

Prediction of correlation between preoperative parents' anxiety and their child's anxiety before elective surgery under anaesthesia: An observational study

Address for correspondence:

Dr. Sugandhi Nemani,
Department of Anaesthesiology
and Critical Care, JIPMER,
Pondicherry, India.
E-mail: sugandhinemani@
gmail.com

Submitted: 28-Dec-2023

Revised: 27-Jun-2024

Accepted: 07-Jul-2024

Published: 16-Aug-2024

**Kamlesh Kumari, Sugandhi Nemani¹, Darshana Rathod, Ankur Sharma,
Pradeep K. Bhatia, Shilpa Goyal**

Department of Anaesthesiology and Critical Care, All India Institute of Medical Sciences, Jodhpur, Rajasthan,

¹Department of Anaesthesiology and Critical Care, JIPMER, Pondicherry, India

ABSTRACT

Background and Aims: Preoperative parental anxiety can have a profound impact on their children undergoing surgery. The present study was done to analyse the correlation between preoperative parental anxiety and their child's anxiety in paediatric patients undergoing elective surgery. **Methods:** Paediatric patients aged 2–12 years, scheduled for elective surgeries under general anaesthesia, were included in the study. The child's behaviour and anxiety were assessed in the preoperative area using the modified Yale Preoperative Anxiety Scale (m-YPAS). The parent filled out the demographic questionnaire and the Spielberger State–Trait Anxiety Inventory (STAI) form in the preoperative area on the day of surgery. Statistical analysis was conducted using Statistical Package for the Social Sciences (SPSS) statistics software version 23.0 (IBM Corp, Armonk, NY, USA). **Results:** A total of 150 children undergoing elective surgery were analysed. Our results showed a strong positive correlation between a child's m-YPAS and his/her parents' anxiety on the day of the surgery (STAI-state) ($r = 0.545$, $P < 0.001$). However, the correlation between a child's m-YPAS and his/her parents' anxiety levels (STAI-trait) was not found to be significant ($r = 0.109$, $P = 0.188$). A positive correlation was observed between a parent's STAI-state and STAI-trait ($r = 0.366$, $P < 0.001$). Factors like area of residence, type of surgery and previous hospitalisation had an influence on the anxiety levels of the child. The birth order of the child, previous hospitalisation and gender of the parent also influenced parental anxiety. **Conclusion:** Parental anxiety has a significant impact on the child's anxiety during the preoperative period.

Keywords: Anaesthesia, anxiety, child, correlation, parents, preoperative period, Spielberger State–Trait Anxiety Inventory, surgery, Yale Preoperative Anxiety Scale

Access this article online
Website: https://journals.lww.com/ijaweb
DOI: 10.4103/ija.ija_1269_23
Quick response code


INTRODUCTION

Surgery is a traumatic experience for both children and their parents. Parents go through a lot of stress and anxiety concerning their child's anaesthesia, surgery and complications, whereas children experience a lot of fear, anger and irritability during the preoperative period. Parental anxiety can have an additive effect on the child's anxiety. Parental anxiety can be sensed by their children and can cause increased anxiety in them.^[1,2] Parents' emotional behaviours and coping mechanisms impact their children, who model their

behaviour after that of their parents.^[3,4] Preoperative anxiety is related to patients' social demography,

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Kumari K, Nemani S, Rathod D, Sharma A, Bhatia PK, Goyal S. Prediction of correlation between preoperative parents' anxiety and their child's anxiety before elective surgery under anaesthesia: An observational study. *Indian J Anaesth* 2024;68:809-14.

family characteristics and parental psychological characteristics. A previous study reported that maternal education level had an impact on the anxiety of their children.^[5]

The causative factors and manifestations of perioperative anxiety and the coping skills of the individual in stressful situations are very much influenced by the sociocultural aspects of the society and country.^[6,7] Preoperative anxiety in children is multifactorial. In developed countries, parents' anxiety is known to influence their children's anxiety, which can affect the perioperative outcome of children. To study any such correlation in developing countries, the present observational study was planned with the primary objective of analysing the correlation between parents' and their children's anxiety preoperatively in paediatric patients aged 2–12 years posted for elective surgery under general anaesthesia. The secondary objective of our study was to determine the factors influencing anxiety among parents and their children. We hypothesised that there is a positive correlation between preoperative parental anxiety and their child's preoperative anxiety in paediatric patients undergoing elective surgeries under general anaesthesia.

