MAGNITUDE AND FACTORS ASSOCIATED WITH PREOPERATIVE ANXIETY IN PEDIATRIC ELECTIVE SURGICAL PATIENTS IN TIKUR AMBESSA SPECIALIZED HOSPITAL, ADDIS ABABA ETHIOPIA FROM JULY TO NOVEMBER 2023GC.

By Dr. Matusala berhanu

A research project submitted to the Department of Anaesthesiology, Critical Care and pain medicine/College of Medicine, Addis Ababa University, in Partial Fulfilment for the Requirement of specialty certificate in Anaesthesiology, critical care and Pain Medicine.

Magnitude and factors associated with preoperative anxiety in pediatric elective surgical patients in Tikur Ambessa Specialized Hospital, Addis Ababa, Ethiopia from July to November 2023 GC

By Dr. Matusala berhanu (Anesthesiology, critical care, and pain Medicine year III)

Advisors- Dr. Getachew Giregna (assistant professor in Anaesthesiology, critical care, and pain medicine) and Dr. Rahel Tilahun (cardiothoracic anesthesiologist)

TABLE OF CONTENTS

LIST OF TABLES AND FIGUERS

TABLES

FIGUERS

ABSTRACT

Background

Preoperative anxiety is often described as an uncomfortable, tense unpleasant mood before surgery, an emotional response to a potential challenge or threat to reality (3).it is affected by Several risk factors. Pre-operative anxiety affects millions of pediatric surgery patients each year and can have both short and long-term adverse effects in the postoperative period (2).

Objective

To assess the magnitude and associated factors of preoperative anxiety among elective pediatric surgical patients at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia, 2023.

Methodology

An institution-based cross-sectional study design was employed. A single population proportion formula is used to determine the sample size. The total sample size is 161. A structured data collection format was used to collect data from the patients and their records, after taking verbal consent by trained data collectors. The data was entered, polished, and analysed using SPSS version 27. Bivariate and multivariate logistic regressions were used to describe an association between independent and dependent variables. P value less than 0.05 was considered statistically significant.

Results

From a total of 161 samples, the research finding showed that 101(62.7%) of children had anxiety in the operating room before the induction of general anesthesia. younger age and parental anxiety were found to be independent risk factors for preoperative anxiety in children.

Conclusion

The magnitude of pediatric preoperative anxiety was found to be high in our study. This reflects substantial effort is needed in identifying pediatric patients at high risk for developing preoperative anxiety as well as in assessing and managing the problem.

ACKNOWLEDGMENT

Firstly, I would like to express my deepest gratitude to the Department of Anaesthesiology, Critical Care, and Pain Medicine for giving me the golden opportunity to do this research on the topic of Magnitude and factors associated with preoperative anxiety in pediatric surgical patients at tikur ambessa specialized hospital.

I would also like to thank my research advisors Dr Rahel Tilahun and Dr Getachew Giregna for their continuous guidance and support.

ABBREVIATIONS

AAU- Addis Ababa University

AOR- adjusted odds ratio

ACCPM- anaesthesiology, critical care and pain medicine

ASA- American society of anaesthesiology

CI- confidence interval

COR- crude odds ratio

FLACC- face, leg, activity, cry and consolability

SPSS- Statistical package for the social science

mYPAS- modified Yale Preoperative Anxiety scale

mYPAS-SF- modified Yale preoperative anxiety scale short form

STAI- The Spielberger State-Trait Anxiety Inventory

TASH- Tikur Ambessa Specialized Hospital

PI- principal investigator

1-INTRODUCTION

1.1 BACKGROUND

Preoperative anxiety is often described as an uncomfortable, tense unpleasant mood before surgery, an emotional response to a potential challenge or threat to reality (3).

Pre-operative anxiety affects millions of pediatric surgery patients each year and can have both short and long-term adverse effects in the postoperative period (2). Preoperative anxiety is more common in children because of their lower cognitive capacities and more reliance on others (6). One estimate suggests that 60% of children experience significant anxiety before anesthesia induction and surgery, and literature from around the world indicates that preoperative anxiety is a global concern for health care (4).

The risk factors for preoperative anxiety are excessive parental anxiety (7), high operative pain, unfamiliar hospital environment, uncertainty about the outcome of the intervention, redo-surgery, parental detachment, stranger anxiety, and previous unpleasant experiences from the hospital. Parents having low coping and less self-efficacy carry high preoperative anxiety in infants and toddlers (8).

Preoperative anxiety (anxiety regarding the impending surgical experience) in children is a common phenomenon that has been associated with several negative behaviors during the surgery experience (e.g., agitation, crying, spontaneous urination, and the need for physical restraint during anesthetic induction). Preoperative anxiety has also been associated with the display of several maladaptive behaviors post-surgery, including postoperative pain, sleeping disturbances, parent-child conflict, and separation anxiety (13).

Children's behavior in the preoperative and operating rooms was evaluated using the modified Yale Preoperative Anxiety Scale (m-YPAS). Kain et al.-developed behavioral checklists meant to gauge young children's levels of anxiety. The questionnaire comprises 22 elements categorized into 5 groups: vocalization, activity, emotional expressivity, arousal level, and usage of parents. The patient's behavior determines the score for each category, which ranges from 0 to 4 (6 for vocalization). Children's anxiety during the induction of anesthesia and in the preoperative holding area can be measured using this scale, which has good to outstanding reliability and validity (9)

The Spielberger State-Trait Anxiety Inventory (STAI) is used to evaluate parent’s anxiety. This is a self-report anxiety behavioural instrument which consists of two separate twenty-item subscales. The first—STAI-trait subscale—measures baseline anxiety in adults while the second subscale—STAI-state—measures situational anxiety. The STAI has a total score of 20–80 in each subscale, based on a 4-point Likert scale (1 = almost never to 4 = nearly usually). An increased level of anxiousness is indicated by higher scores (18).

1.2 PROBLEM STATEMENT

An important but little-reported issue in children is preoperative anxiety. Parents and healthcare experts cannot understand the level of worry that a youngster experiences. It is also possible for parents' anxiety to affect their kids. Poor perioperative outcomes occur when anxiety persists during the preoperative phase (10).

Preoperative anxiety is a common occurrence among children undergoing surgery and can result in adverse physiological and psychological reactions. Children with high levels of preoperative anxiety are more likely to exhibit signs of emergence delirium and to develop maladaptive behavioural changes postoperatively. These children also present with more postoperative pain and require more pain control medication (11).

It is important for anaesthesiologists to appreciate the impact of preoperative anxiety in children. Not only does it put a lot of kids through agony before they have surgery, but it also affects how poorly they heal from the procedure and sometimes even long after. These worries mean that more research is necessary to find strategies for easing their anxieties during perioperative care (4).

In the US, more than 5 million youngsters need surgery each year. Between 50% and 75% of those 5 million kids had significant anxiety and worry prior to surgery (12).

In a study that aimed to determine the magnitude of preoperative anxiety and associated factors in pediatrics patients at the University of Gondar Comprehensive Specialized Hospital Northwest Ethiopia 2020, The magnitude of preoperative anxiety in children in the operation room was 75.44% (14).

To develop effective anxiety reliving interventions and techniques there is an important need to understand the magnitude of the problem and the different factors that contribute to its development in our setup.

