

Understanding Surgical Anxiety: A Mixed-Methods Study on Pediatric and Adult Patients

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Abstract. Anxiety is common in surgical patients and can negatively impact recovery and treatment outcomes. Children are particularly prone to intense perioperative anxiety, yet clinical practice often prioritizes medical safety over emotional support. This mixed-methods study combined 102 patient questionnaires with six semi-structured interviews involving medical staff, patients, and their families. Anxiety levels were evaluated across preoperative, intraoperative, and postoperative stages, while qualitative data explored the causes of anxiety and staff coping strategies. Children reported higher anxiety than adults, with the greatest increase observed in those under general anesthesia, whose postoperative anxiety scores rose by about 9% compared with preoperative levels. Local anesthesia and parental presence were linked to lower anxiety in children. Preoperative anxiety strongly predicted postoperative discomfort. Interviews identified causes such as disorientation during anesthesia recovery, separation anxiety in post-anesthesia care units, insufficient direct communication with children, and postoperative physical discomfort. Effective perioperative care requires preoperative psychological assessment, child-friendly post-anesthesia care unit environments, and standardized emotional support strategies. Tailoring care to age and anesthesia type—addressing both physical and psychological needs—can reduce anxiety and improve patient outcomes. By integrating patient experiences with medical staff practices, this study offers evidence-based guidance for enhancing perioperative care.

Keywords: surgical anxiety, pediatric patients, general anesthesia, emotional comfort, mixed methods

1. Introduction

Surgery is a common and critical treatment in modern medicine, but it is often accompanied by high levels of psychological stress and anxiety in patients. Previous studies have shown that surgical patients frequently experience varying degrees of anxiety, fear, and unease before and after surgery. These negative emotions not only affect patients' mental health but also may delay their recovery process and even impact surgical outcomes [1]. Against this background, communication and emotional comfort provided by medical staff before, during, and after surgery are particularly important.

However, the existing healthcare system mostly focuses on the safety of surgical procedures and the monitoring of vital signs, with less systematic attention paid to patients' emotional support and psychological care [2]. Some studies point out that measures such as preoperative education, postoperative comfort, and health guidance help reduce patient anxiety. In practice, though, medical staff often fail to provide continuous and personalized psychological support to patients due to limited human resources or insufficient awareness [3].

Therefore, this study aims to explore medical staff's attention to patients' emotions, their comfort strategies in surgery-related scenarios, and patients' feelings and evaluations of these measures. It will adopt a mixed research method, combining semi-structured interviews with medical staff and questionnaires conducted among patients and their family members. By integrating qualitative and quantitative data, this study hopes to reveal the effectiveness and shortcomings of existing practices, thereby providing suggestions for improving clinical practice.

2. Literature review

2.1. Anxiety and psychological needs of surgical patients

Numerous studies have indicated that surgical patients generally experience high levels of anxiety. This is particularly evident before general anesthesia and major surgeries, where patients often worry about the unknown process, potential risks, and postoperative pain [4]. Preoperative anxiety not only affects patients' subjective experience but also may cause fluctuations in vital signs such as blood pressure and heart rate during surgery, thereby increasing surgical risks [5]. Additionally, postoperative anxiety is closely associated with recovery speed, analgesic effects, and length of hospital stay [6]. Therefore, meeting patients' psychological needs is of great significance for ensuring surgical quality and the recovery process.

2.2. Communication and health education by medical staff

Studies have found that effective communication by medical staff is crucial to alleviate patients' anxiety. Preoperative health education helps patients gain basic understanding of surgical risks and procedures, reducing the fear caused by uncertainty [7]. However, in reality, preoperative communication often focuses on explaining medical risks, with insufficient attention to the emotional aspect [8]. Some scholars have pointed out that medical staff, within limited time, usually tend to convey information to family members rather than the patients themselves. This may weaken patients' sense of security and trust [9].

2.3. Emotional comfort and psychological interventions

In the postoperative period, emotional comfort and psychological interventions are equally indispensable. Common strategies include verbal comfort, health education, face-to-face encouragement, and diverting patients' attention through multimedia resources (such as promotional videos and animations) [10]. Studies have shown that these strategies can alleviate anxiety to a certain extent and improve patient satisfaction [11]. At the same time, however, some scholars emphasize that most current interventions rely on the personal experience of medical staff. There is significant heterogeneity in existing literature regarding specific intervention measures, timing of interventions, patient characteristics, and outcome measurement, with a lack of systematic and standardized operating procedures [12].

