mean pain score in the experimental group was 3.12 as compared to the control group's mean of 6.62 which was statistically significant at p<.001 (t=13.33). This concurs with findings of other

researchers who had used therapeutic play[4], serious gaming and distraction techniques[5] and found reduction in post operative pain. 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.

The present study revealed that the mean respiratory status score in the experimental group was 10.56 as compared to the control group's mean of 13.05 which was statistically significant at $p<.001(t=7.61)$. In the control group 20.4% had signs of mild respiratory infection based on the respiratory status scores. Effectiveness of using breathing techniques in reducing pulmonary complications is reported by other researchers [8, 9]. These studies used chest radiographs to detect atelectasis. The present study reported respiratory complications based on the clinical signs and symptoms only. In the present study in the experimental group children were willing for early ambulation and practicing deep breathing techniques which were taught to them through the multimedia educational programme. Therefore its effectiveness needs to be commented.

Conclusion

Reducing pain and respiratory complications can be effectively implemented through a preoperative educational programme in children posted for elective abdominal surgery. Multimedia programmes are interesting and children may easily adopt these techniques. Age appropriate programmes need to be planned in order to get the maximum effect. More outcome variables can be explored with regard to effectiveness of such programmes.

References

1. Anand KJ, Scalzo FM. Can adverse neonatal experiences alter brain development and subsequent behavior? Biol Neonate, 2000; 77:69-82.
2. 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; 34(4):483-92.
3. He HG, Pölkki T, Pietilä AM, Vehviläinen-Julkunen K. A survey of Chinese nurses' guidance to parents in children's postoperative pain relief. J Clin Nurs. 2005; 14(9):1075-82.
4. He HG *et al.*, Therapeutic play intervention on children's perioperative anxiety, negative emotional manifestation and postoperative pain: a randomized controlled trial.J Adv Nurs. 2015; 71(5):1032-43.
5. Nilsson S, Enskar K, Hallgvist C, Kokinsky E. Active and Passive Distraction in Children Undergoing Wound Dressings, Journal of Pediatric Nursing, 2013; 28(2):158-166.
6. Cavenaghi S, Moura SCG, Silva TH, Venturinelli DT, Marino CHL, Lamari MN *et al.* Importance of pre- and post-operative physiotherapy in pediatric cardiac surgery. Revista basilera cirurgia cardiovascular. Available from URLhtt://www.scielo.php?pid=s0102-76382009000400021&script=sci-arttext&tlng, 2009; 24(7-9).
7. Overend JT, Anderson MC, Lucy DS, Bhatia C, Jonsson IB, Timmermans C. The effect of incentive spirometry on post-operative pulmonary complications: A systematic Review. Chest., 2001; 120:971-978.
8. Ward RJ, Danziger F, Bonica JJ *et al.* An evaluation of post-operative respiratory maneuvers. Surg Gynecol Obstet, 1966; 123:51-54.
9. O'Donohue WJ Jr. National survey of the usage of lung expansion modalities for the prevention and treatment of post-operative atelectasis following abdominal and thoracic surgery. Chest, 1985; 87:76-80.