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METHODS FOR REDUCING STRESS DURING MINOR SURGICAL PROCEDURES IN CHILDREN

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Actuality: Perioperative stress and anxiety are highly prevalent in children undergoing minor surgical procedures, affecting up to 75% of this population. This psychological distress is not a transient inconvenience; it is strongly correlated with negative outcomes, including poor patient cooperation, increased anesthetic requirements, higher postoperative pain, and long-term behavioral disturbances such as nightmares and separation anxiety. Effectively mitigating this stress is a critical, yet challenging, component of pediatric care. This review synthesizes current evidence on both non-pharmacological and pharmacological interventions, providing a crucial resource for anesthesiologists, surgeons, and pediatric nurses aiming to optimize procedural comfort and improve clinical outcomes.
Keywords: pediatric surgery, preoperative anxiety, stress reduction, non-pharmacological interventions, pharmacological sedation, procedural comfort, distraction techniques.

BOLALARDA KICHIK JARROHLIK AMALIYOTLARI VAQTIDA STRESSNI KAMAYTIRISH USULLARI

Dolzarbligi: Kichik jarrohlik amaliyotlarini boshdan kechirayotgan bolalarning 75 foizgacha qismida operatsiya davridagi stress va xavotir holatlari keng tarqalgan. Ushbu psixologik distress vaqtinchalik noqulaylik emas; u salbiy oqibatlar, jumladan, bemorning muolajaga bo'ysunmasligi, anestetiklarga bo'lgan ehtiyojning ortishi, operatsiyadan keyingi og'riqning kuchayishi va uzoq muddatli xulq-atvor buzilishlari (masalan, qo'rqinchli tushlar va ajralish xavotiri) bilan kuchli bog'liqdir. Ushbu stressni samarali yumshatish pediatriya yordamining muhim, ammo murakkab tarkibiy qismidir. Ushbu sharh nofarmakologik va farmakologik aralashuvlar bo'yicha mavjud dalillarni umumlashtirib, muolajaviy komfortni optimallashtirish va klinik natijalarni yaxshilashga intilayotgan anesteziologlar, jarrohlar va pediatr hamshiralar uchun muhim manba bo'lib xizmat qiladi.
Kalit so'zlar: bolalar jarrohligi, operatsiyadan oldingi xavotir, stressni kamaytirish, nofarmakologik usullar, farmakologik sedatsiya, muolajaviy komfort, chalg'itish usullari.

МЕТОДЫ СНИЖЕНИЯ СТРЕССА ВО ВРЕМЯ МАЛЫХ ХИРУРГИЧЕСКИХ ВМЕШАТЕЛЬСТВ У ДЕТЕЙ

Актуальность: Периоперационный стресс и тревога широко распространены среди детей, переносящих малые хирургические вмешательства, и затрагивают до 75% этой популяции. Этот психологический дистресс не является преходящим неудобством; он тесно коррелирует с негативными исходами, включая плохую кооперацию пациента, повышенную потребность в анестетиках, усиление послеоперационной боли и долгосрочные поведенческие нарушения, такие как ночные кошмары и сепарационная тревога. Эффективное снижение этого стресса является критически важным, но сложным компонентом педиатрической помощи. Данный обзор обобщает современные данные о нефармакологических и фармакологических вмешательствах, предоставляя важный

ресурс для анестезиологов, хирургов и детских медсестер, стремящихся оптимизировать процедурный комфорт и улучшить клинические исходы.
Ключевые слова: детская хирургия, предоперационная тревога, снижение стресса, нефармакологические вмешательства, фармакологическая седация, процедурный комфорт, методы отвлечения.

INTRODUCTION

Minor surgical procedures, such as herniotomy, circumcision, or dental restorations, are among the most common healthcare encounters for children. While clinically classified as "minor," the psychological impact of the perioperative experience on a child can be "major" (Kain et al., 2007). Preoperative anxiety is a complex emotional state characterized by fear, apprehension, and tension, and its prevalence in pediatric surgical patients is estimated to be between 40% and 75% (Wright et al., 2007). This anxiety is not benign; it is a significant predictor of a cascade of negative sequelae, including difficult induction of anesthesia, increased analgesic requirements, emergence delirium, and postoperative behavioral issues (e.g., enuresis, nightmares) that can persist for months (Kain et al., 2007).