2.4. Research gaps and contributions of this study

Overall, existing literature contains extensive research on the anxiety of surgical patients. Most of these studies, however, focus on psychological measurement and verification of intervention effects, lacking systematic exploration from the perspective of combining medical staff's practical experience with patients' real feelings [13]. Therefore, this study adopts a mixed research method. On one hand, it explores medical staff's comfort strategies and perceptions in depth through interviews. On the other hand, it collects patients' subjective evaluations via questionnaires, aiming to fill this gap in both academic and clinical fields.

3. Methodology

3.1. Study design

This study adopted a mixed research method, with quantitative research as the main approach and qualitative research as a supplementary one. First, a self-designed questionnaire was used to conduct a quantitative survey on the anxiety levels of patients (both children and adults), as well as their perceptions of humanistic care measures. Then, interviews were conducted with medical staff to further explain the reasons and contexts behind the data, thereby enhancing the explanatory power and credibility of the research results.

3.2. Participants and sampling

For the questionnaire survey, participants included children (and their guardians) and adult patients who had undergone surgery recently. A total of 102 valid responses were collected and analyzed from diverse demographic regions across 19 provinces in China and overseas.

For the interview, the participants were medical staff (anesthesiologists and nurses) working in the post-anesthesia care unit (PACU) and surgery-related departments of a Grade A tertiary hospital. A total of 6 semi-structured interviews were conducted to supplement the quantitative results and explore the specific causes of differences in anxiety levels.

3.3. Instrument and questionnaire design

The questionnaire design referred to existing assessment tools for children's preoperative anxiety and patient satisfaction studies.

- **Anxiety Level Measurement:** A 0–10 scale was used (0 = no anxiety at all, 10 = extreme anxiety). The design drew on the ideas of the modified Yale Preoperative Anxiety Scale (mYPAS) and the Wong-Baker FACES Subjective Anxiety/Pain Rating Scale [14,15].

- **Demographic Information:** This included age, gender, type of surgery, and anesthesia method.

Before the formal survey, two clinicians and one nursing postgraduate student were invited to review the content validity of the questionnaire. A small-sample pre-test was also conducted to ensure that the questions were clearly expressed and easy to understand.

3.4. Data collection and analysis

For the quantitative part, the questionnaire data were statistically analyzed using SPSS, including descriptive statistics (mean, frequency, percentage) and inter-group comparisons (t-test, analysis of

variance). The focus was on comparing the differences in anxiety levels between children and adults in the preoperative, intraoperative, and postoperative stages.

For the qualitative part, the interview recordings were transcribed and then subjected to thematic analysis. Recurring themes were coded and summarized to explain the changing trends of quantitative data, such as the reasons for increased anxiety in children after general anesthesia.

4. Results

4.1. Quantitative findings from questionnaire surveys

(1) Overall Anxiety Levels of Pediatric Patients Were Generally Higher Than Those of Adult Patients

Questionnaire data revealed that the overall anxiety level of pediatric patients undergoing surgery was higher than that of adult patients. The average preoperative anxiety score for children was 6.81, compared to 6.77 for adults. This difference became more pronounced in general anesthesia (GA) surgeries: the preoperative anxiety score for children reached 7, which was 23.5% higher than the 5.67 score of adults. Postoperatively, children's anxiety scores further increased to 7.64, 13.3% higher than the 6.75 score of adults.

Notably, under local anesthesia (LA), children's anxiety levels were lower than those of adults. Children had a preoperative anxiety score of 6.51, while adults scored 7.64. Combined analysis of questionnaire data and interview results indicated that under LA, children typically received companionship and timely comfort from their parents or nurses both before and after surgery, which significantly alleviated their anxiety.

(2) Changes in Anxiety Scores Across Different Surgical Stages

The impact of different surgical stages on anxiety levels varied significantly, with distinct patterns observed across anesthesia types.

In GA surgeries, children's anxiety scores rose by 9%, from 7 preoperatively to 7.64 postoperatively. For adults, the increase was more substantial at 19%, jumping from 5.67 to 6.75. Interview feedback suggested that post-GA, children often reported pain, discomfort, and the abrupt feeling of losing mobility—all factors that contributed to heightened anxiety.

