Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

A comparison of the effect of accompanying parent selected by the child, and a parent together with a favourite toy on anxiety during anaesthesia induction and postoperative delirium in children undergoing elective ENT surgery

ayşe duran

ayseduran@kmu.edu.tr

Karamanoğlu Mehmetbey University

betül başaran

Karamanoğlu Mehmetbey University

fatih yücedağ

Karamanoğlu Mehmetbey University

ayşegül bilge

Karamanoğlu Mehmetbey University

rafet yarımoğlu

Karamanoğlu Mehmetbey University

Research Article

Keywords: Toy, paediatric patient, postoperative delirium, paediatric perioperative anxiety, accompanying parent

Posted Date: November 23rd, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11140966/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: No competing interests reported.

Abstract

Background

The aim of this study was to determine whether a combination of child selected parental accompaniment and bringing favourite toy is more effective than only parental accompaniment in alleviating perioperative anxiety and postoperative delirium.

Methods

In the study, 100 children 5–12 years who underwent day surgery at the Otorhinolaryngology Clinic were divided into 2 groups. Children in both groups were asked which parent they wanted to accompany during anesthesia induction, and group 2 was asked to bring their favourite toy with them in the perioperative period. The anxiety levels of the children were evaluated using the modified Yale Preoperative Anxiety Scale (mYPAS) during perioperative period. The postoperative delirium status was evaluated with the Paediatric Anaesthesia Emergence Delirium (PAED) Scale. The anxiety levels of the parents were evaluated using the State/Trait Anxiety Inventory (STAI-S/-T).

Results

The preoperative mYPAS score was calculated as 29.9 ± 11 in Group 1 and 32.2 ± 9.7 in Group 2 ($p = 0.258$). During anaesthesia induction, these values were 36.8 ± 16.1 in Group 1 and 39.3 ± 12.1 in Group 2 ($p = 0.384$). No statistically significant difference was determined between the groups in respect of the PAED score ($p = 0.124$). It was seen that as the education level of the accompanying parent increased, so there was a statistically significant decrease in the STAI values, indicating a lower level of anxiety of the parents.

Conclusion

The addition of a favourite toy to child-selected parental accompaniment was not associated with a statistically significant reduction in perioperative anxiety or emergence delirium in children undergoing elective ENT surgery.

Practice implications:

Accompanying parent selection alone safe and free-of-cost technique in reduction of perioperative anxiety. Nevertheless, management of delirium and further decrease in perioperative anxiety may be topic of further researches including pharmacologic or different combinations of other non-

pharmacologic interventions. Since then, the selected parental accompaniment should be core of the perioperative anxiety management therapy.

Trial registration:

The study was registered on ClinicalTrials.gov, NCT06459089. Initially submitted on 10 June 2024.

Introduction

Adenotonsillectomy is one of the most frequently performed outpatient surgical procedures in children in current Ear, Nose, and Throat (ENT) practice. Children with complaints of sleeping with the mouth open, snoring, recurrent tonsillitis, or recurrent sinusitis benefit from adenotonsillectomy. The improvement in quality of life of the child after surgery is of critical importance for physical growth and development [1,2]. If there is accompanying chronic serous otitis media that does not recover with medical treatment, a ventilation tube can be applied alone or together with adenotonsillectomy [3]. Adenotonsillectomy alone or together with the application of a ventilation tube is always performed under general anaesthetic and the patient is intubated [4].

Admission to hospital, especially to undergo surgery, is a traumatic process for children and can cause perioperative anxiety for both the child and the parents. In patients of all age groups, perioperative anxiety can lead to negative physiological and psychological effects. Preoperative anxiety, postoperative delirium, and behavioural problems are common in children undergoing surgery and these can cause adverse behavioural reactions such as sleep disorders, eating problems, and even enuresis [5].

Preschool children undergoing surgery are dependent on their parents and are defenceless against separation anxiety, and therefore are extremely sensitive to perioperative anxiety [6,7]. Recent studies have reported perioperative anxiety in 64% of children undergoing surgery and anaesthesia [8]. Exposure to an unfamiliar environment can cause children to show anxiety during anaesthesia induction [9]. In addition, keeping the mask on the face in the absence of the parents and breathing volatile anaesthetics can place children under stress, sometimes creating anxiety to the extent that they will refuse anaesthesia with a mask [5,6,10,11]. Patients showing excessive behavioural disorder may not even be able to be placated by the presencce of their parents or favourite toys. Children who appear to be more anxious preoperatively have greater potential to exhibit negative behaviour postoperatively [12].

Postoperative delirium (ED) is an early postoperative behavioural change, seen especially in the paediatric population, the mechanism of which cannot be fully explained [13]. High perioperative anxiety has been associated with an increased incidence of ED, and causes adverse outcomes such as an increase n postoperative pain, delayed recovery, and disruption in the postoperative sleep-wake cycle [14,15].

Reducing the anxiety of children during transfer from the preoperative waiting area to the operating room and during anaesthesia induction is extremely important to be able to minimise postoperative delirium, and there are both pharmacological and non-pharmacological intervention methods for this purpose [16]. Sedative drugs can be used for perioperative anxiety in paediatric patients and many studies have recommended the use of oral midazolam [17]. Non-pharmacological intervention methods have recently become more widespread, including watching cartoon films, education programs, hypnosis, clown doctors, video games, parental presence during anaesthesia induction (PPIA), and having their favourite toy with them [18].

The primary aim of this study was to investigate the effect on anxiety scores through evaluation of the accompanying parent selected by the child and the presence or not of a favourite toy with the selected parent in the operating room during anaesthesia induction. A secondary aim was to evaluate the anxiety level of the mother or father in the preoperative waiting area and during anaesthesia induction, and the incidence and degree of emergence delirium in the child.

