

ORIGINAL RESEARCH

Use of Smartphones to Reduce Preoperative Anxiety in Children Before Anaesthesia

Dr. Anjali Unadkat¹, Dr. Dipti Desai², Dr. Hetal Kanabar³, Dr. Mehna Solia⁴

¹Assistant Professor, Department of Anesthesiology, GMERS Medical College, Junagadh, Gujarat, India

^{2,3}Associate Professor, Department of Anesthesiology, GMERS Medical College, Junagadh, Gujarat, India

⁴Resident, Department of Anesthesiology, GMERS Medical College, Junagadh, Gujarat, India

Corresponding author

Dr. Mehna Solia

Resident, Department of Anesthesiology, GMERS Medical College, Junagadh, Gujarat, India

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ABSTRACT

Preoperative paediatric anxiety is a common phenomenon usually associated with surgery and has a negative effect on postoperative recovery like higher postoperative pain, emergence delirium, uncooperative behavior, and higher doses of sedation or preoperative analgesia. In this generation the use of smartphones is more so this study aims to reduce preoperative anxiety in children undergoing surgeries under anaesthesia using smartphone as a distraction technique.

Material and method: This blinded randomized clinical trial included 40 children aged 3 to 12 years undergoing a planned surgical intervention at a GMERS general hospital divided into Group A (n = 20) and Group B (n = 20) groups. The video was shown on a smartphone to children in the experimental Group A preceding a planned surgical procedure. The control Group B was posted for surgery without intervention. **Results:** There was statistically significant reduction in mYPAS score in Group A as compared to Group B. **Conclusion:** Smartphone can be used to reduce preoperative paediatric anxiety as a distraction technique.

Keywords: Anxiety, Children, postoperative recovery, Smartphone. Diabetic kidney disease, Proteinuria, Angiotensin converting enzyme

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INTRODUCTION

Every year, more than 2 million children undergo surgical procedures. Children may experience anxiety and fear of surgery, pain, separation from parents, unfamiliar environment, the unknown, unpleasant sensory stimulation. [1,2]. As anxiety induces functional changes in the central nervous system, increases the deleterious effects on the child's body when associated with other preoperative stressors produces negative behaviors and high pain intensity scores in the postoperative period. In addition, anxiety causes sleep disturbances, nausea, fatigue and inadequate responses to anesthesia and analgesia leading to higher costs for the health services and family. [3,4]

The literature revealed the effects of preoperative pediatric anxiety as contributory to the manifestation of numerous postoperative psychological behavioral changes such as feeding and sleeping problems, bed wetting, withdrawal and apathy, and these symptoms exist up to 2 weeks after surgery. [5,6] To reduce child anxiety, sedatives and anti-anxiety drugs are regularly administered before surgery. However, these may prolong patient recovery and have many negative side

effects. Therefore, various non-pharmacological interventions have been used for reduction of preoperative anxiety such as music therapy, and visual imagery technique. [7-9] Most children like to play with smart phones, listening to music, watching videos or playing video games. Moreover, it has the double advantage of distraction and shielding view of a harsh-looking operating theatre.

MATERIAL AND METHODS

After obtaining approval from institutional ethical committee, GMERS medical college and hospital Junagadh and informed and written consent from the parents, a 40 non premedicated children aged 3-12 years posted for surgery under anesthesia were enrolled in the study. The study was conducted from March 2024 to August 2024 over a period of six months.

All children of either sex aged 3-12 years, American Society of Anesthesiologists (ASA) category I or II undergoing surgery under anesthesia were included in the study. Children with uncooperative parents, with impaired mental status, with any neurological disorder, on any psychotropic drugs, or with sepsis

and hypotension were not included in the study.