In LA surgeries, adult anxiety scores showed a downward trend: 7.54 preoperatively, 6.43 intraoperatively, and 6.29 postoperatively. Children's scores fluctuated slightly—rising from 6.54 preoperatively to 6.58 intraoperatively, then falling to 6.25 postoperatively—resulting in an overall decrease. Interviews revealed that the inability to be accompanied by parents during surgery was a key reason for the temporary intraoperatively anxiety spike in children.

In non-anesthesia surgeries, children's anxiety scores dropped by 14%, from 7 preoperatively to 6 postoperatively. This decrease was significantly larger than the 4% drop observed in LA surgeries.

Overall, the data showed a clear trend: the deeper the anesthesia level, the more severe the postoperative anxiety in children. Non-anesthesia surgeries were associated with the largest reduction in anxiety.

(3) Correlation Between Preoperative and Postoperative Anxiety

Data also indicated a strong correlation between preoperative and postoperative anxiety in pediatric patients. Among children who exhibited anxiety before GA surgery, 75% continued to experience anxiety postoperatively. In contrast, this rate was only 43% for children under LA. A similar trend was observed in the adult group. These findings suggest that preoperative anxiety assessment can serve as a valuable indicator for predicting postoperative anxiety.

4.2. Causal analysis and interview results

To better understand the psychological and physiological mechanisms behind the quantitative data, the research team interviewed multiple doctors and nurses from surgical departments. Key findings from these interviews are summarized below.

4.2.1. Disorientation and agitation during GA emergence

Anesthesiologists interviewed commonly noted that children often experienced “time-space disorientation” when waking from GA. They would fall asleep in their parents’ arms or the pre-surgery preparation room, but wake up in an unfamiliar post-anesthesia care unit (PACU) surrounded by strange medical staff and equipment. Some children also exhibited emergence delirium, characterized by intense crying, restlessness, and lack of response to verbal comfort. This phenomenon was particularly common among children aged 2–6 years.

4.2.2. Separation anxiety

Typically, 2–3 anesthesiologists or nurses managed 5–6 beds in the PACU. Since parents were not allowed to enter the PACU, children often woke up alone in an unfamiliar environment, which easily triggered separation anxiety. Although medical staff provided verbal comfort, limited human resources made one-on-one companionship impossible.

4.2.3. Communication and comfort strategies of medical staff

Doctors and nurses generally communicated with family members about surgical risks and potential postoperative discomfort before surgery. However, direct communication with patients themselves—especially pediatric patients—was limited. In general clinical practice, medical staff commonly used verbal reassurance, illustrative examples, and health education to alleviate anxiety. In some cases, iPads were used to play cartoons to distract children, but this practice was mostly restricted to outpatient consultations or pre-surgery stages and rarely used in the operating room.

4.2.4. Physical discomfort exacerbating anxiety

Interviews also highlighted that children who underwent GA often experienced physical discomfort postoperatively, such as sore throats, nausea, and vomiting. These symptoms further intensified their anxiety. In comparison, physical discomfort was relatively mild in LA and non-anesthesia surgeries, which aligned with the more significant reduction in anxiety levels observed in these groups.

5. Discussion

5.1. Comparison with existing studies

The findings of this study are highly consistent with views in existing literature regarding the common occurrence of anxiety in surgical patients and its negative impact on the recovery process [1,4]. Children tend to show high levels of anxiety during surgery, which is also supported by many studies. These studies highlight children’s sensitivity to unknown procedures and changes in their environment [16,17].

Regarding communication and health education provided by medical staff, this study further confirms the importance of effective communication in reducing patients' anxiety, as evidenced by the observed alleviation of anxiety in children who received timely comfort under local anesthesia. However, the study also finds that medical staff often focus more on explaining medical risks to family members within limited time, while paying insufficient attention to the emotional needs of the patients themselves, especially children. This shows that although medical staff recognize the importance of communication, they still face challenges from time pressure and professional priorities in actual practice. Their tendency to deliver information to family members rather than the patients may unintentionally reduce the patients' sense of security and trust.

In terms of emotional comfort and psychological intervention, this study observes that medical staff use strategies such as verbal comfort, health education, and multimedia to divert attention. These measures are effective to a certain extent, but interviews also reveal that they lack systematic and standardized procedures, and often rely on the personal experience of medical staff. The differences in the implementation, timing, patient characteristics, and outcome evaluation of these interventions make their effects unstable and hard to promote—this aligns with problems pointed out in existing literature [12].