Material and method

Ethical Approval and Consent to Participate

Approval for this prospective study was granted by the Ethics Committee of Karamanoğlu Mehmetbey University Faculty of Medicine (01-2024/13). The study was registered on clinicaltrials.gov with the number NCT06459089, initially submitted on 10 June 2024. The manuscript was prepared in accordance with the CONSORT reporting guidelines. All procedures performed in this study involving human participants were conducted in accordance with the ethical principles of the Declaration of Helsinki and relevant institutional guidelines and regulations. Written informed consent for participation in the study was provided by the parents or legal guardian of all the children.

Study Procedure

The study included 100 children aged 5–12 years who underwent day surgery in the Ear, Nose, and Throat Clinic of Karaman Training and Research Hospital. The study was conducted between 26 June 2024 and 18 September 2024, in accordance with the dates registered on ClinicalTrials.gov (NCT06459089). The study inclusion criteria were defined as ASA 1 and 2 patients, those capable of speech and following instructions, and patients who could be accompanied by both parents in the preoperative waiting area on the day of surgery. Patients were excluded from the study if they had a history of anaesthesia, a history of chronic disease, or any developmental retardation.

The patients were randomly separated into two groups of 50. The children in Group 1 were asked which of their parents they wanted to accompany them during anaesthesia induction. The children in Group 2 were asked which of their parents they wanted to accompany them and were also told to bring their favourite toy to have with them in the perioperative period.

The same standardised anaesthesia-analgesia protocol was applied to both groups. To avoid any effect on the results, no anxiolytic was given to any child to be able to examine the effect of the non-pharmacological variable on anxiety. The parents were informed that this practice was different to routine clinical practice. Anaesthesia induction was performed by an anaesthesia specialist with at least 3 years of experience. Standard non-invasive blood pressure, ECG, and pulse oximeter monitorisation was performed. Anaesthesia induction was applied with 6L/min oxygen and 8% sevoflurane. After the patient lost consciousness, a vascular route was opened and for endotracheal intubation, 0.6mg/kg rocuronium and 2mcg/kg fentanyl was administered. Anaesthesia was maintained with sevoflurane inhalation (MAC 0.8). Paracetamol at 15mg/kg was administered intravenously for analgesic purposes. At the waking stage, the combination of atropine (20mcg/kg) and neostigmine (50 mcg/kg) was used to reverse the neuromuscular block. In the post-anaesthesia care unit (PACU), patient recovery was evaluated with the modified Aldrete Score and postoperative pain with a Visual Analog Scale (VAS). If the patient had a VAS score ≥ 4, 0.5 mcg/kg fentanyl iv was administered. When the modified Aldrete score was > 8, the patient was discharged from PACU to the clinical ward.

The primary aim of this study was to evaluate the anxiety levels of children during intubation using the modified Yale Preoperative Anxiety Scale (mYPAS). The anxiety levels of the children were evaluated in the preoperative waiting area and in the operating room before the administration of anaesthetic gas with the mask. Both parents were with the child in the preoperative waiting room and then the parent selected by the child accompanied the child during anaesthesia induction. The mYPAS, which was first used in 1995 and was then updated in 1997, is used to measure the level of preoperative anxiety in children. The scale evaluates 5 different areas of anxiety: 1) activity, 2) speech, 3) emotional state, 4) degree of excitation, 5) relationship with parents. Each item has Likert-type responses reflecting behaviours, scored from 1–4 points or 1–6 points (emotional subgroup). The total score obtained is in the range of 22.9–100 points, with higher points indicating more severe anxiety [19,20].

The incidence and degree of postoperative delirium of the children was evaluated with the Paediatric Anaesthesia Emergence Delirium (PAED) Scale when the child first made eye contact in the recovery room. This scale was developed and first described by Sikich et al. in 2004. Five main behaviours of the child are evaluated in the recovery room: 1) eye contact, 2) the presence of purposeful action, 3) awareness of the surroundings, 4) restlessness, 5) inconsolability. Items 1, 2, and 3 are scored as 0 = very much, 1 = a lot, 2 = some, 3 = a little, 4 = none. Items 4 and 5 are reverse scored as 4 = very much, 3 = a lot, 2 = some, 1 = a little, 0 = none. A PAED score ≥ 10 is accepted as delirium [21].

The secondary aims of this study were to evaluate the state-trait anxiety levels of the parents using the State-Trait Anxiety Inventory (STAI), and examine the effects of the sociodemographic characteristics of the parents on the anxiety levels of the children and parents. The parent selected by the child in both groups completed the Turkish versions of the STAI-State (STAI-S) and the STAI-Trait (STAI-T) scales in the preoperative waiting area, under the supervision of a researcher, and the STAI-S immediately after anaesthesia induction. The STAI was developed by Spielberger et al. in 1970, and was adapted for a Turkish population by Öner and Le Compte in 1985.The scale consists of 40 questions to evaluate levels

of state and trait anxiety [22,23]. Scoring is applied using 4-point Likert-type responses, providing a total score in the range of 20–80 points, with higher points representing a higher level of anxiety. The aim of the STAI is to evaluate “state anxiety” as the temporary response given to a situation and “trait anxiety” as a general personality characteristic. Direct statements in the scale reflect negative emotions and reverse statements express positive emotions.

Statistical Analysis

Data obtained in the study were analyzed statistically using IBM SPSS vn. 22.0 software. Conformity of continuous variables to normal distribution was evaluated with the Shapiro-Wilk test, Q-Q, and histogram. In the comparisons of continuous variables, the Independent Samples t-test and One-Way Variance Analysis were used. Post hoc tests were applied using the Scheffe method. Categorical variables were compared using the Chi-square test. A value of $p < 0.05$ was accepted as the level of statistical significance.