METHODS

After getting approval from the Institutional Ethical Committee (vide approval number IEC Code 2022/5116, dated 28/07/2022) and trial registration at the Clinical Trials Registry-India (vide registration number CTRI/2023/08/056427, accessible at www.ctri.nic.in/), this prospective observational study was conducted at a tertiary care teaching institute from September 2023 to November 2023. Children aged 2–12 years, with American Society of Anesthesiologists physical status I or II, scheduled for elective surgeries under general anaesthesia were included. Written informed consent was obtained from the parents, and assent was obtained from children >7 years old, along with the parents' consent for participation in the study and using patient data for research and educational purposes. The study was carried out using the principles of the Declaration of Helsinki, 2013, and Good Clinical Practice. Patients posted for elective surgery under regional anaesthesia, children with congenital disorders or developmental abnormalities, children with a history of significant chronic respiratory, central nervous system or cardiovascular system disease, and children whose parents were not able to understand and answer the Spielberger State-Trait Anxiety Inventory (STAI)

questionnaire in Hindi or English were excluded from the study.

During the preoperative assessment, an explanation about the anaesthesia and the surgery was given to the parent accompanying the child to the preoperative area, and the same parent filled out the demographic questionnaire and the STAI form in the preoperative area on the day of surgery.^[8] The STAI questionnaire consists of 20 questions for assessing state and trait anxiety. Scores on this questionnaire range from 20 to 80, with higher scores indicating elevated levels of anxiety. The child's behaviour and anxiety were assessed in the preoperative area before separation from parents using the modified Yale Preoperative Anxiety Scale (m-YPAS) by the anaesthesiologist,^[9] which has five domains: (1) activity, (2) vocalisations, (3) emotional expressivity, (4) state of apparent arousal and (5) use of a parent. The score ranges from 23 to 100; the higher the score, the higher the anxiety level. Sociodemographic data of the child and the parent, like age of the child and the parent, gender, birth order of the child, educational qualification of the parent and the child, previous surgical history, area of residence and type of surgery (major surgery was defined as an invasive procedure in which a body cavity was entered, the mesenchymal barrier was crossed, the fascial plane was opened or an organ was removed, and minor surgery was defined as an invasive procedure in which only skin, mucous membranes or superficial connective tissue was manipulated), was noted.

The child was not given any premedication before the assessment of anxiety scores. IV access was secured in the ward before the day of surgery. After the assessment, the child was given premedication (IV ketamine 0.5 mg/kg) and was shifted to the operation theatre, where he/she was given routine general anaesthesia as per the standard protocol of the institute. Parents were not present inside the operation theatre during anaesthesia induction.

The sample size was calculated from a study by Cui *et al.*,^[2] who reported the correlation between the study parameters (m-YPAS and STAI) as 0.297 in preschool children (2–5 years of age). Considering this for sample size calculation, we estimated the sample size to be 126 at a 95% confidence interval (CI), 90% power, and 10% contingency for dropouts. Statistical analysis was done using Statistical Package for the Social Sciences statistics software version 23.0 (IBM Corp, Armonk, NY, USA) statistical software. Descriptive

statistics were computed for the demographic and clinical characteristics of the sample. The normality of the data was checked by the Kolmogorov–Smirnov test of normality, and data was found not to be normally distributed. All qualitative variables were presented as percentages or ratios and analysed using the Chi-square test. Children's and parents' age and anxiety scores (m-YPAS and STAI scores) are expressed as median [interquartile range (IQR)]. Mann–Whitney *U* test was used to find factors that affect m-YPAS and STAI scores. Spearman's correlation analysis was used to examine the relationship between children's anxiety and the anxiety of their parents. *P* values less than 0.05 were considered statistically significant.