1.3 RATIONALE OF THE STUDY

Different research done globally and also one study done in our country showed high prevalence of preoperative anxiety in children. prevalence of preoperative anxiety ranged from 29.9% at a preoperative holding room in Chile to 95% during induction in a study done in India (15,17).

The presence of pre-operative anxiety has a strong impact on post-operative outcomes, with multiple studies showing that between 50 and 74% of children with pre-operative anxiety exhibit post-operative behavior changes. Paediatric surgery patients with lower pre-operative anxiety tend to recover more quickly, while those with heightened preoperative anxiety have an increased possibility of negative psychological, physical, and behavioural consequences (2). Coping with this preoperative stress requires consistent communication between the child, the parents, and all health care providers involved in the perioperative period (16).

Although there are different studies done on preoperative anxiety in children worldwide Apart from a study conducted at Gondar hospital, Ethiopia there are no research done on this problem in other regions of the country or in Africa.

This study will be conducted to assess incidence and associated factors of preoperative anxiety among pediatric elective surgical patients at Tikur Anbessa Specialized Hospital and will add evidence on the burden of preoperative anxiety in children along with its associated factors and encourage the department of ACCPM to perform a quality improvement project on this problem with the support of policies that lead to better preoperative anxiety management from officials and Ministry of Health.

2-LITREATURE REVIEW

The perioperative period is a stressful situation producing fear and anxiety in children who face surgery. Although anxiety is an adaptative response to this stressful period, the high rate observed in children is a cause for concern for both parents and anaesthesiologists. Preoperative anxiety in children might be associated with behavioural disorders, such as irritability, nighttime fears and enuresis lasting up to several weeks after the surgery. The identification of risk factors associated with preoperative anxiety would be useful to predict and prevent anxiety in children undergoing surgery (15).

However, during preparations for surgery, they are exposed to stressful events like the admissions procedure, getting blood drawn, getting shots, or getting other medications given to them. Perioperative nurses have difficulties when attempting to transfer clinging children to the operating room (OR). The children's stress levels persist during this process, during induction, and when they awaken in the post-anaesthesia care unit (PACU) prior to their parents' arrival (16).

Up to 75% of paediatric surgery patients have been shown to exhibit preoperative anxiety, which usually peaks during the induction of anaesthesia on the day of operation. Owing to their developmental stage, children frequently express their feelings through behaviour rather than words. This frequently leads to acts of aggressiveness, disobedience, retreat, and regression in cases of pre-operative worry. Children may exhibit heightened muscle tone, urinate on their own initiative, and try to flee from the medical personnel. Consequently, in about 25% of instances involving paediatric surgery, physical restraint to keep the kid down is necessary during the induction of anaesthesia, which has been demonstrated to raise stress levels for both the child and medical staff (2).

Variables, which influence preoperative anxiety in children, include their age, temperament, prior hospital experience and parent coping abilities (5).

Younger children (those under the age of 6 years old) are often anxious about separation from their parents, while older children have anxiety about the pain and mutilation that they associate with surgery. children who are shy or have a high IQ coupled with poor adaptive abilities are at increased risk for pre-operative anxiety, as are those whose parents have high anxiety. For adolescents, baseline anxiety, depression, somatization tendencies, and a fearful temperament are significant predictors of pre-operative anxiety (2).

Contradictory research, however, has produced mixed results. While some studies indicate that gender has no bearing on pre-operative anxiety levels or the development of unfavourable post-operative behaviours, other studies declare that males or other females are more vulnerable. While some studies contradict one another and find no difference, others discovered that post-operative behavioral difficulties in younger children occur more frequently and stay longer. It's interesting to note that discomfort during induction of anesthesia has been demonstrated to be age-insensitive, suggesting that anxiety can be induced during anesthesia induction regardless of cognitive capacity.

Contrary to what some research suggests, pre-operative anxiety may be increased by bad recollections of prior hospital stays as well as pediatrician or dental appointments that can last into adolescence (2).

The preoperative anxiety of children in the paediatric surgery department, ages 2 to 7, was examined in a study conducted in China. 220 children in the tertiary hospital had a preoperative anxiety rate of 67.6%. Preoperative anxiety was less common in children in the research who attended elementary school and were highly compliant. A higher risk of preoperative anxiety was seen in children who were extremely resistant, yelled out in pain, twisted during a needle puncture, and whose parents were excessively concerned (1).

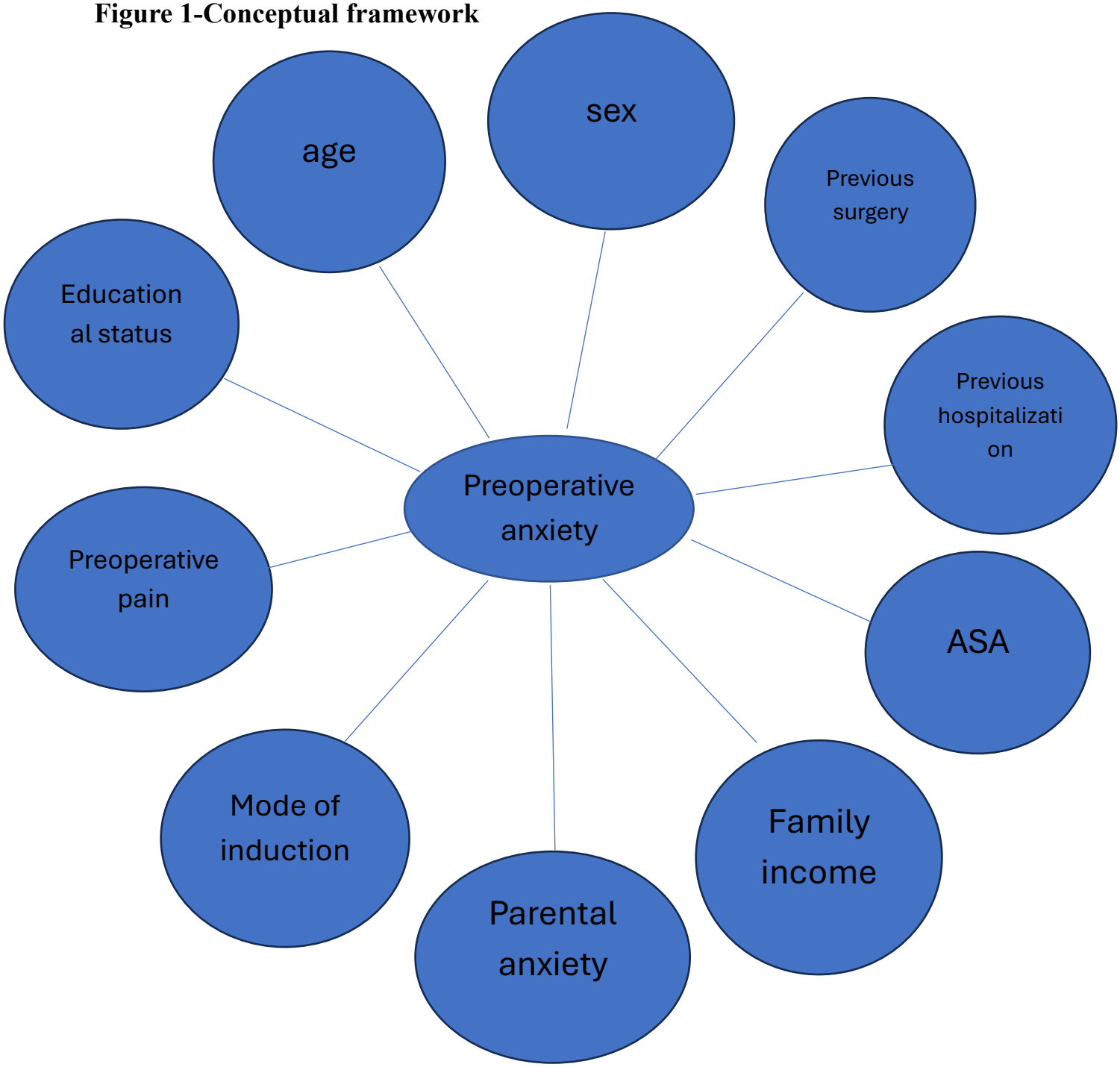
In a prospective observational study done in 60 children aged 7 to 12yrs in India the incidence of high anxiety escalated from pre-operative time (48%) to the time of parental separation (72%) and increased further at anaesthetic induction (95%). Parental anxiety and socioeconomic background were significant predictors of the child's pre-operative anxiety (17).