Sample size calculation

The sample size required in this study was calculated based on a previous study by the current authors. The mean mYPASscore of the children who selected which parent would accompany them was determined to be 36.3 ± 12.9 [24]. A decrease of ≥ 10 points was considered clinically significant. It was calculated necessary to have at least 43 children in each group to be able to obtain power of 95% with a significance level of 0.05. Considering a potential 15% dropout rate, a total of 100 children were recruited for this study.

Results

Evaluations were made of 100 patients who underwent elective surgery. No missing data were identified, and all 100 participants were included in the final analysis. No adverse events related to the study interventions were observed in either group. Adenotonsillectomy was performed in 94 cases, adenotonsillectomy +ventilation tube application in 3, tonsillectomy in 1, and adenoidectomy+ventilation tube application in 2. There was homogenous distribution in both groups in respect of patient age, gender, and weight. No statistically signficant difference was determined between the groups in respect of the gender and age of the parent selected to accompnay the patient. The mean operating time was 33.3 ± 8.6 mins in Group 1 and 32.4 ± 12.7 mins in Group 2 (Table 1).

Table 1
The demographic characteristics of patients and parents, and information related to the operation performed.

Subjects	Variables	Group 1 (n = 50)	Group 2 (n = 50)	p value
Children	Age (years), mean ± sd	8.0 ± 2.2	7.8 ± 1.8	0.499[a]
	Gender, n (%)			0.543[b]
	Male	27 (54)	31 (62)	
	Female	23 (46)	19 (38)	
	Weight (kg)	26.8 ± 6.7	25.5 ± 5.4	0.289[a]
Parents	Age (years), mean ± sd	35.8 ± 4.8	34.3 ± 5.8	0.171[a]
	Gender, n (%)			0.815[b]
	Male	13 (26)	11 (22)	
	Female	37 (74)	39 (78)	
	Educational level, n (%)			0.922[a]
	Primary	17 (34)	18 (36)	
	Secondary	10 (20)	9 (18)	
	High school	20 (40)	18 (36)	
	University	3 (6)	5 (10)	
Operation type	Adenotonsillectomy	46 (92)	48 (96)	
	Adenotonsillectomy + ventilation tube insertion	2 (4)	1 (2)	
	Tonsillectomy	-	1 (2)	
	Adenoidectomy + ventilation tube insertion	2 (4)	-	
Duration of surgery	Minutes, mean ± sd	33.3 ± 8.6	32.4 ± 12.7	0.688[a]

Data were expressed as mean ± standard deviation (sd),[a]: Independent samples t test, [b]: Yate's Chi-Square. Group 1: Parent selected by the child, Group 2: Parent selected by the child + toy selected by the child.

No statistically significant difference was determined between the two groups in respect of the mean mYPAS scores evaluated in the preoperative waiting area and during anaesthesia induction (Fig. 1). The

preoperative waiting area mYPAS score was calculated as 29.9 ± 11 in Group 1 and 32.2 ± 9.7 in Group 2 (p = 0.258). During anaesthesia induction, these values increased to 36.8 ± 16.1 in Group 1 and 39.3 ± 12.1 in Group 2 but the difference between the groups was not statistically significant (p = 0.384) (Table 2).

The mean anxiety points of the parents evaluated using both the STAI-S and STAI-T showed no significant difference between the groups. The STAI-S scores in both groups showed an increase during anaesthesia induction (Table 2).

Table 2
Comparisons of PAED and mYPAS scores of both groups.

Subjects	Time	Group 1 (n = 50)	Group 2 (n = 50)	Mean difference (95% CI)	p value
Emergence Delirium, n(%)	Post-anaesthesia care unit	20 (40)	25 (50)	-	0.421[a]
PAED score	Post-anaesthesia care unit	7.5 ± 5.8	9.2 ± 4.9	-1.6 (-3.8 to 0.4)	0.124[b]
mYPAS score	Preoperative waiting area	29.9 ± 11	32.2 ± 9.7	-2.3 (-6.4 to 1.7)	0.258[b]
	Induction of anaesthesia	36.8 ± 16.1	39.3 ± 12.1	-2.5 (-8.1 to 3.1)	0.384[b]
STAI-S	Preoperative waiting area	40.9 ± 9.6	38.7 ± 7.5	2.1 (-1.2 to 5.6)	0.211[b]
	Induction of anaesthesia	43 ± 10	41 ± 9.4	1.9 (-1.9 to 5.8)	0.329[b]
STAI-T	Preoperative waiting area	43.3 ± 9.2	41.2 ± 6.4	2 (-1.1 to 5.1)	0.209[b]

Data were expressed as mean ± standard deviation (sd), CI: confidence interval, [a]:Yate's Chi-Square, [b]:Independent samples t test. PAED: Pediatric Anesthesia Emergence Delirium Scale, mYPAS: modified Yale Anxiety Scale, STAI-S: State-Trait Anxiety Inventory-State, STAI-T: State-Trait Anxiety Inventory-Trait. Group 1: Parent selected by the child, Group 2: Parent selected by the child + toy selected by the child.

The PAED scores were measured higher in Group 2, but no statistically significant difference was determined between the groups (p = 0.124) (Fig. 2).

The mYPAS scores of the male children both in the preoperative waiting area and during anaesthesia induction were recorded as higher than those of the female children but the difference was not statistically significant (p = 0.137, p = 0.092) (Table 3). No difference was determined between the genders in respect of the PAED scores (p = 0.211) (Table 3).

Table 3
Comparisons of PAED scores and mYPAS scores of children and parents.