RESULTS

Of the 162 children undergoing elective surgery, 150 were included in the study and their data was analysed [Figure 1]. The sociodemographic data of the study participants and their parents is shown in Table 1. Parents' median STAI-state (anxiety on the day of surgery) anxiety scores were found to be greater than STAI-trait (parents' normal anxiety levels) anxiety scores [Table 2]. There was a strong positive correlation between children's m-YPAS anxiety scores and their parents' STAI-state anxiety scores ($r = 0.545$, $P = 0.001$) [Figure 2a]. There was no correlation between children's m-YPAS and parents' STAI-trait

anxiety scores ($r = 0.109$, $P = 0.184$) [Figure 2b]. A statistically significant positive correlation was also observed between parents' STAI-state and STAI-trait anxiety scores ($r = 0.366$, $P < 0.001$) [Figure 2c].

Our findings indicate that the area of residence, type of surgery and previous hospitalisation significantly influence anxiety levels in children. In contrast, the gender of the child did not have any impact on the child's anxiety [Table 3]. Children residing in urban areas had significantly higher anxiety levels when compared to children residing in rural areas. Children undergoing major surgeries had higher anxiety levels compared to children undergoing minor surgeries ($P < 0.001$). Children with a history of previous hospitalisation had higher anxiety levels compared to children with no history of previous hospitalisation, but the difference was not statistically significant. The child's age had a negative correlation with their anxiety (m-YPAS). Younger children had significantly more anxiety compared to older children ($r = -0.494$, $P < 0.001$).

Table 1: Demographic characteristics of children and their parents

Variables	Number (n=150)	Percentage
Age of child (years) [median (IQR)]	4 (2–7)	
Child's gender: male/female	113/37	75.3/24.7
Child's birth order 1 st /2 nd /3 rd /4 th	68/70/11/1	45.3/46.7/7.3/0.7
Place of residence		
Rural/urban	132/18	88/12
Previous hospitalisation of child		
Yes/no	55/95	36.7/63.3
Surgery type		
Major/minor	76/74	50.7/49.3
Parents' age (years) [Median (IQR)]	34 (29–40)	
Parents' gender		
Males/female	74/76	49.3/50.7
Age of the parent (years) [mean (SD)]	34.39 (6.12)	
Parents' education level		
Low/medium/high	90/46/14	

Data is represented as the median (interquartile range), mean (standard deviation), or number of patients. IQR=interquartile range, SD=standard deviation, n=number of patients

Table 2: Anxiety scores of parents and their children (n=150)

Anxiety scores	Median (IQR) (range)
Y-PAS score	51.60 (31.60–81.70) (23.30–100)
STAI-state score	50.00 (48.00–54.00) (23.30–100)
STAI-trait score	47.00 (45.00–49.00) (23.30–100)

Data is represented as median (interquartile range) (range). IQR=interquartile range, STAI=State–Trait Anxiety Inventory, Y-PAS=Yale Preoperative Anxiety Scale, n=number of patients