in contrast a Greek study done on 128 children with their parents found 38.5 % magnitude of anxiety in children at the preoperative waiting room. The results showed that boy's parents seem to be less anxious than girl's parents while sex does not affect how anxious the children are. Parents with younger children (<5) are displaying a higher level of anxiety than those having older children. The child's level of anxiety is unaffected by its age. Parental anxiety is unaffected by the number of children in the family or the kid's birth order, however patients who were the only child in their family experience noticeably higher levels of worry than those who have siblings. It was discovered to be intriguing that parents' anxiety levels were unaffected by their prior hospital stays, while children who had previously been hospitalised showed a propensity towards greater anxiety. Premedication considerably reduced children's anxiety compared to no premedication. Furthermore, the STAI-state scale revealed that parents who were aware that their kids had gotten midazolam were far less worried than parents whose kids hadn't (18).

in a study done on 204 children aged 2–12 undergoing elective surgery in a Chilean hospital the incidence of children with anxiety was 29.9% in the preoperative holding room and increased to 41.7% in the operating room. The study found no significant association between age and children's anxiety in the operating room. Likewise, no associations were found between incidence of anxiety and gender, ASA classification, previous negative surgical experiences, knowing about scheduled surgery, and surgical setting (outpatient vs. inpatient) or type of surgery. The incidence of parental anxiety was 18.1% in the preoperative holding room and increased significantly to 23.5% in the operating room. When comparing anxiety incidence according to parental gender, no significant differences were observed between mothers and fathers. Average parental age was 35.52 ± 6.8 years, and it was not associated with anxiety nor correlated with the children's mYPAS score in operating room (15).

In a study done on 173 paediatrics patients at the University of Gondar Comprehensive Specialized Hospital Northwest Ethiopia 2020, The magnitude of preoperative anxiety in children in the operation room was 75.44%. Age, previous surgery and anaesthesia, outpatient surgery and parental anxiety were significantly associated with preoperative children anxiety.

Figure 1-Conceptual framework



3- OBJECTIVES

3.1 GENERAL OBJECTIVE

To assess the magnitude and associated factors of preoperative anxiety among elective pediatric surgical patients at Tikur Anbessa specialized Hospital, Addis Ababa, Ethiopia, 2023.

3.2 SPECIFIC OBJECTIVES

To determine the magnitude of preoperative anxiety among elective pediatric surgical patients at Tikur Anbessa specialized Hospital.

To identify factors associated with preoperative anxiety among elective pediatric surgical patients at Tikur Anbessa specialized Hospital

4- METHODS AND MATERIALS

4.1 STUDY DESIGN

An institutional based cross-sectional study

4.2 STUDY PLACE

The study was conducted at Tikur Anbessa Specialized Hospital in Addis Ababa the capital city of Ethiopia. It is one of the biggest hospitals in the country and serves people coming from all areas of the country.

4.3 STUDY PERIOD

From July to November 2023 GC

4.4 POPULATION

4.4.1. Source population

All pediatric patients between the ages of 2 to 12 years who came for elective surgery At the pediatric elective surgery table were included.

4.4.2. Study Population

All selected pediatric patients between the ages of 2 to 12 years who came for elective surgery at the pediatric elective surgery table were included.

4.5 INCLUSION AND EXCLUSION CRITERIA

4.5.1 Inclusion criteria

1) children aged 2 to 12 years undergoing elective surgery

2) the children's guardians or caregivers voluntarily participated in this project and provided informed consent

3) ASA I and II patients

4.5.2 Exclusion criteria

1) children with confirmed developmental delay or mood anxiety disorder

2) children who were administered preoperative sedative drugs

3) children who were asleep during the preoperative monitoring period.

4) Parents refusal of the study

5) ASA III and IV patients

4.6 SAMPLE SIZE DETERMINATION

In a study that aimed to determine the magnitude of preoperative anxiety and associated factors in paediatrics patients at the University of Gondar Comprehensive Specialized Hospital Northwest Ethiopia 2020, The magnitude of preoperative anxiety in children in the operation room was 75.44% (95% confidence interval (CI): 68.36, 81.34) (14).

The sample size was calculated by the following formula:

$$N = \frac{z^2 p(1-\rho)}{D^2}$$

N= Sample size

P= Population proportion (from the previous study=0.7544)

Z = Z value corresponding to a 95% level of significance = 1.96

D= Margin of error (5%)

$$N = \frac{1.96^2 0.7544(1-0.7544)}{0.05^2}$$

N- 285

If the population to be studied in a year is less than 10,000 (finite population) then the next formula, which uses the required sample size we found from the above formula will be applied.

$$n' = \frac{n}{1+\frac{n}{N}}$$

n'- Sample size for finite population

n- The sample size required if the population would have been more than 10,000.

N- The estimated population size (estimated number of elective pediatric cases done in the first six months of the year 2023 GC in TASH was 300).

$$n' = \frac{285}{1+\frac{285}{300}}$$

n'= 146

considering 10% nonresponse rate sample size studied are 161.

4.7 SAMPLING PROCEDURE

Study participants were selected from the daily surgical list of pediatric patients scheduled for elective surgery using a systematic randomization technique using skip intervals.

4.8. DATA COLLECTION PROCEDURE

The data was collected by the principal investigator and ACCPM residents assigned to elective operation theatre through a structured questionnaire.

mYPAS was used to assess the state of anxiety of the children inside the preoperative waiting room. The mYPAS-SF was used at the next time points, which are the times patients entered the operating room and during the anaesthesia induction period. The Spielberger short version state-trait anxiety inventory (STAI) translated into Amharic was used to evaluate parents' situational anxiety. The data was checked for completeness every day after collecting questionnaire papers.

4.9 DATA ANALYSIS PROCEDURE

After the data collection and completeness were confirmed, it was entered into the SPSS version 27. Data cleaning was performed to check for outliers, missed values, and any inconsistencies before the data were analyzed using the software.