Subjects	Time	Male (n = 58)	Female (n = 42)	Mean difference (95% CI)	p value
Emergence Delirium, n(%)	Post-anaesthesia care unit	28 (48.3)	17 (40.5)	-	0.569[a]
PAED score	Post-anaesthesia care unit	8.9 ± 5.3	7.5 ± 5.5	1.3 (-0.7 to 3.5)	0.211[b]
mYPAS score	Preoperative waiting area	32.4 ± 11.1	29.2 ± 9.11	3.1 (-1.0 to 7.3)	0.137[b]
	Induction of anesthesia	40.0 ± 15.6	35.3 ± 11.8	2.7 (-0.7 to 10.1)	0.092[b]
Parents (STAI score)		**Male (n = 24)**	**Female (n = 76)**		
STAI-S	Preoperative waiting area	35.7 ± 7.5	41.1 ± 8.6	-5.3 (-9.3 to -1.4)	**0.007**[b]
	Induction of anesthesia	38.0 ± 7.5	43.3 ± 10.2	-5.3 (-9.7 to -0.8)	**0.021**[b]
STAI-T	Preoperative waiting area	39.3.1 ± 6.3	43.2 ± 8.2	-3.8 (-7.5 to -0.2)	**0.037**[b]

Data were expressed as mean ± standard deviation (sd), CI: confidence interval, [a]: Yate's Chi-Square, [b]:Independent samples t test. Significant p values are shown in bold. PAED score: Pediatric Anesthesia Emergence Delirium Scale, mYPAS: modified Yale Anxiety Scale, STAI-S: State-Trait Anxiety Inventory-State, STAI-T: State-Trait Anxiety Inventory-Trait.

The STAI-S scores in the preoperative waiting area and during anaesthesia induction, and the STAI-T scores in the preoperative waiting area of the mothers were determined to be statistically significantly higher than those of the fathers (Table 3).

When the education level of the accompanying parents was examined, the mean STAI-S and STAI-T scores in the preoperative waiting area and during anaesthesia induction were determined to be significantly higher for parents with a primary school level of education compared to the other groups (Table 4).

Table 4
Comparisons of parental STAI scores according to educational status.

Subjects	Primary[1] (n = 35)	Secondary[2] (n = 19)	High school[3] (n = 38)	University[4] (n = 8)	p[a]value	Post hoc p[b] value
Preoperative waiting area STAI-S	44.8 ± 6.5	35.3 ± 8.6	37.1 ± 7.1	41.3 ± 13.3	**0.001**	1–2: **0.001** 1–3: **0.001**
Induction of anesthesia STAI-S	46.6 ± 9.0	38.3 ± 8.4	39.7 ± 9.0	41.5 ± 14.3	**0.005**	1–2:**0.028** 1–3:**0.025**
Preoperative waiting area STAI-T	45.6 ± 8.6	41.3 ± 7.5	40.4 ± 6.8	38.3 ± 7.2	**0.013**	1–3:**0.045**

Data were expressed as mean ± standard deviation(sd), [a]: One-way ANOVA, [b]: Post-hoc test with Scheffe corrections. Significant p values are shown in bold. STAI-S: State-Trait Anxiety Inventory-State, STAI-T: State-Trait Anxiety Inventory-Trait.

Discussion

The primary finding of this study was that the presence of a favourite toy together with the parent selected by the child in the perioperative period did not cause a decrease in the perioperative anxiety score. This study is the first to have combined two different non-pharmacological anxiety-reducing techniques of child selection.

Perioperative anxiety is an important problem that requires attention, especially in children. It is characterised by increased autonomous nervous system activity, irritability and stress in children. High levels of perioperative anxiety have been associated with negative results such as prolonged anaesthesia induction, increased incidence of postoperative delirium and postoperative pain, increased analgesia use and negative postoperative behaviour changes [14,25].

There are various pharmacological and non-pharmacological methods to reduce the level of anxiety in children and their parents during anasthesia induction [16]. These include premedication with sedative agents, hypnosis, the presence of a parent, behavioural preparation programs, music therapy, and acupuncture [26]. The administration of oral midazolam, the presence of a parent, and behavioural preparation programs are the methods used more often, while acupuncture, hypnosis, and music therapy are less frequently used. The use of oral midazolam has been shown to be an effective method to reduce perioperative anxiety, but it may cause a delay in the time to discharge from hospital [8,12] and negative behavioural changes [27–29].

One of the methods frequently used to reduce perioperative anxiety is the presence of a parent. Although the effect of parental presence is controversial, it is thought that it could reduce perioperative anxiety. In a study by Kain et al. from 1995 to 2002 examining reductions in perioperative anxiety, there was reported to be an increasing trend for a parent to be present [30]. In the first studies in literature related to the presence of a parent, it was seen that although perioperative anxiety was reduced by preventing separation anxiety [31], later studies did not provide consistency on the point of parental presence reducing perioperative anxiety when compared with other non-pharmacological studies [16].

A recent study evaluating 160 children who underwent adenotonsillectomy, separated the patients into two groups as those accompanied by a parent and an unaccompanied control group. Lower heart rate and blood pressure values were obtained in the group accompanied by a parent compared to the control group. Lower mYPAS scores were also obtained in the accompanied group both in the preoperative waiting area and during anaesthesia induction, and it was concluded that a parent accompanying a child undergoing surgery significantly reduced anxiety in the child [32].

Most studies in the literature have compared the presence and absence of a parent. Yücedağ et al. examined the effect on perioperative anxiety when the accompanying parent was selected by the child in a study of 80 children aged 4–12 yeaars undergoing day surgery. It was seen that when the parent accompanying the child in the perioperative period was selected by the child, the anxiety score during anaesthesia induction decreased [33]. The current study was conducted after that study in the same clinic with the hypothesis that the addition of a favourite toy could further reduce the anxiety score. The results showed that at least two non-pharmacological methods with the selection of a favourite toy did not lead to any change in the perioperative anxiety and postoperative delirium scores.