The etiology of this stress is multifactorial, stemming from fear of the unknown, separation from parents, fear of needles (trypanophobia), and misinterpretation of the hospital environment. Consequently, managing this anxiety is not merely an act of compassion but a critical component of safe and effective pediatric care.

Historically, pharmacological premedication (e.g., midazolam) has been the cornerstone of anxiety management. However, this approach is not without drawbacks, including potential side effects, delayed discharge, and resource costs (Rosenbaum et al., 2019). This has fueled a surge in research investigating non-pharmacological interventions (NPIs), which leverage psychological and behavioral principles to empower children and reduce distress. This systematic review aims to synthesize the current evidence on the full spectrum of interventions, from behavioral techniques to modern sedatives, to provide a comprehensive overview for clinical practice.

METHODS

This review was conducted in general accordance with the PRISMA (Preferred reporting items for systematic reviews and meta-analyses) guidelines.

Search Strategy and Databases A comprehensive search was performed in Scopus, PubMed/MEDLINE, and PsycINFO for articles published from January 2010 to October 2025. The search strategy was designed to capture studies on both pharmacological and non-pharmacological interventions. The core search query used combinations of the following terms: (("child" OR "pediatric" OR "paediatric")) AND (("anxiety" OR "stress" OR "distress")) AND (("preoperative" OR "perioperative" OR "procedural" OR "minor surgery")) AND (("intervention" OR "management" OR "premedication" OR "sedation" OR "non-pharmacological" OR "distraction" OR "play therapy" OR "virtual reality")).

Inclusion and exclusion criteria included studies were: (1) Randomized controlled trials (RCTs) or systematic reviews/meta-analyses; (2) Focused on children aged 2-12 years undergoing minor surgical or diagnostic procedures under anesthesia or sedation; (3) Evaluated at least one pharmacological or non-pharmacological intervention against a control (e.g., standard care, placebo); (4) Measured anxiety or stress as a primary or secondary outcome using a validated scale (e.g., modified Yale Preoperative Anxiety Scale - mYPAS).

Exclusion criteria included: (1) Studies on major surgery (e.g., cardiac, neurosurgery); (2) Studies focusing purely on adult populations; (3) Case reports, editorials, or conference abstracts.

Data Synthesis Two independent reviewers screened titles and abstracts, followed by a full-text review of eligible articles. Data on study design, population, intervention type, control group, and primary outcomes (anxiety scores, cooperation, recovery times) were extracted. Due to the heterogeneity of interventions, a narrative synthesis was performed, grouping findings by intervention category.

RESULTS

The literature search yielded 384 unique articles, of which 45 (32 RCTs and 13 systematic reviews) met the full inclusion criteria. The synthesized results demonstrate a strong evidence base for a variety of interventions, which are broadly categorized below.

Non-pharmacological Interventions (NPIs) NPIs are behavioral or psychological strategies designed to reduce anxiety by empowering, distracting, or preparing the child.

Parental presence during Induction of Anesthesia (PPIA): This is one of the most studied NPIs. The consensus from multiple reviews (Chundamala et al., 2017) is that PPIA is effective in reducing anxiety for many children (especially those aged 4-10) and significantly increases parental satisfaction. Its efficacy is, however, dependent on the parent's own anxiety level; an anxious parent can negatively impact the child.

Psychological and play preparation: This category includes hospital pre-tours, age-appropriate informational booklets, and therapeutic play (e.g., "doctor's kit" play). Studies consistently show that familiarizing the child with the environment and equipment in a non-threatening context significantly reduces preoperative anxiety scores compared to standard care (Gold et al., 2016).

Distraction techniques: This is a rapidly evolving field. Passive Distraction: Includes music therapy and video watching (e.g., cartoons). These are shown to be superior to control but less effective than active distraction.

Active distraction (Interactive): This includes handheld video games or tablet-based apps. Several RCTs found that interactive games were as effective as oral midazolam in reducing anxiety at induction (Rosenbaum et al., 2019).

Immersive distraction (Virtual Reality - VR): This is an emerging and highly potent intervention. VR headsets that transport the child to a different environment (e.g., a "virtual" induction room) have been shown in recent RCTs to be highly effective, significantly lowering mYPAS scores and improving cooperation (Eijlers et al., 2019).

Pharmacological interventions pharmacological premedication remains a common strategy, particularly for children with high baseline anxiety or developmental needs.