4.10 DATA QUALITY ASSURANCE

Data collectors received short training on data collection procedures prior to their engagement. The completeness and consistency of the research was supervised by the principal investigator during the data collection process.

4.11 STUDY VARIABLES

4.11.1. Dependent variables

Preoperative anxiety in children

4.11.2. Independent variables

- Age
- Sex

- ASA
- previous surgery and anesthesia
- previous hospitalization
- preoperative pain
- mode of induction
- educational status
- parental anxiety
- family income

4.12 OPERATIONAL DEFINITION

Preoperative anxiety- a score of greater than 30 in the modified Yale preoperative anxiety scale.

Parental anxiety- STAI score of greater than or equal to 44.

Pain – a score other than zero when using an age-appropriate pain rating scale(FLACC scale for 2yrs up to 7yrs, Wong-Baker for children older than 3yrs, numeric pain rating scale for those older than 8yrs)

ASA Physical status: a grading system used preoperatively to compare the severity of pre-existing comorbidities in patients coming to surgery

• ASAI**:** A normal healthy patient

• ASAII**:** A patient with mild systemic disease that results in no functional impairments

• ASAIII**:** A patient with severe systemic disease that results in functional limitations

• ASAIV**:** A patient with severe systemic disease that is a constant threat to life

• ASAV**:** A moribund patient who is not expected to survive with or without the operation

• ASAVI**:** A brain-dead patient whose organs are being removed with the intention of transplanting them into another patient (20).

4.13 ETHICAL CONSIDERATION

Ethical clearance and support letter was obtained from the Anesthesiology, critical care, and pain medicine department, and Chief Clinical and Academic Director Offices.

Verbal informed consent was taken from respondents after an explanation was given on the objective, procedure, potential risks and benefits of participating in the study, and the right to withdraw from the study at any time throughout their interview.

Study participants were assured about their information confidentiality by removing personal identifications and instead codes were used to avoid sharing their information with anyone.

4.14 RESULT DISSEMINATION PLAN

The result of the study will be submitted to the AAU School of Medicine, department of Anesthesiology and critical care, AAU school of pharmacy, Addis Ababa health bureau and FMOH. In addition to this, the findings will also be presented and disseminated to other concerned stakeholders through presentations at different professional conferences. Finally, the manuscript will be submitted to a peer-reviewed scientific journal for possible publication.

5 – RESULT

5.1. SOCIODEMOGRAPHIC VARIABLES

From a total of 161 samples of elective pediatric surgical patients who underwent surgical operations under general anesthesia, majority of the children were in the age range of 2-6 years (70.8%) and were males (67.1%). A larger proportion of children were not yet enrolled in schools (49.7%) and came from rural areas (69.6%) (table 1).

Table 1- sociodemographic profile of pediatric elective surgical patients at AAU, TASH (n=161)

Variable	Category	frequency	Percent (%)
Age	2-6 years 7-12 years	114 47	70.8 29.2
Sex	Male Female	108 53	67.1 32.9
Level of education	Did not attend school Kindergarten Elementary school	80 44 37	49.7 27.3 23
Birth order	First second third and above	62 72 27	38.5 44.7 16.8
Residency	Rural Urban	112 49	69.6 30.4
Parent level of education	No formal education Primary (up to grade 8) High school (9 to 12) College and above	12 27 63 59	7.5 16.8 39.1 36.6
Annual parent income	No income More than 15,000ETB Less than 15,000ETB	4 145 12	2.5 90.1 7.5

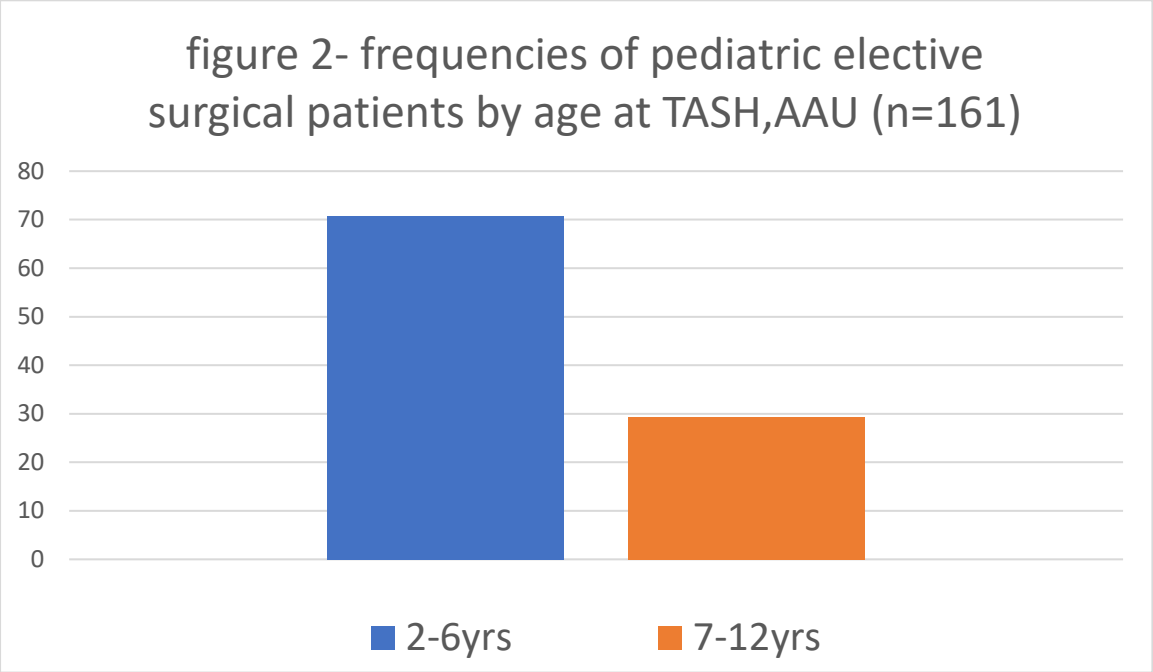


figure 2- frequencies of pediatric elective surgical patients by age at TASH,AAU (n=161)
80
70
60
50
40
30
20
10
0
2-6yrs
7-12yrs