In another study, 130 children aged 3–7 years were randomly separated into 3 groups. When the control group was compared with a group that had their favourite toy with them and a group that watched a cartoon film in the perioperative period, there was no decrease in the anxiety scores [34]. In both study groups, a single method was used to reduce preoperative anxiety, unlike the current study. In addition, the absence of a parent in one of the groups means that it cannot be compared with the current study.

In a prospective study of 117 children aged 2–7 years, planned to undergo minor elective surgery, Kim et al. separated these children at random into 3 groups. One group watched a video to distract their attention, one group was acccompanied by a parent, and the third group watchd a video together with a parent. The mYPAS scores of these 3 groups were similar in the preoperative area, whereas the anxiety levels of the children who watched a video with their parent were found to be significantly lower than those of the other groups during anasthesia induction [35]. That study showed the efficacy of using a combined method to reduce anxiety, and formed the basis for the hypothesis of the current study. Although it can be said that watching a video and a parent being present may be successful compared to a favourite toy and the presence of a parent, not all the children in that study underwent head-neck surgery and the accompanying parent was not selected by the child.

Postoperative delirium is a complication widely seen in children after general anaesthesia, with reported incidence ranging between 2% and 80% [36]. In addition to preoperative anxiety, there are many risk factors that have been associated with postoperative delirium, including the type of surgery, the use of short-effect gas anaesthesia, insufficient postoperative pain management, and the child's temperament [14]. However, the relationship between preoperative anxiety and ED remains a matter of debate.

In a prospective study by Arai et al., 638 paediatric patients, aged 1–3 years, undergoing surgery were examined. It was concluded that in children accompanied by a parent and given oral midazolam, perioperative anxiety was reduced, compliance was increased, and the incidence and severity of postoperative delirium was decreased [37]. It has been reported that children watching a video in the presence of a parent until anaesthesia induction effectively reduces perioperative anxiety but does not improve the incidence of postoperative delirium [38]. In another study conducted in our clinic, the selection of the accompanying parent by the child significantly reduced the mYPAS scores during anaesthesia induction but did not make any difference to the incidence of postoperative delirium [24]. In both of these studies there were found to be many factors in the pathogenesis of postoperative delirium, of which perioperative anxiety is only one. Therefore, multiple interventions are required to reduce the incidence of postoperative delirium.

In previous studies where parents have accompanied children, the anxiety levels of the parents have been evaluated with the STAI-S/-T. This determined the most important factor affecting the anxiety level of the parent, and it has been shown that the anxiety levels of mothers are higher than those of fathers [39]. There has also been seen to be a tendency for high anxiety levels in the mothers of younger children and in the mothers of children with a history of surgery [40].

A total of 120 children aged 6–8 years, undergoing tonsillectomy, adenoidectomy, and adenotonsillectomy were evaluated in two groups. Preoperatively, the children in the control group were given a non-medical story book, and for the children in the intervention group, the mothers were given an age-appropriate, informative story book to be read aloud at least once. The baseline anxiety level of the children was evaluated with the mYPAS and the anxiety level of the mothers with the STAI. The mothers then completed a questionnaire to provide information about how many times the book was read and by whom, and the age and education level of the mother. It was concluded that the children of mothers with a higher education level had lower levels of anxiety, and repeated reading of the informative story book significantly reduced the anxiety level of the child [41].

The current study results showed that the STAI-S scores in the preoperative waiting area and during anaesthesia induction and the STAI-T scores in the preoperative waiting area were significantly higher for the mothers than the fathers. When education levels were examined, the mean STAI-S and STAI-T scores in the preoperative waiting area and during anaesthesia induction were determined to be significantly higher for parents with a primary school level of education compared to the other groups.

Limitations

As children undergoing emergency surgery and those with a history of surgery were not included in the study, the results only reflect children undergoing elective surgery for the first time. Premedication was not given to any of the patients so no comment can be made about how preoperative administration of midazolam would change the efficacy of the interventions. It is not known whether the parents and children were more or less anxious during anaesthesia induction because children with a history of surgery were excluded. With the selection of the accompanying parent by the child, there is an increased risk that the child will think that the parent not selected will be upset. The different fasting and waiting times before surgery and prolongation of these periods could also increase the perioperative anxiety of the children.

Conclusion

The addition of a favourite toy to child-selected parental accompaniment was not associated with a statistically significant reduction in perioperative anxiety or emergence delirium in children undergoing elective ENT surgery. This study can be continued with further studies of the effect of other non-pharmacological anxiety-reducing methods on the presence of a parent selected by the child.

Abbreviations

ENT: Ear, Nose, and Throat;

mYPAS: modified Yale Preoperative Anxiety Scale;

PAED: Pediatric Anesthesia Emergence Delirium;

STAI: State-Trait Anxiety Inventory;

PACU: Post-Anesthesia Care Unit.

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the Ethics Committee of Karamanoğlu Mehmetbey University Faculty of Medicine (01-2024/13). Written informed consent was obtained from the parents or legal guardians of all participating children. The study was conducted in accordance with the Declaration of Helsinki and relevant guidelines and regulations.

Consent for publication

Not applicable.

Availability of data and materials

The data that support the findings of this study are available from the corresponding author, AD, upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

Funding

This study received no external funding.

Authors' contributions

A.D.: Design, literature search, writing – original draft; B.B.: Methodology, writing – review and editing; F.Y.: Formal analysis, writing – review and editing; A.B.: Data collection; R.Y.: Data collection. All authors read and approved the final manuscript.