PROCEDURE

During pre-anesthetic visit, one day before surgery, we established good rapport with the children and their parents. Then children were allotted in two groups for study -Group A is experimental group and Group B is control group. On the day of surgery, in the pre-anesthetic room the mYPAS score was measured by an experienced anesthesiologist for all the children in both groups. Then children in Group A were given the smart phone to hold and play for around 20 minutes. Before few minutes of anesthesia induction the child was then transported without parental presence from the preoperative room to the operation theatre with continued use of smart phone. The child was placed on the operating table and again mYPAS score is measured by same anesthesiologist. After that routine monitors were attached. Our study ended here.

In non-interventional Group B children were not offered smart phones in pre anaesthesia room and mYPAS score is measured by same anaesthesiologist and were kept there for 20 minutes. Before few minutes of anesthesia induction child was transported to operating theatre without parental presence. Child was placed on the operating table and again mYPAS score is measured by same anesthesiologist and induced as per protocol followed by our institute for pediatric patients.

The outcome measured in the study is represented by preoperative anxiety in the child and was measured using m-YPAS score. The m-YPAS is an observational scale including 5 categories of child behavior including activity (score range, 1-4), vocalizations (score range, 1- 6), emotional expressivity (score range, 1-4), state of apparent arousal (score range, 1- 4), and use of parents (score

range, 1-4). These categories are weighted differently, and the overall score is calculated as that the range of the total score of each child varies from 23.33 (minimum anxiety) to 100 (maximum anxiety).

STATISTICAL ANALYSIS

The recorded data was compiled and entered in a computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). Quantitative variables were described as means and standard deviations or median and interquartile range based on their distribution. Qualitative variables were presented as percentages. For all tests, level of confidence and level of significance were set at 95% and 5% respectively.

RESULTS

For each group, we calculated mean age, relative frequency of gender mean mYPAS at initial and mean mYPAS score at post interventional assessment. The differences between the means were tested with an analysis of variance, and the differences between the relative frequencies were tested using the appropriate statistical test. Level of Significance was set at $P < 0.05$. Forty children participated in the study, of which 20 were assigned to the experimental Group A and 20 to the control Group B.

Table 1 Shows The mean [SD] age of the children in Experimental Group A was 7.4 [5.5] years & Control Group B was 7.1(5.2). Total 15 children were female out of 40 children. The Table shows the differences of age and gender between the children in the 2 Groups. Because the differences were not statistically significant, so both groups can be considered to be homogenous with regard to all the considered demographic variable.

Table 1: Difference between demographic variable of group A and group B

Demographic variable	Experimental group A	Control group B	P value
Age (SD)	7.4(5.5)	7.1(5.2)	0.9
Male (SD)	12(60)	13(65)	0.98
Female (SD)	8(40)	7(35)	0.95

* indicates statistically insignificance at $p < 0.05$ using paired t test

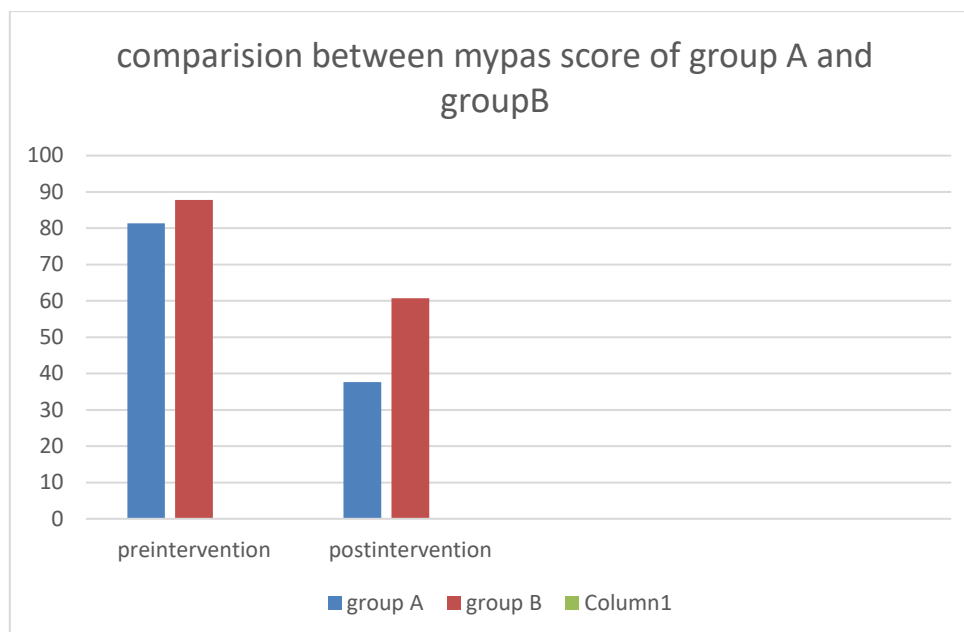
Table 2 shows the mean m-YPAS scores of Preoperative anxiety at the initial test for experimental Group A was 81.33(5.567) and for control Group B was 87.83(6.414) which did not show significant difference between the 2 groups. At second