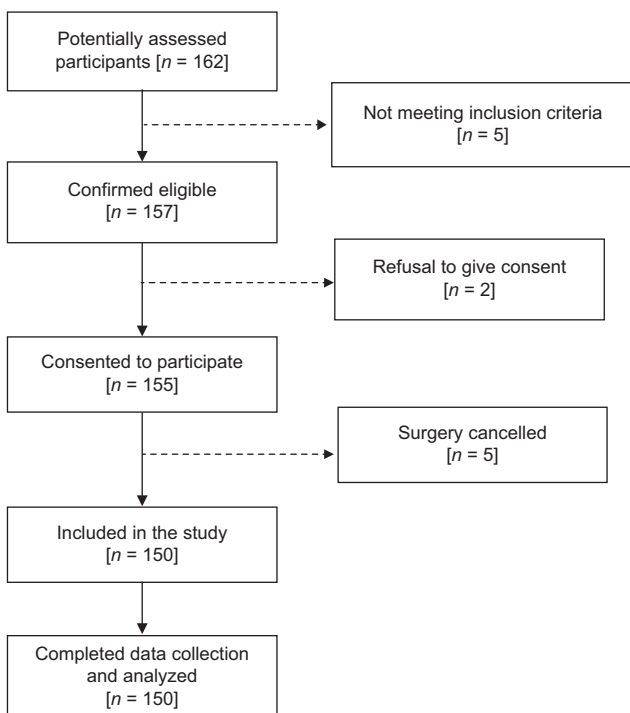


Figure 1: Flow diagram of the participants

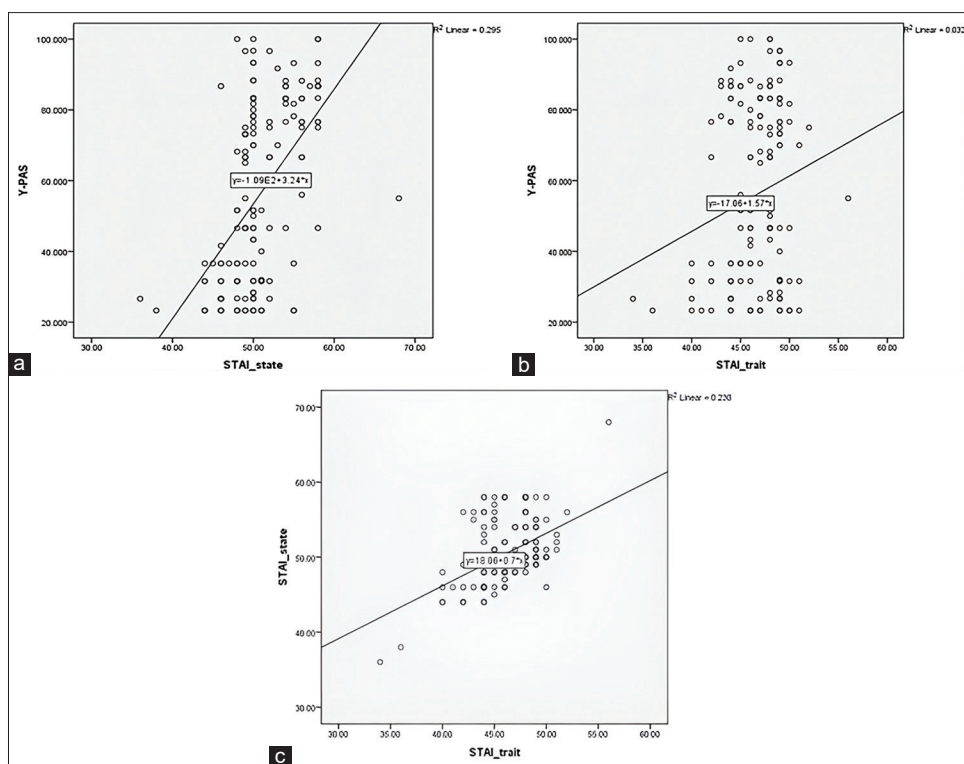


Figure 2: (a) Y-PAS of children and STAI-state of parents. (b) Y-PAS of children and STAI-trait of parents. (c) STAI-state and STAI-trait of parents. STAI = State–Trait Anxiety Inventory, Y-PAS = Yale Preoperative Anxiety Scale