Acknowledgements

Not applicable.

References

1. Mitchell RB, Archer SM, Ishman SL, et al. (2019). Clinical practice guideline: tonsillectomy in children (Update)-executive summary. Otolaryngol Head Neck Surg. 160:187–205. https://doi.org/10.1177/0194599818807917
2. Parker NP, Walner DL. (2011). Trends in the indications for pediatric tonsillectomy or adenotonsillectomy. Int J Pediatr Otorhinolaryngol. 75:282–285. https://doi.org/10.1016/j.ijporl.2010.11.019
3. Hellström S, Groth A, Jörgensen F, et al. (2011). Ventilation tube treatment: a systematic review of the literature. Otolaryngol Head Neck Surg. 145:383–395. https://doi.org/10.1177/0194599811409862
4. Bangera A. (2017). Anaesthesia for adenotonsillectomy: an update. Indian J Anaesth. 61:103–109. https://doi.org/10.4103/0019-5049.199855
5. Fortier MA, Del Rosario AM, Martin SR, Kain ZN. (2010). Perioperative anxiety in children. Paediatr Anaesth. 20:318–322. https://doi.org/10.1111/j.1460-9592.2010.03263.x
6. Kain ZN, Mayes LC, O'Connor TZ, Cicchetti DV. (1996). Preoperative anxiety in children. Predictors and outcomes. Arch Pediatr Adolesc Med. 150:1238–45. https://doi.org/10.1001/archpedi.1996.02170370016002
7. Vetter TR. (1993). The epidemiology and selective identification of children at risk for preoperative anxiety reactions. Anesth Analg. 77:96–9. https://doi.org/10.1213/00000539-199307000-00019

8. Perrott C, Lee CA, Griffiths S, Sury MRJ. (2018). Perioperative experiences of anesthesia reported by children and parents. Paediatr Anaesth. 28(2):149-156. https://doi.org/ 10.1111/pan.13300
9. Chorney JM, Kain ZN. (2009). Behavioral analysis of children's response to induction of anesthesia. Anesth Analg. 109(5):1434-1440. https://doi.org/ 10.1213/ane.0b013e3181b412cf
10. Kain ZN, Mayes LC, Caramico LA, Silver D, Spieker M, Nygren MM, Anderson G, Rimar S. (1996). Parental presence during induction of anesthesia. A randomized controlled trial. Anesthesiology. 84:1060–7. https://doi.org/ 10.1097/00000542-199605000-00007
11. Przybylo HJ, Tarbell SE, Stevenson GW. (2005). Mask fear in children presenting for anesthesia: aversion, phobia, or both? Paediatr Anaesth. 15:366–70. https://doi.org/ 10.1111/j.1460-9592.2004.01524.x
12. Menser C, Smith H. (2020). Emergence agitation and delirium: considerations for epidemiology and routine monitoring in pediatric patients. Local Reg Anesth. 13:73-83. https://doi.org/ 10.2147/LRA.S181459 . eCollection 2020
13. Mason KP. (2017). Paediatric emergence delirium: a comprehensive review and interpretation of the literature. Br J Anaesth. 118(3):335-343. https://doi.org/ 10.1093/bja/aew477
14. Kain ZN, Caldwell-Andrews AA, Maranets I, et al. (2004). Preoperative anxiety and emergence delirium and postoperative maladaptive behaviors. Anesth Analg. 99(6):1648-1654. https://doi.org/10.1213/01.ANE.0000136471.36680.97
15. Kain ZN, Mayes LC, Caldwell-Andrews AA, Karas DE, McClain BC. (2006). Preoperative anxiety, postoperative pain, and behavioral recovery in young children undergoing surgery. Pediatrics. 118(2):651-658. https://doi.org/10.1542/peds.2005-2920
16. Manyande A, Cyna AM, Yip P, Chooi C, Middleton P. (2015). Non-pharmacological interventions for assisting the induction of anaesthesia in children. Cochrane Database Syst Rev 2015(7):CD006447. https://doi.org/10.1002/14651858.CD006447.pub3
17. Feld LH, Negus JB, White PF. (1990). Oral midazolam preanesthetic medication in pediatric outpatients. Anesthesiology. 73:831–834. https://doi.org/10.1097/00000542-199011000-00006
18. Agbayani CG, Fortier MA, Kain ZN. (2020). Non-pharmacological methods of reducing perioperative anxiety in children. BJA Educ. 20:424–430. https://doi.org/10.1016/j.bjae.2020.08.003
19. Moore AD, Anghelescu DL. (2017). Emergence delirium in pediatric anesthesia. Paediatr Drugs. 19(1):11-20. https://doi.org/10.1007/s40272-016-0201-5
20. Kain ZN, Mayes LC, Cicchetti DV, et al. (1995). Measurement tool for pre-operative anxiety in young children: the Yale Preoperative Anxiety Scale. Child Neuropsychol. 1:203-210. https://doi.org/10.1080/09297049508400225
21. Sikich N, Lerman J. (2004). Development and psychometric evaluation of the pediatric anesthesia emergence delirium scale. Anesthesiology. 100(5):1138-1145. https://doi.org/10.1097/00000542-200405000-00015
22. Spielberger C. D. (1983). Manual for the State-Trait-Anxiety Inventory: STAI (form Y). Palo Alto, CA: Consulting Psychologists Press.