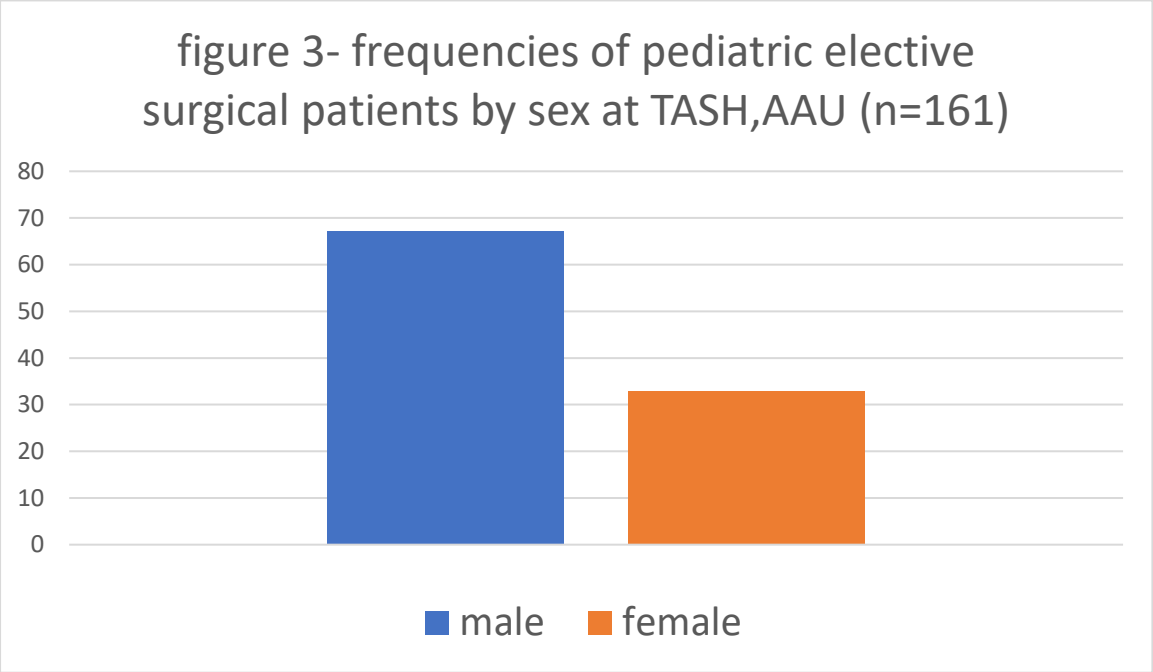


figure 3- frequencies of pediatric elective surgical patients by sex at TASH,AAU (n=161)
80
70
60
50
40
30
20
10
0
male
female

5.2. MAGNITUDE OF PREOPERATIVE ANXIETY

The research finding showed that 101(62.7%) of children had anxiety in the operating room before the induction of general anesthesia (figure 4).

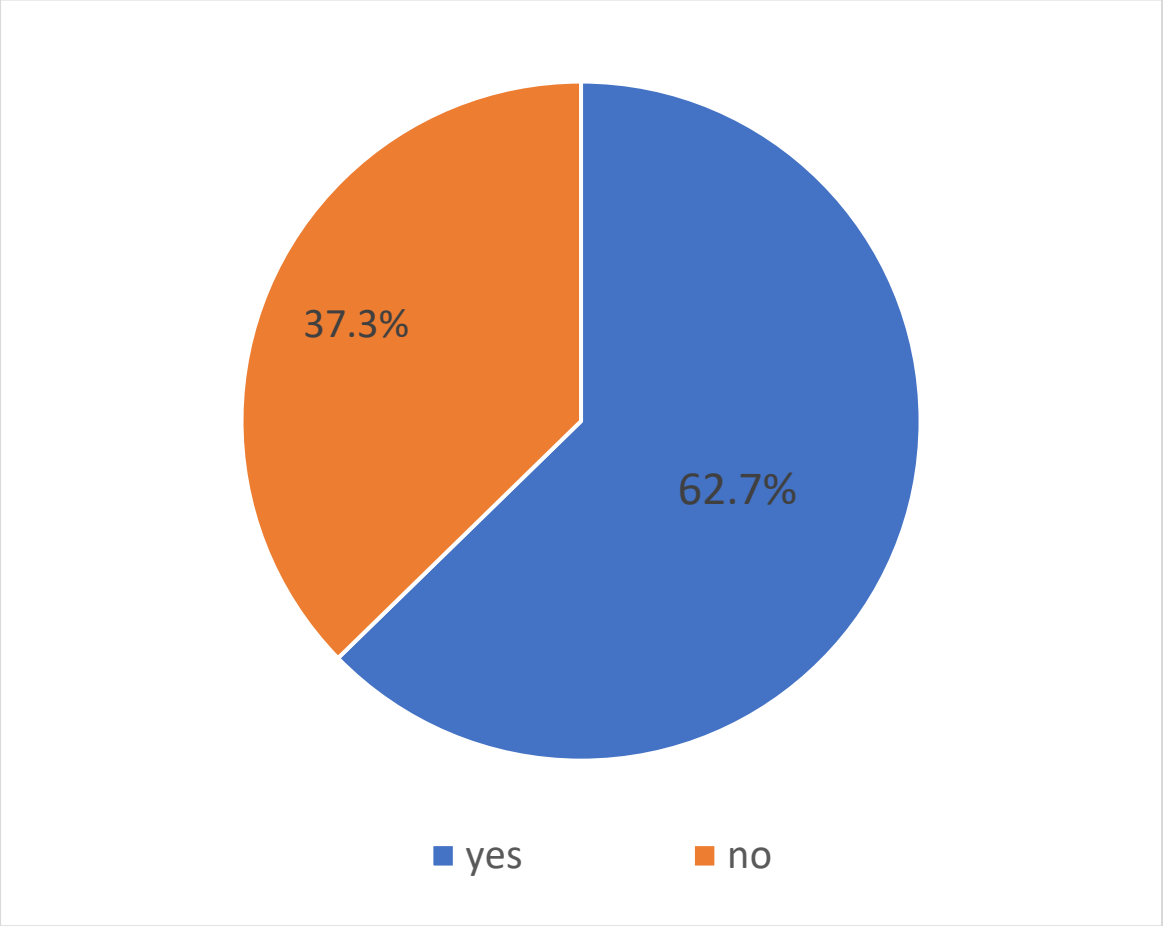


Figure 4- magnitude of preoperative pediatric anxiety among study participants Who underwent elective surgery at AAU, TASH (n=161)

5.3. PREOPERATIVE ANXIETY AND ASSOCIATED FACTORS

The majority of children who had preoperative anxiety 86 (75.4%) were in the age range of 2-6 years. 37 (69.8%) of patients who had anxiety were females. a majority of patients who are classified as ASA I 84 (77.8%) were anxious. From children who had a history of previous hospital admission and previous anesthesia or surgical experience a large proportion of children were anxious, 56 (72.7%) and 50 (74.6%) respectively. Most of the children whose parents experienced anxiety 76 (71.0%) were also anxious (table 2).

Table 2- preoperative anxiety and associated factors among elective pediatric patients at AAU, TASH (n=161)

variables	Category	frequency (%)	Anxious (%)
Age	2-6 years 7-12 years	114 (70.8) 47 (29.2)	86 (75.4) 15 (31.9)
Sex	Male Female	108 (67.1) 53 (32.9)	64 (59.3) 37 (69.8)
ASA class	ASA I ASA II	108 (67.1) 53 (32.9)	84 (77.8) 17 (32.1)
Previous hospital admission	Yes No	77 (47.8) 84 (52.2)	56 (72.7) 45 (53.6)
Previous anesthesia or surgery	Yes No	67 (41.6) 94 (58.4)	50 (74.6) 51 (54.3)
Preoperative pain	Yes No	23 (14.3) 138 (85.7)	13 (56.5) 88 (63.8)
Mode of anesthesia induction	Intravenous inhalational	120 (74.5) 41 (25.5)	80 (66.7) 21 (51.2)
Type of operation	General Urology ENT Other	30 (18.6) 65 (40.4) 23 (14.3) 43 (26.7)	18 (60.0) 42 (64.6) 10 (43.5) 31 (72.1)
Parental anxiety	Yes No	107 (66.5) 54 (33.5)	76 (71.0) 25 (46.3)

5.4. FACTORS ASSOCIATED WITH PREOPERATIVE CHILDREN ANXIETY IN BINARY LOGISTIC REGRESSION

In the bivariable logistic regression analysis age, sex, ASA class, previous hospital admission, previous anesthesia or surgery, mode of induction and parental anxiety showed association with preoperative anxiety in children with P-values less than 0.25 (table 3). However, in the multivariable binary logistic regression analysis, only age and parental anxiety showed a significant association with children's preoperative anxiety with P-values less than 0.05 (table 4)**.**

Table 3 - factors associated with preoperative children anxiety in bivariable logistic regression analysis (n=161).