Table 3: Factors affecting child's anxiety and parents' anxiety

Variable	Y-PAS [median (IQR)] (n=150)	P
Gender- male/female	65.00 (30.00–83.20)/46.60 (31.60–72.50)	0.416
Place of residence- rural/urban	46.60 (31.6–77.8)/79.15 (59.95–93.30)	0.006
Previous hospitalisation- yes/no	66.60 (31.60–83.20)/43.30 (28.4–76.60)	0.129
Type of surgery- major/minor	78.25 (68.20–86.70)/31.60 (23.30–37.45)	<0.001
Variable	STAI-state [median (IQR)]	P
Gender of the child- male/female	50.00 (48.00–54.00)/50.00 (48.50–55.50)	0.49
Residence- rural/urban	50.00 (48.00–55.00)/50.00 (50.00–56.00)	0.076
Previous hospitalisation of child- no/yes	50.00 (48.00–55.00)/50.00 (48.00–52.00)	0.205
Parents' gender- male/female	49.00 (47.75–50.00)/52.00 (50.00–56.00)	<0.001
Type of surgery- major/minor	52.00 (50.00–56.00)/49.00 (46.00–50.00)	<0.001
Education of parents		
Low	50.00 (48.00–54.00)	0.764
Medium	50.00 (48.75–52.00)	
High	50.00 (48.75–53.75)	
Child's birth order		
1 st	51.50 (50.00–56.00)	<0.001
2 nd	49.00 (47.75–50.25)	0.001
3 rd	46.00 (44.00–50.00)	

Data is represented as median (interquartile range). IQR=interquartile range, STAI=State–Trait Anxiety Inventory, Y-PAS=Yale Preoperative Anxiety Scale, n=number of patients

Parental anxiety (STAI-state) was also influenced by many factors like the birth order of the child, gender of the parent, previous hospitalisation and type of surgery [Table 3]. Parents of the firstborn child were more anxious than parents of the second child or parents of the third child ($P < 0.001$). Mothers were more anxious compared to fathers ($P < 0.001$). Parents

of children undergoing major surgeries were more anxious than parents whose children underwent minor surgeries ($P < 0.001$). Parents' anxiety (STAI-state) was negatively correlated with their age and also with their child's age. Younger parents were more anxious ($r = -0.427$, $P < 0.001$), and parents of younger children had more anxiety compared to parents of

older children ($r = -0.453$, $P < 0.001$). Factors like the gender of the child, area of residence, education of the parents and previous hospitalisation of the child had no significant influence on parents' anxiety.

DISCUSSION

The present study demonstrated a strong positive correlation between children's m-YPAS anxiety scores and parents' anxiety on the day of surgery (STAI-state). This study showed that younger children, urban children, those undergoing major surgeries and those with a history of previous hospitalisation had higher anxiety levels. Similarly, younger parents, mothers, parents of firstborn children and parents of children undergoing major surgeries had higher anxiety levels.

Surgery can be one of the significant sources of distress among children, resulting in high levels of anxiety. Preoperative anxiety has an impact on the child both physiologically and psychologically.^[10] Preoperative anxiety might lead to increased surgical morbidity by having a negative impact on anaesthesia management by requiring high doses of induction and maintenance anaesthetics, causing delayed recovery time and leading to postoperative delirium. Many factors have been shown to influence preoperative anxiety in children. Parents play a major role in aiding children in coping with their surgeries and anxiety. Our study stresses the influence of parental anxiety on their child's anxiety and various factors influencing children's and parents' anxiety in the Western Indian population.

Our results were similar to those of Cagiran *et al.*,^[5] Malik *et al.*,^[11] and Charana *et al.*,^[12] where it was found that preoperative parental anxiety levels were significantly related to preoperative anxiety in their children. Parents' emotional behaviours have a significant impact on their child's behaviour, as children model their behaviour after that of their parents, explaining the higher anxiety levels in children of anxious parents.

In the present study, we found that younger children had more anxiety compared to older age group children. Our finding is consistent with other similar studies that demonstrated that younger children (<4 years) were associated with higher preoperative anxiety.^[9,12,13] Higher anxiety in younger children can be explained by the theory of Trad, which states that immature defence mechanisms against anxiety occurring in

unfamiliar environments like hospitals are seen in younger children.^[14] Older children who are going to school have a better tendency to overcome separation anxiety.^[15] The effect of a child's previous experience of hospitalisation or surgery on the anxiety levels during subsequent surgery has been studied in a few earlier studies, but with conflicting results, with some studies showing that previous exposure increased the anxiety levels.^[16] In contrast, other studies^[17,18] showed no such effect on anxiety levels. Similar to our results, a study conducted by Charana *et al.*^[12] found that the last hospitalisation created more anxiety among parents, which in turn led to more anxiety in their children.