23. Öner N, Lecompte A. (1985). Durumluluk-Sürekli Kaygı Envanteri El Kitabı. İstanbul, Boğaziçi Üniversitesi Yayınları.
24. Yucedag F, Sezgin A, Bilge A, Basaran B. (2024). The effect on perioperative anxiety and emergence delirium of the child or parent's preference for parental accompaniment during anesthesia induction in children undergoing adenotonsillectomy surgery. Paediatr Anaesth. 34(8):792-799. https://doi.org/10.1111/pan.14912
25. Aytekin A, Doru Ö, Kucukoglu S. (2016). The Effects of Distraction on Preoperative Anxiety Level in Children J Perianesth Nurs. 31(1):56-62. https://doi.org/10.1016/j.jopan.2014.11.016
26. Wright KD, Stewart SH, Finley GA, Buffett-Jerrott SE. (2007). Prevention and intervention strategies to alleviate preoperative anxiety in children: a critical review. Behav Modif. 31:52–79. https://doi.org/10.1177/0145445506295055
27. McGraw T, Kendrick A. (1998). Oral midazolam premedication and postoperative behaviour in children. Paediatr Anaesth. 8:117–21. https://doi.org/10.1046/j.1460-9592.1998.00724.x
28. Stewart SH, Buffett-Jerrott SE, Finley GA, Wright KD, Valois Gomez T. (2006). Effects of midazolam on explicit vs implicit memory in a pediatric surgery setting. Psychopharmacology 188:489–97.
29. Watson AT, Visram A. (2003). Children's preoperative anxiety and postoperative behaviour. Paediatr Anaesth. 13:188–204. https://doi.org/10.1046/j.1460-9592.2003.00848.x
30. Kain ZN, Caldwell-Andrews AA, Krivutza DM, Weinberg ME, Wang SM, Gaal D. (2004). Trends in the practice of parental presence during induction of anesthesia and the use of preoperative sedative premedication in the United States, 1995-2002: results of a follow-up national survey. Anesth Analg. 98:1252–9. https://doi.org/10.1213/01.ANE.0000111183.38618.D8
31. O'Sullivan M, Wong GK. (2013). Preinduction techniques to relieve anxiety in children undergoing general anaesthesia. Contin Educ Anaesth Crit Care Pain. Volume 13, Issue 6, Pages 196–199. https://doi.org/10.1093/bjaceaccp/mkt014
32. Li X, Qiao XF, Ren PX, Wang GP, Bai YH. (2023). Parental presence during induction of anesthesia in children undergoing tonsillectomy and adenoidectomy. Eur Arch Otorhinolaryngol. 280(12):5475-5482. https://doi.org/10.1007/s00405-023-08222-3
33. Yucedag F, Sezgin A, Bilge A, Basaran B. (2024). The Effect of Child Preference for Parental Selection on Pediatric Anxiety During Induction in Children Undergoing Elective Day Case Surgery. J Perianesth Nurs. 39(3):397-402. https://doi.org/10.1016/j.jopan.2023.08.021
34. Lee J, Lee J, Lim H, Son JS, Lee JR, Kim DC, Ko S. (2012). Cartoon Distraction Alleviates Anxiety in Children During Induction of Anesthesia. Anesthesia & Analgesia. 115(5):p 1168-1173. https://doi.org/10.1213/ANE.0b013e31824fb469
35. Kim H, Jung SM, Yu H, Park SJ. (2015). Video Distraction and Parental Presence for the Management of Preoperative Anxiety and Postoperative Behavioral Disturbance in Children: A Randomized Controlled Trial. Anesth Analg. 121(3):778-784. https://doi.org/10.1213/ANE.0000000000000839

36. Aldecoa C, Bettelli G, Bilotta F, et al. (2017). European Society of Anaesthesiology evidence-based and consensus-based guideline on postoperative delirium. Eur J Anaesthesiol. 34(4):192-214. https://doi.org/10.1097/EJA.0000000000000594
37. Arai YC, Ito H, Kandatsu N, Kurokawa S, Kinugasa S, Komatsu T. (2007). Parental presence during induction enhances the effect of oral midazolam on emergence behavior of children undergoing general anesthesia. Acta Anaesthesiol Scand. 51:858–861. https://doi.org/10.1111/j.1399-6576.2007.01339.x
38. Patel A, Schieble T, Davidson M, Tran MC, Schoenberg C, Delphin E, Bennett H. (2006). Distraction with a hand-held video game reduces pediatric preoperative anxiety. Paediatr Anaesth. 16:1019–27. https://doi.org/10.1111/j.1460-9592.2006.01914.x
39. Litman RS, Berger AA, Chhibber A. (1996). An evaluation of preoperative anxiety in a population of parents of infants and children undergoing ambulatory surgery. Paediatr Anaesth. 6(6):443-447. https://doi.org/10.1046/j.1460-9592.1996.d01-17.x
40. Shirley PJ, Thompson N, Kenward M, Johnston G. (1998). Parental anxiety before elective surgery in children. A British perspective Anaesthesia. 53(10):956-9. https://doi.org/10.1046/j.1365-2044.1998.00533.x
41. Aydın GB, Uyar BS J. (2021). Mothers Level of Education and Preoperative Informative Story Book Reading Helps Reduce Preoperative Anxiety in Children in Turkey Pediatr Nurs 60:e19-e23. https://doi.org/10.1016/j.pedn.2021.02.012