measurement, the mean (SD) m-YPAS score for the experimental Group A was 37.66 (4.956), whereas the mean (SD) score in the control Group B was 60.74 (6.089). The 23.08-point difference between the means was statistically significant ($P = 0.0001$).

Table 2: Difference between MYPAS score of Study and Control groups before and after use of smartphones

Characteristic	Experimental group A Mypas score	Control group B mypas score	P value
Preintervention score mean (SD)	81.33(5.567)	87.83(6.414)	1.0
Postintervention score mean (SD)	37.66(4.957)	60.74(6.089)	<0.0001

* Indicate statistically significance at $p \leq 0.05$ using unpaired t test



Graph 1

DISCUSSION

A significant number of children undergo surgery. A number of preoperative anxiety reducing intervention strategies, both pharmacological and non-pharmacological interventions, have been employed. Each intervention has its own benefits and limits. Anxiolytic premedication with midazolam has proven effective but it has got various disadvantages like delay in emergence, recovery and discharge, increased incidence of maladaptive behavioral changes post-surgery and amnesia. [9]

With this experimental study, we wanted to test the effectiveness of a new method to reduce preoperative anxiety in children by smart phone distraction. If effective, this method would help to reduce preoperative anxiety in children. Non-pharmacological interventions improve children's cooperation and contribute to containing health costs, as they are usually cheaper than medications. Also, some non-pharmacological interventions are as effective as drugs in reducing preoperative anxiety.

The results of our study were in accordance with that found out by a study by Bachaspatimayum J et al [1] who also showed that smart phones are effective to reduce preoperative anxiety in children and better postoperative outcome. Because the 2 study groups did not differ significantly with respect to other relevant variables such as age, sex. The lower preoperative anxiety observed in the experimental group can be attributed to the smart phone. However, the smart phone has been shown to be effective only prior to elective surgical interventions. Therefore, it cannot be recommended in children who are undergoing emergency surgical procedures. Kain et al.[3] compared the efficacy of programme allowing the presence of parents just before induction and midazolam as pre anesthetic medication and had observed that children belonging to the midazolam

Group had significantly less anxiety. In today's generation use of smart phone is very much common and easily available so in our study we tested effectiveness of smart phone as distraction technique. It showed that children who received the intervention had significantly lower mean value of pre operative anxiety score before anesthesia compared to control Group. Therefore various distraction techniques allow a higher number of children to receive effective non pharmacological intervention to reduce pre operative anxiety without adverse effect of pre medication drugs and cost effective method.

CONCLUSION

The use of smartphone which is readily available, easily implemented and portable, as a distraction technique is effective in reducing preoperative anxiety in children without using anxiolytic medication. If smartphones given especially just before giving preoperative medications, the child will experience very less anxiety or no anxiety and that could reduce the post-operative hospital stay and improve postoperative outcome status of the child.

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