Our study demonstrated that mothers were more anxious than fathers. This is congruent with the findings reported by Pomicino *et al.*^[14] Such vulnerability of females to anxiety may be due to genetic factors, hormonal influences and sociocultural influences.^[5] The age of the child had a significant influence on the parents' anxiety; the younger the child, the more anxious the parents were.^[19] Due to poor cognitive and communication skills, high dependence on others and a lack of understanding of the tenets of the healthcare system, younger children are more prone to preoperative anxiety, which in turn leads to more anxiety in parents. Parents who had a higher education level had more anxiety, which probably might be due to their detailed knowledge of surgery and its complications. In addition, parents with low educational qualifications had higher anxiety levels, probably due to a poor understanding of the procedure and its consequences.^[7] Our results are in contrast to studies that state that previous hospitalisation has a negative impact on the anxiety of both parents and children.^[20]

Preoperative anxiety in children is multifactorial. Parental anxiety is one of the significant factors contributing to a child's anxiety, as observed in our study. In our study, the preoperative anxiety of most children was high, as anxiety was assessed before premedication and no non-pharmacological measures were used to reduce the child's anxiety. Future studies are required to see the impact of non-pharmacological interventions on decreasing the anxiety of children.

There are a few limitations to the current study. Our current study has recruited patients solely from a specific region, which may limit the generalisability of our findings to a broader population. By implementing

multicentric trials, we can capture the nuances and variations in preoperative anxiety across different geographical areas. This approach allows us to consider the influence of regional factors, such as cultural norms, socioeconomic disparities and healthcare infrastructure, which may significantly impact the experiences of children and their parents. A larger sample size would have allowed for more comprehensive analyses and a more accurate representation of the target population.

CONCLUSION

Parental anxiety has a significant impact on the child's anxiety during the perioperative period. Appropriate interventions should be implemented mainly for the parents to reduce preoperative anxiety. Educating and empowering the parents to manage their anxiety might greatly improve the outcome of the child perioperatively and postoperatively.

Statement on data sharing

De-identified data may be requested with reasonable justification from the authors (email to the corresponding author) and shall be shared after approval as per the authors' institution policy.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