Variables	**category**	**Anxiety status**		**COR (95% CI)**	**P VALUE**
		Yes (%)	**no (%)**		
Age	2-6 years 7-12 years	86 (75.4) 15 (31.9)	28 (24.6) 32 (68.1)	6.552(3.104,13.830) 1	< 0.001
Sex	Male Female	64 (59.3) 37 (69.8)	44 (40.7) 16 (30.2)	1 1.590(0.789,3.204)	0.195
ASA class	ASA I ASA II	84 (77.8) 17 (32.1)	24 (22.2) 36 (67.9)	1 0.135(0.065,0.281)	< 0.001
Previous hospital admission	Yes No	56 (72.7) 45 (53.6)	21 (27.3) 39 (46.4)	2.311(1.195,4.471) 1	0.013
Previous anesthesia or surgery	Yes No	50 (74.6) 51 (54.3)	17 (25.4) 43 (45.7)	2.480(1.252,4.913) 1	0.009
Mode of induction	Intravenous inhalational	80 (66.7) 21 (51.2)	40 (33.3) 20 (48.8)	0.525(0.255,1.079)	0.080
Parental anxiety	Yes No	76 (71.0) 25 (46.3)	17 (25.4) 43 (45.7)	2.844(1.443,5.606)	0.003

The odds of being anxious in the operation room among children aged 2–6 years was (AOR: 3.017; 95% CI: 1.207,7.540) times higher as compared to children who were aged 7–12 years. The odds of being anxious in the operation room among children who had anxious parents was (AOR: 2.690; 95% CI: 1.131,6.398) times higher as compared to children whose parents were not anxious (table 4).

Table 4- factors associated with preoperative children anxiety in multivariable binary logistic regression analysis at TASH,AAU (n=161)

Variables	**category**	**Anxiety status**		**AOR (95% CI)**	**P VALUE**
		Yes (%)	**no (%)**		
Age	2-6 years 7-12 years	86 (75.4) 15 (31.9)	28 (24.6) 32 (68.1)	**3.017(1.207,7.540) *** 1	**0.018**
Sex	Male Female	64 (59.3) 37 (69.8)	44 (40.7) 16 (30.2)	1 2.295(0.866,6.081)	0.095
ASA class	ASA I ASA II	84 (77.8) 17 (32.1)	24 (22.2) 36 (67.9)	1 0.533(0.172,1.656)	0.277
Previous hospital admission	Yes No	56 (72.7) 45 (53.6)	21 (27.3) 39 (46.4)	1.285(0.499,3.306) 1	0.603
Previous anesthesia or surgery	Yes No	50 (74.6) 51 (54.3)	17 (25.4) 43 (45.7)	1.324(0.502,3.492) 1	0.570
Mode of induction	Intravenous inhalational	80 (66.7) 21 (51.2)	40 (33.3) 20 (48.8)	1 0.661(0.251,1.741)	0.402
Parental anxiety	Yes No	76 (71.0) 25 (46.3)	17 (25.4) 43 (45.7)	**2.690(1.131,6.398) *** 1	**0.025**

* Significant association

6-DISCUSSION

This study wanted to assess the magnitude and associated factors of preoperative anxiety among elective pediatric surgical patients at black lion comprehensive specialized hospital from July to November 2023 GC. Younger age and parental anxiety were the independent risk factors for preoperative children's anxiety. The study also revealed that 62.7% of children had anxiety in the operating room before the induction of anesthesia.

67 children with age ranges of 2-6 years were involved in the study done in Portugal and found that 13.4% of children were anxious in the preoperative holding area which increased to 35.8% in the operation room during induction of anesthesia, significantly lower than our finding. Parents were allowed to accompany their children until the start of anesthetic induction and children were allowed to bring their video games and also other distraction methods were used at the operation room waiting area (22). Parents were also allowed to be present at induction of anesthesia in studies done in Chile and Australia which revealed preoperative children anxiety levels 0f 41.7% and 50.2% respectively (15,22), which is lower than our study finding.

A randomized trial was done on the effect of two techniques of parental interaction on children's anxiety at induction of anesthesia in a hospital in Pakistan and it concluded that Children exhibited lower anxiety during anesthesia induction in the OR when accompanied by one of the parents compared to children who were not accompanied by parents (25). a Systematic Review done on Audiovisual Interventions for Reducing Preoperative Anxiety in Children Undergoing Elective Surgery concluded that audiovisual interventions can be effective in reducing children's preoperative anxiety (26). this could explain the significant decrease in the magnitude of preoperative children's anxiety in the above studies compared to our study because, in our institution, parents are not allowed to enter the operating room past the waiting area to accompany their child until induction of general anesthesia and audiovisual, play, and other anxiety relieving methods in waiting areas and operating rooms are also suboptimal in our setup.

In a study done in Brazil on 210 children with age ranges of 5-12 years, the prevalence of preoperative anxiety was found to be 42%.our study finding is significantly higher than this study which could be explained by the inclusion of younger ages in our study.

Compared to the research done in Ethiopia, Gonder specialized hospital which found an incidence of pediatric preoperative anxiety of 75.4% our study has lower incidence. This difference could be due to the inclusion of a larger number of outpatients.

This study showed that younger age children 2-6 years had higher odds of being anxious when compared to older age children 7-12 years. This finding is similar to studies done in Brazil and Korea (24,27). Children between the ages of 1 and 5 years are at greatest risk for developing extreme anxiety and distress. This is not surprising because separation anxiety often does not peak until 1 year of age and children older than 5 years can more easily cope with new situations (7). On the contrary, some studies found no association between age and child preoperative anxiety (15,18).

This study also showed that children with anxious parents have higher odds of having preoperative anxiety than children whose parents are not anxious. A significant positive correlation was observed between self-reported parental anxiety in the preoperative holding room and children's anxiety in the operating room (15). High parental anxiety is associated with child preoperative anxiety (18). Because children of anxious parents are more likely to experience high levels of preoperative anxiety, it is important to identify the predictors of increased parental preoperative anxiety (28).

7-STRENGTH AND LIMITATION OF THE STUDY

The study used a validated tool that has good inter-observer and intra-observer reliability and excellent internal validity.it has adequate sample size and clearly addressed its main objectives.it could also help as an input for future research.

Since the study is cross-sectional, it is difficult to establish the cause-and-effect relationship. This study was conducted in a single government Tertiary hospital in Addis Ababa which could limit its generalizability. Many risk factors have been identified in several studies and the results are at times contradictory. The factors related to anxiety are multiple ranging from preoperative physician interaction with child and parents to induction of general anesthesia and may be interrelated. Because of this complex nature, potential risk factors can be best determined from very large studies, which record many potentially confounding variables and have a well-defined outcome measure.