The mixed research method used in this study effectively fills the gap in existing literature, which lacks systematic discussion combining medical staff's practical experience and patients' real feelings [13]. First, questionnaires were used to quantify patients' anxiety levels and feelings. Then, interviews were conducted to gain in-depth insights into medical staff's practical experience and patients' specific experiences. Qualitative data provides rich context and explanations for quantitative results. For example, only through interviews could we deeply understand the specific causes of agitation during awakening and separation anxiety in children under general anesthesia, thus better explaining the dynamic changes in children's anxiety levels.

5.2. Clinical implications

The results of this study provide the following important implications for clinical practice:

Strengthen pre-operative psychological intervention for children undergoing general anesthesia surgery: Given that children have high anxiety levels during general anesthesia surgery and pre-operative anxiety is a key predictor of post-operative anxiety, clinical practice should attach importance to pre-operative psychological assessment and intervention for children. It is essential to predict anxiety preoperatively to implement proactive postoperative intervention plans. More child-friendly communication methods can be used—such as picture books, animations, or games—to explain the surgical process to children and reduce their fear of the unknown.

Optimize the child-friendly environment in post-anesthesia care units (PACUs): When conditions permit, consider introducing a parent accompanying system in PACUs or designing more child-friendly environments. For instance, provide soothing music, toys, or cartoons, and increase the number of medical staff trained in professional psychological comfort. These measures can help reduce children's separation anxiety and confusion about time and space.

Improve medical staff's emotional comfort skills and standardized intervention procedures: Training for medical staff should not be limited to medical knowledge and operational skills, but also focus on developing their emotional communication and psychological comfort abilities. Standardized psychological comfort procedures should be developed for patients, specifically tailored to different age groups and anesthesia methods, ensuring the systemization and effectiveness of interventions and reducing reliance on personal experience.

Foster interdisciplinary collaboration to enhance holistic care: Recognizing that medical staff often have limited capacity, fostering teamwork between medical professionals and social workers could provide more holistic care for patients' physical and mental well-being, ensuring comprehensive medical care.

Pay attention to the interaction between physical discomfort and psychological anxiety: In post-operative management, while relieving physical discomfort (such as pain and nausea), psychological comfort should be provided simultaneously. Effective pain management itself is an important part of reducing anxiety.

5.3. Limitations

This study has several limitations. First, although 102 valid questionnaires were collected from patients across 19 provinces in China and overseas regions, the overall sample size remained modest. This may restrict the generalizability and applicability of the findings. Second, the anxiety levels in the questionnaires were measured using a 0-10 subjective rating scale. Though this approach drew on ideas from established tools, it still carries some reporting bias. Future studies could consider incorporating more objective physiological indicators (such as heart rate variability and cortisol levels) or behavioral observation scales for multi-dimensional assessment. Additionally, while this study focused on anxiety changes before, during, and after surgery, it did not follow up on patients' long-term mental health and recovery status, making it impossible to evaluate the long-term effects of short-term interventions. The small sample size in the interview section might also fail to fully capture all perspectives of medical staff, patients, and their families.

6. Conclusion

This study used a mixed-methods approach to explore in depth the anxiety of surgical patients (especially children) and the strategies medical staff use to attend to and comfort patients' emotions before, during, and after surgery. Combining quantitative questionnaire data with qualitative interview results, the study found that surgical patients generally experience significant anxiety. Among them, children under general anesthesia show higher anxiety levels and more complex psychological needs. The main causes of increased anxiety in these children include post-operative disorientation, separation anxiety, agitation during awakening, and physical discomfort.

The results indicate that communication and comfort from medical staff are crucial for relieving patients' anxiety. However, current clinical practice faces challenges such as limited resources, a focus on medical risks rather than emotional support in communication, and a lack of systematic, standardized procedures for interventions. By integrating multi-perspective data from patients and medical staff, this study fills the gap in existing literature regarding discussions that combine practical experience with real feelings, providing a more comprehensive perspective for understanding emotional management in surgical settings.

These findings offer important references for improving psychological care for surgical patients. It is suggested that clinical practice should pay special attention to the psychological needs of children undergoing general anesthesia, strengthening targeted pre-operative psychological interventions and post-operative humanistic care. This includes optimizing child-friendly environments in post-anesthesia care units, allowing parental companionship when possible, and providing medical staff with systematic training in emotional comfort skills to develop and implement standardized psychological support procedures. These improvements are expected to

effectively reduce surgical patients' anxiety, promote their physical and mental recovery, and enhance the overall medical experience.