Figures

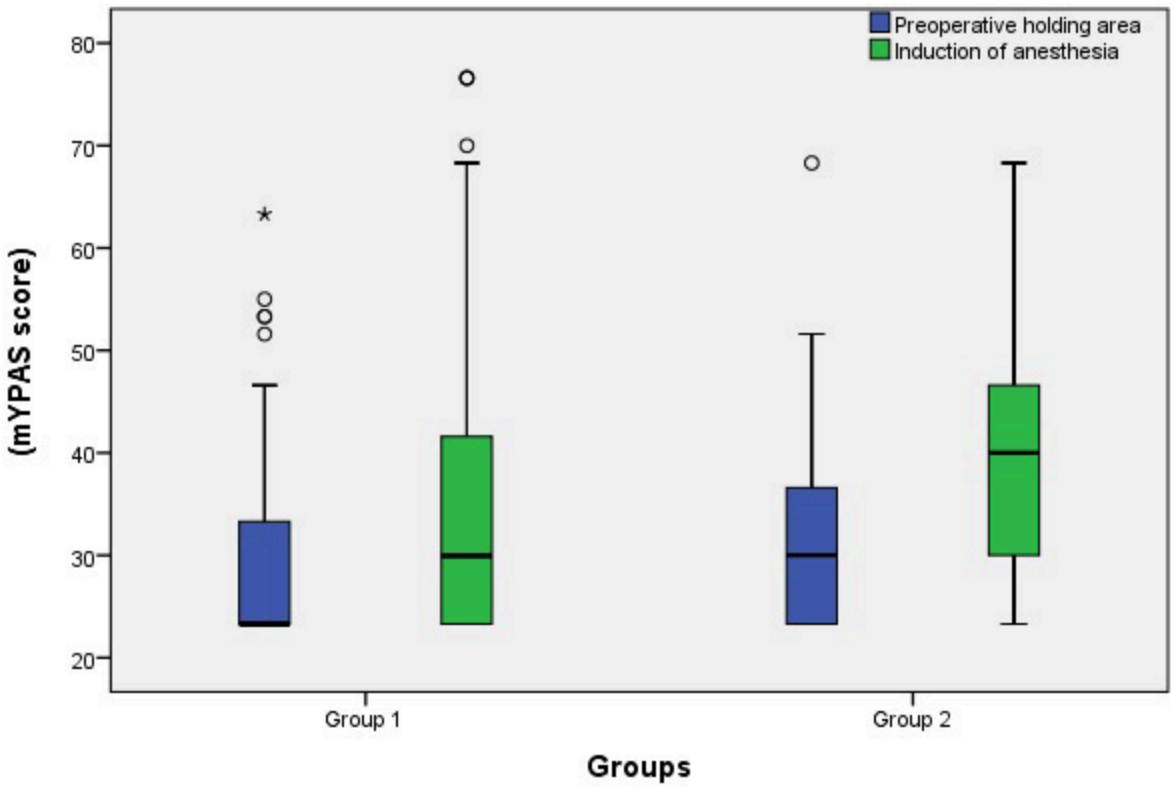

Figure 1

Distribution of mYPAS scores in group 1 and group 2 shown as box plots

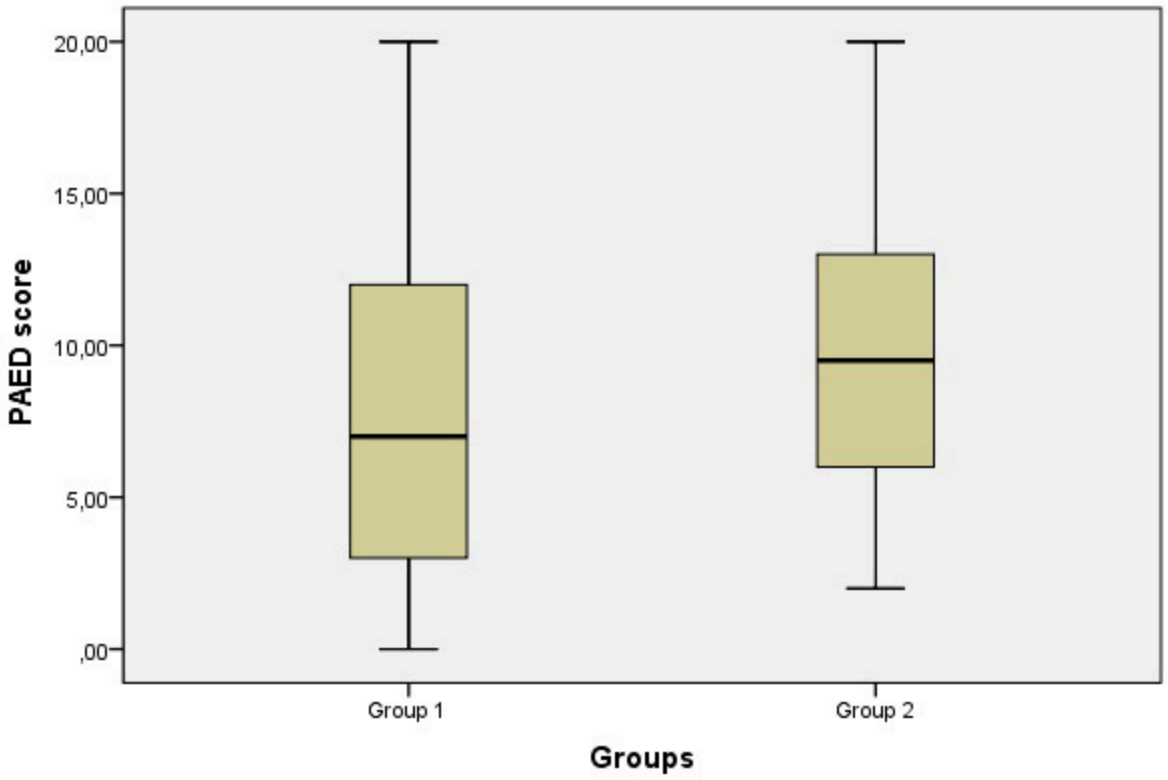

Figure 2

Distribution of PAED scores in group 1 and group 2 shown as box plots

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- CONSORTList.docx