ORCID

Kamlesh Kumari: <https://orcid.org/0000-0001-9877-4095>

Sugandhi Nemani: <https://orcid.org/0000-0002-9886-1145>

Darshana Rathod: <https://orcid.org/0000-0002-4007-0682>

Ankur Sharma: <https://orcid.org/0000-0001-9339-6988>

Pradeep Kumar Bhatia: <https://orcid.org/0000-0001-5082-7151>

Shilpa Goyal: <https://orcid.org/0000-0002-8983-0953>

REFERENCES

- Luengo TD, Rivas AB, Loureiro E, Vargas E. Reducing preoperative anxiety in parents of surgical patients. *Heliyon* 2023;9:e15920. doi: 10.1016/j.heliyon.2023.e15920.
- Cui X, Zhu B, Zhao J, Huang Y, Luo A, Wei J. Parental state anxiety correlates with preoperative anxiety in Chinese preschool children. *J Paediatr Child Health* 2016;52:649-55.
- Stassart C, Dardenne B, Etienne AM. The role of parental anxiety sensitivity and learning experiences in children's anxiety sensitivity. *Br J Dev Psychol* 2017;35:359-75.
- Talabi AO, Sowande OA, Mosaku KS, Owujuyigbe AM, Amosu LO, Adejuyigbe O. Effect of parental presence on anxiety during induction of anaesthesia in children undergoing elective day case surgery. *Ann Pediatr Surg* 2021;17. doi: 10.1186/s43159-021-00106-7.
- Cagiran E, Sergin D, Deniz MN, Tanattu B, Emiroglu N, Alper I. Effects of sociodemographic factors and maternal anxiety on preoperative anxiety in children. *J Int Med Res* 2014;42:572-80.
- Mathew PJ, Gopinath AM, Gupta A, Yaddanapudi S, Panda NB, Kohli A. Assessment of potential predictors affecting preoperative anxiety in Indian children-A prospective observational study. *J Anaesthesiol Clin Pharmacol* 2023;39:279-84.
- Shewangzaw Engda A, Belay Yizaw H, Alemnew Engdaw N, Admasu Basha E, Adem A, Dargie Wubetu A, *et al.* Magnitude of preoperative anxiety and associated factors among adult surgical patients in Debre Berhan comprehensive specialized hospital. *Int J Gen Med* 2022;15:5999-6007.
- Spielberger CD, editor. *Manual for the State-Trait Anxiety Inventory (STAI: Form Y)*. Palo Alto, California: Consulting Psychologists Press; 1983. p. 4-26.
- Kain ZN, Mayes LC, Cicchetti DV, Bagnall AL, Finley JD, Hofstadter MB. The Yale preoperative anxiety scale: How does it compare with a "gold standard"? *Anaesth Analg* 1997;85:783-8.
- Santapuram P, Stone AL, Walden RL, Alexander L. Interventions for parental anxiety in preparation for paediatric surgery: A narrative review. *Children (Basel)* 2021;8:1069. doi: 10.3390/children8111069.
- Malik R, Yaddanpudi S, Panda NB, Kohli A, Mathew PJ. Predictors of preoperative anxiety in Indian children. *Indian J Pediatr* 2018;85:504-9.
- Charana A, Tripsianis G, Matziou V, Vaos G, Iatrou C, Chloropoulou P. Preoperative anxiety in greek children and their parents when presenting for routine surgery. *Anesthesiol Res Pract* 2018;2018:5135203. doi: 10.1155/2018/5135203.
- Getahun AB, Endalew NS, Mersha AT, Admass BA. Magnitude and factors associated with preoperative anxiety among pediatric patients: Cross-sectional study. *Pediatric Health Med Ther* 2020;16:485-94.
- Pomicino L, Maccacari E, Buchini S. Levels of anxiety in parents in the 24 hr before and after their child's surgery: A descriptive study. *J Clin Nurs* 2018;27:278-87.
- Fenikowski D, Tomaszek L. Factors related to anxiety in paediatric patients and their parents before and after a modified ravitch procedure—A single-centre cohort study. *Int J Environ Res Public Health* 2022;19:16701. doi: 10.3390/ijerph192416701.
- Meentken MG, van der Ende J, del Canho R, van Beynum IM, Aenderkerk EW, Legerstee JS, *et al.* Psychological outcomes after pediatric hospitalization: The role of trauma type. *Childrens Health Care* 2021;50:278-92.
- Mustafa MS, Shafique MA, Zaidi SD, Qamber A, Rangwala BS, Ahmed A, *et al.* Preoperative anxiety management in paediatric patients: A systemic review and meta-analysis of randomised controlled trials on the efficacy of distraction techniques. *Front Pediatr* 2024;12:1353508. doi: 10.3389/fped.2024.1353508.
- Delvecchio E, Salcuni S, Lis A, Germani A, Di Riso D. Hospitalized children: Anxiety, coping strategies, and pretend play. *Front Public Health* 2019;7:453734. doi: 10.3389/fpubh.2019.00250.
- Chamberland C, Bransi M, Boivin A, Jacques S, Gagnon J, Tremblay S. The effect of augmented reality on preoperative anxiety in children and adolescents: A randomised controlled trial. *Paediatr Anaesth* 2024;34:153-9.
- Kampouroglou G, Velonaki VS, Pavlopoulou I, Drakou E, Kosmopoulos M, Kouvas N, *et al.* Parental anxiety in paediatric surgery consultations: The role of health literacy and need for information. *J Pediatr Surg* 2020;55:590-6.