8-CONCLUSION

The magnitude of pediatric preoperative anxiety was found to be high in our study. younger age and parental anxiety were found to be independent risk factors for preoperative anxiety in children.

9-RECOMMENDATION

Perioperative clinicians should be aware of risk factors that put pediatric patient at risk of preoperative anxiety and give emphasis to the appropriate assessment and management of preoperative anxiety in children starting from the clinician's preoperative visit to the child and parents up to the induction of anesthesia. Developing hospital guidelines for the assessment and management of preoperative anxiety in children is also important.

REFERENCES

1. Liang Y, Huang W, Hu X, Jiang M, Liu T, Yue H, Li X. Preoperative anxiety in children aged 2–7 years old: a cross-sectional analysis of the associated risk factors. Transl Pediatr 2021;10(8):2024-2034. Doi: 10.21037/tp-21-215
2. Fronk, E., Billick, S.B. Pre-operative Anxiety in Pediatric Surgery Patients: Multiple Case Study Analysis with Literature Review. *Psychiatr Q* **91**, 1439–1451 (2020). https://doi.org/10.1007/s11126-020-09780-z
3. Preoperative Anxiety's Incidence and Related Factors in Surgical Patients Jin-Dong Liu, Xuzhou Medical University
4. Ahmed MI, Farrell MA, Parrish K, Karla A. Preoperative anxiety in children risk factors and non-pharmacological management. Middle East J Anaesthesiol. 2011 Jun;21(2):153-64. PMID: 22435267.
5. dreger, V. A., & Tremback, T. F. (2006). *Management of preoperative anxiety in children. AORN Journal, 84(5), 777–804.* doi:10.1016/s0001-2092(06)63965-3
6. Lee, J.H.; Jung, H.K.; Lee, G.G.; Kim, H.Y.; Park, S.G.; Woo, S.C. Effect of behavioral intervention using a smartphone application for preoperative anxiety in pediatric patients. Korean J. Anesthesiol. 2013, 65, 508–518. [Google Scholar] [CrossRef] [PubMed]
7. Kain ZN, Mayes LC, Weisman SJ, Hofstadter MB. Social adaptability, cognitive abilities, and other predictors for children's reactions to surgery. J Clin Anesth. 2000 Nov;12(7):549-54. doi: 10.1016/s0952-8180(00)00214-2. PMID: 11137417.
8. Rosenberg RE, Clark RA, Chibbaro P, Hambrick HR, Bruzzese JM, Feudtner C, Mendelsohn A. Factors Predicting Parent Anxiety Around Infant and Toddler Postoperative and Pain. Hosp Pediatr. 2017 Jun;7(6):313-319. doi: 10.1542/hpeds.2016-0166. Epub 2017 May 16. PMID: 28512138; PMCID: PMC5469249.
9. 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"? Anesth Analg. 1997 Oct;85(4):783-8. doi: 10.1097/00000539-199710000-00012. PMID: 9322455.
10. Das S, Kumar A (2017) Preoperative Anxiety in Pediatric Age Group- A Brief Communication. J Anesth Crit Care Open Access 8(5): 00317. DOI: 10.15406/jaccoa.2017.08.00317
11. MacLaren JE, Thompson C, Weinberg M, Fortier MA, Morrison DE, Perret D, Kain ZN. Prediction of preoperative anxiety in children: who is most accurate? Anesth Analg. 2009 Jun;108(6):1777-82. doi: 10.1213/ane.0b013e31819e74de. PMID: 19448201; PMCID: PMC2717023.
12. Perry JN, Hooper VD, Masiongale J. Reduction of preoperative anxiety in pediatric surgery patients using age-appropriate teaching interventions. J Perianesth Nurs. 2012;27(2):69–81. doi:10.1016/j. jopan.2012.01.003
13. Wright KD, Stewart SH, Finley GA, Buffett-Jerrott SE. Prevention and intervention strategies to alleviate preoperative anxiety in children: a critical review. Behav Modif. 2007 Jan;31(1):52-79. doi: 10.1177/0145445506295055. PMID: 17179531.
14. Magnitude and Factors Associated with Preoperative Anxiety Among Pediatric Patients: Cross-Sectional Study Amare Belete, Getahun Nigussie, Simeneh Endalew Abraham Tarekegn, Mersha Biruk, Adie Admass Department of Anaesthesia, School

of Medicine, College of Medicine and Health Science, University of Gondar, Gondar, Ethiopia
15. Arze, Santiago; Lagos, Claudio; Ibacache, Mauricio; Zamora, Maximiliano; GonzÃ¡lez, Alejandro (2020). *Incidence and risk factors of preoperative anxiety in Spanish speaking children living in a Spanish speaking country. Pediatric Anaesthesia, pan.13899–.* doi:10.1111/pan.13899
16. Victoria A. Dreger; Thomas F. Tremback (2006). Management of preoperative anxiety in children. , 84(5), 0–804. doi:10.1016/s0001-2092(06)63965-3
17. Malik, Ritu; Yaddanpudi, Sandhya; Panda, Nidhi Bidyut; Kohli, Adarsh; Mathew, Preethy J (2018). Predictors of Pre-operative Anxiety in Indian Children. The Indian Journal of Pediatrics, doi:10.1007/s12098-018-2606-3
18. 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 Jul 2;2018:5135203. doi: 10.1155/2018/5135203. PMID: 30065758; PMCID: PMC6051335.
19. MICHELLE A. FORTIER; ANTONIO M. DEL ROSARIO; SARAH R. MARTIN; ZEEV N. KAIN (2010). Perioperative anxiety in children. , 20(4), 318–322. doi:10.1111/j.1460-9592.2010.03263.x
20. ASA Physical Status Classification System [Internet]. [cited 2023 May 13]. Available from: https://www.asahq.org/standards-and-guidelines/statement-on-asa-physical-status-classification-system
21. Development of a short version of the modified Yale Preoperative Anxiety Scale. https://escholarship.org/uc/item/6335n1tq Journal Anesthesia and analgesia, 119(3) Authors Jenkins, Brooke N Fortier, Michelle A Kaplan, Sherrie H et al. Publication Date 2014-09-01 DOI 10.1213/ane.0000000000000350
22. Rema JP, Cavaleiro C, Pina P, Machado MS (2016) Preoperative Anxiety in Preschool Children-Observational Study. J Anesth Clin Res 1: 669. doi:10.4172/2155-6148.1000669
23. Davidson AJ, Shrivastava PP, Jamsen K, et al. Risk factors for anxiety at induction of anesthesia in children: a prospective cohort study. Pediatr Anes. 2006;16(9):919–927. doi:10.1111/j.1460-9592.2006.01904.x
24. Moura L, Dias IMG, Pereira LV. Prevalence, and factors associated with preoperative anxiety in children aged 5–12 years. Rev Lat Am Enfermagem. 2016;24.
25. Hussain A, Khan FA. Effect of two techniques of parental interaction on children's anxiety at induction of general anaesthesia-a randomized trial. Turk J Anaesthesiol Reanim. 2018;46(4):305–310. doi:10.5152/TJAR.2018.6675030140538
26. Chow CH, Van Lieshout RJ, Schmidt LA, Dobson KG, Buckley N. Systematic review: audiovisual interventions for reducing preoperative anxiety in children undergoing elective surgery. *J Pediatr Psychol*. 2015;41(2):182–203. doi:10.1093/jpepsy/jsv09426476281
27. Kim J, Jo B, Oh H, Choi H, Lee Y. High anxiety, young age and long waits increase the need for preoperative sedatives in children. J Int Med Res. 2012;40(4):1381–1389. doi:10.1177/147323001204000041622971489
28. Messeri A, Caprilli S, Busoni P. Anaesthesia induction in children: a psychological evaluation of the efficiency of parents' presence. Paediatr Anaesth. 2004;14(7):551–556.