References

- [1] Mitchell M. Patient anxiety and modern elective surgery: a literature review. *Journal of Clinical Nursing*. 2003; 12(6): 806-15. doi: 10.1046/j.1365-2702.2003.00812.x.
- [2] Pritchard MJ. Identifying and assessing anxiety in pre-operative patients. *Nursing Standard*. 2009; 23(51): 35-40. doi: 10.7748/ns.23.51.35.s46.
- [3] Jawaid M, Mushtaq A, Mukhtar S, Khan Z. Preoperative anxiety before elective surgery. *Neurosciences*. 2007; 12(2): 145-148. PMID: 21857597.
- [4] Kain ZN, Sevarino F, Alexander GM, et al. Preoperative anxiety and postoperative pain in women undergoing hysterectomy: a repeated-measures design. *Journal of Psychosomatic Research*. 2000; 49(6): 417-422. doi: 10.1016/s0022-3999(00)00189-6.
- [5] Maranets I, Kain ZN. Preoperative anxiety and intraoperative anesthetic requirements. *Anesthesia & Analgesia*. 1999; 89(6): 1346-1351. doi: 10.1097/00005539-199912000-00003.
- [6] Zahid M, Wali Ahmed F, Altaf F, et al. Assessment of Postoperative Pain, Anxiety, and Functional Recovery Among Patients Undergoing Elective Abdominal Surgery. *Cureus*. 2025; 17(6): e85311. doi: 10.7759/cureus.85311.
- [7] Guo P. Preoperative education interventions to reduce anxiety and improve recovery among cardiac surgery patients: a review of randomised controlled trials. *Journal of Clinical Nursing*. 2015; 24(1-2): 34-46. doi: 10.1111/jocn.12618.
- [8] Powell R, Scott NW, Manyande A, et al. Psychological preparation and postoperative outcomes for adults undergoing surgery under general anaesthesia. *Cochrane Database of Systematic Reviews*. 2016; (5): CD008646. doi: 10.1002/14651858.CD008646.pub2.
- [9] Hemsley B, Balandin S, Worrall L. Nursing the patient with complex communication needs: time as a barrier and a facilitator to successful communication in hospital. *J Adv Nurs*. 2012; 68(1): 116-126. doi: 10.1111/j.1365-2648.2011.05722.x.
- [10] Wang R, Huang X, Wang Y, Akbari M. Non-pharmacologic Approaches in Preoperative Anxiety, a Comprehensive Review. *Front Public Health*. 2022; 10: 854673. doi: 10.3389/fpubh.2022.854673.
- [11] Johnston M, Voge C. Benefits of psychological preparation for surgery: a meta-analysis. *Annals of Behavioral Medicine*. 1993; 15(4): 245-256.
- [12] Hanalis-Miller T, Nudelman G, Ben-Eliyahu S, Jacoby R. The Effect of Pre-operative Psychological Interventions on Psychological, Physiological, and Immunological Indices in Oncology Patients: A Scoping Review. *Front Psychol*. 2022; 13: 839065. doi: 10.3389/fpsyg.2022.839065.
- [13] Mazurenko O, Zemke D, Lefforge N, et al. What Determines the Surgical Patient Experience? Exploring the Patient, Clinical Staff, and Administration Perspectives. *J Healthc Manag*. 2015; 60(5): 332-46. PMID: 26554144.
- [14] Kain ZN, Mayes LC, O'Connor TZ, Cicchetti DV. Preoperative anxiety in children. Predictors and outcomes. *Arch Pediatr Adolesc Med*. 1996; 150(12): 1238-45. doi: 10.1001/archpedi.1996.02170370016002.
- [15] Crandall M, Blaschke GS, Crandall D, Schuman S. Initial validation of a numeric zero to ten scale to measure children's state anxiety. *Anesth Analg*. 2007; 105(5): 1250-1253. doi: 10.1213/01.ane.0000284700.59088.8b.
- [16] Ma X, Zhang Z, Bao Y, Zhao H. Impact of pediatric surgery on anxiety in children and their families and coping strategies: a narrative review. *Transl Pediatr*. 2025; 14(4): 718-727. doi: 10.21037/tp-2025-10.
- [17] Liang Y, Huang W, Hu X, et al. 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.