ANNEXES

ANNEX ONE- WRITTEN INFORMED CONSENT

Hello, my name is _____I am collecting data on behalf of Dr. Matusala berhanu, Final year resident at Addis Ababa University School of Medicine department of Anesthesiology, Critical care and pain medicine. He is conducting research on. He has received permission from Addis Ababa University School of Medicine department of Anesthesiology, Critical care and pain medicine to conduct the study.

You are selected to participate in this study because you are a client who came for elective surgery at this Hospital. Your participation in this surgery will only be based on your willingness to participate. You have the right to choose not to take part in this study. If you are willing, you have the right to stop at any time or withdraw without giving any reason which you will not be subjected to any mistreatment. There will be no direct benefit by participating in this research but in the future the information gathered by this study will help policy makers, programmers, and researchers to give appropriate attention on issues of preoperative anxiety in children. The information that you provide will be kept confidential by using only code numbers and locking the data. Only the members of the research will have access to the non-coded data and the data will not be used for purposes other than the study. Your willingness and active participation is very important for the success of this study.

Based on the understanding of the above information, are you willing to participate in this study?

_____Yes _____No

If yes, Signature _____ Date_____

Data collector, Name_____ Signature_____

Questionnaire ID

Date of data collection

ANNEX TWO- QUESTIONNAIRE

Part I: Identification (Socio-demographic)			
S. NO		Response	Remark
1	Card no		
2	Age	1) 2-6yrs 2) 7-12yrs	
3	Sex	1) Male 2) female	
4	Level of education	1) Did not attend school 2) Kindergarten 3) Elementary school 4) Other	
5	Birth order	1) First 2) second 3) third and above	
6	Residency	1) Urban 2) rural	
7	Parent level of education	1) No formal education 2) Primary (up to grade 8) 3) High school (9 to 12) 4) College and above	
8	Annual parent income	1) No income 2) Less than 10,000ETB 3) More than 10,000ETB	
Part II- pediatric anxiety and Associated factors			
9	ASA class	1) ASA I 2) ASA II	
10	Previous hospital admission	1) Yes 2) No	
11	Previous anesthesia or surgery	1) Yes 2) No	
12	Preoperative pain	1) Yes 2) No	
13	Mode of anesthesia induction	1) inhalational 2) intravenous	
14	Type of operation	1) General 2) ENT 3) Urology 4) Other	
15	Pediatric anxiety	Waiting room(P1)- 1) yes 2) No During parental separation(P2)- 1) yes 2) No During induction(P3)- 1) yes 2)No	
16	Parental anxiety	1) Yes 2) No	

ANNEX THREE-The mYPAS

A. Activity	1) Looking around, curious, playing with toys, reading (or other age appropriate behavior); moves around holding area/treatment room to get toys or go to parent; may move toward OR equipment 2) Not exploring or playing, may look down, may fidget with hands or suck thumb(blanket); may sit close to parent while waiting, or play has a definite manic quality 3) Moving from toy to parent in unfocused manner, nonactivity derived movements; frenetic/frenzied movement or play; squirming, moving on table, may push mask away or clinging to parent 4) Actively trying to get away, pushes with feet and arms, may move whole body; in waiting room, running around unfocused, not looking at toys or will not separate from parent, desperate clinging
B. Vocalizations	1) Reading (nonvocalizing appropriate to activity), asking questions, making comments, babbling, laughing, readily answers questions but may be generally quiet; child too young to talk in social situations or too engrossed in play to respond 2) Responding to adults but whispers, "baby talk", only head nodding 3) Quiet, no sounds or responses to adults 4) Whimpering, moaning, groaning, silently crying 5) Crying or may be screaming "no" 6) Crying, screaming loudly, sustained (audible through mask)
C. Emotional Expressivity	1) Manifestly happy, smiling, or concentrating on play 2) Neutral, no visible expression on face 3) Worried (sad) to frightened, sad, worried, or tearful eyes 4) Distressed, crying, extreme upset, may have wide eyes
D. State of Apparent Arousal	1) Alert, looks around occasionally, notices watches what anesthesiologist does with him/her (could be relaxed) 2) Withdrawn child sitting still and quiet, may be sucking on thumb or face turned into adult 3) Vigilant looking quickly all around, may startle to sounds, eyes wide, body tense 4) Panicked whimpering, may be crying or pushing others away, turns away
E. Use of Parents	1) Busy playing, sitting idle, or engaged in age-appropriate behavior and doesn't need parent; may interact with parent if parent initiates the interaction 2) Reaches out to parent (approaches parent and speaks to otherwise silent parent), seeks and accepts comfort, may lean against parent 3) Looks to parents quietly, apparently watches actions, doesn't seek contact or comfort, accepts it if offered or clings to parent 4) Keeps parent at distance or may actively withdraw from parent, may push parent away or desperately clinging to parent and will not let parent go

Note: Use of parents is only scored when parent is present

Scoring: Divide each item rating by the highest possible rating (i.e., 6 for the 'vocalizations' item and 4 for all other items), add all of the produced values, divide by 5 (or 4 if E is not rated), and multiply by 100 (21).

ANNEX FOUR-Amharic translation of STAI (የፍርሃት ስሜት ሁኔታ ድግግሞሽ)

እያንዳንዱን ጥያቄዎች በጥንቃቄ በማንበብ በአሁን ሰዓት ምን ኣይነት ስሜት እየተሰማዎት እንደሆነ ከአጠገብ ያሉትን ምርጫዎች ይምረጡ

	በፍፁም የለም	በትንሹ	የተወሰነ	በጣም ብዙ
እርጋታ ይሰማኛል				
ደህንነት ይሰማኛል				
ጭንቀት ይሰማኛል				
ውጥረት ይሰማኛል				
እፎይታ ይሰማኛል				
ተስፋ መቁረጥ ይሰማኛል				
በአሁኑ ሰዓት ተጨንቂያለው ምክንያቱም በኢጋጣሚ ሊከሰቱ የሚችሉ ችግሮች ይኖራሉ በሚል ነው				
የረካሁ ይመስለኛል				
ፍርሃት ይሰማኛል				
ምቾት እየተሰማኝ ኣይደለም				
በራስ መተማመን ይሰማኛል				
ደስታ ይሰማኛል				
ንዴት ይሰማኛል				
ድንጋጤ ይሰማኛል				
በነገሮች መዋዠቅ ይሰማኛል				
ዘና ያልኩ ይመስለኛል				
ግዴለሽነት ይሰማኛል				
የተጨነቅኩ ይመስለኛል				
የተወዛገብኩ ይመስለኛል				
ችኩልነት ይሰማኛል				