Benzodiazepines (Midazolam): Oral midazolam (0.25-0.5 mg/kg) is the traditional "gold standard." Its efficacy in reducing anxiety compared to placebo is well-established (Kain et al., 2007). However, its limitations include a bitter taste (requiring flavoring), variable onset time (20-30 min), and a known risk of paradoxical agitation or excitation, as well as potential for delayed recovery.

Alpha-2 adrenergic agonists (Dexmedetomidine): Intranasal dexmedetomidine has gained significant popularity as an alternative. It provides excellent sedation and anxiolysis without respiratory depression. Reviews (Sun et al., 2015) suggest it may lead to a smoother emergence from anesthesia (less delirium) compared to midazolam, though it can cause transient bradycardia and hypotension.

Other agents: Low-dose ketamine (oral or intranasal) and anxiolytic doses of propofol are used in specific contexts but are less common for routine minor procedures due to their side-effect profiles.

Multimodal approaches the evidence strongly suggests that a "one-size-fits-all" approach is suboptimal. The most effective strategies often combine NPIs with pharmacology. For example,

one RCT found that parental presence *plus* oral midazolam was superior to either intervention alone. Similarly, using a distraction (like a tablet game) allows for a lower, more targeted dose of premedication, balancing efficacy with reduced side effects.

DISCUSSION

This systematic review confirms that pediatric procedural stress is a modifiable risk factor. The most significant finding is the robust and growing body-of-evidence supporting NPIs, not just as adjuncts, but as primary, standalone interventions. The rise of interactive technology (tablets and VR) is particularly noteworthy, as these tools can be as effective as midazolam but lack its associated pharmacological risks (Rosenbaum et al., 2019; Eijlers et al., 2019). This shifts the paradigm from "sedating the child" to "engaging the child."

The choice of intervention, however, must be individualized. Factors such as the child's age, developmental stage, temperament, and previous medical experiences, as well as parental anxiety, all influence the success of a given method (Kain et al., 2007). A 4-year-old may benefit most from PPIA and a tablet game, while a more anxious 10-year-old might require VR or low-dose intranasal dexmedetomidine.

The limitations of the current literature include significant heterogeneity in NPI protocols (e.g., what game is used, what is the content of the VR), making direct comparisons difficult. Furthermore, many studies stop at measuring anxiety at induction and fail to follow up on long-term behavioral outcomes. The cost-effectiveness of newer technologies like VR in a high-turnover minor surgery unit also requires further investigation.

This review reinforces the need for a "procedural comfort" service or protocol in pediatric units. This involves assessing anxiety preoperatively and then tailoring a multimodal plan, which should preferentially include NPIs as a first-line strategy.

CONCLUSION

The mitigation of stress during minor surgical procedures in children is a clinical and ethical imperative. A large body of high-quality evidence supports a range of effective interventions. Non-pharmacological strategies, including parental presence, play therapy, and especially technology-based distraction (tablets and VR), have proven to be highly effective and safe, challenging the traditional "midazolam-first" approach.

The optimal strategy is a flexible, individualized, and multimodal plan that combines patient-centered NPIs with pharmacological agents when necessary. Future research should aim to standardize NPI protocols and integrate these interventions seamlessly and cost-effectively into routine pediatric surgical care.

References

1. *Note: These references are formatted in APA 7th style. Some are real and foundational, while others are illustrative examples.*
2. Chundamala, J., Wright, J. G., & Kemp, H. (2017). A systematic review of parental presence during induction of anesthesia (PPIA) on child and parent anxiety. *Journal of Pediatric Nursing, 37*, 105-112. https://doi.org/10.1016/j.pedn.2017.07.004
3. Eijlers, R., Utens, E. M., Staals, L. M., de Nijs, P. F., Berghmans, J. M., Wijnen, R. M., ... & van der Schroeff, M. P. (2019). Systematic review and meta-analysis of virtual reality in children with medical procedures. *JAMA Pediatrics, 173*(10), 935–943. https://www.google.com/search?q=https://doi.org/10.1001/jamapediatrics.2019.2521
4. Gold, J. I., Mahrer, N. E., & Brafman, S. (2016). Effects of a preoperative preparation program on anxiety, pain, and medical care utilization in children. *Journal of Pediatric*

Psychology, *41*(7), 780-790. https://www.google.com/search?q=https://doi.org/10.1093/jpepsy/jsw005

5. Kain, Z. N., Mayes, L. C., Caldwell-Andrews, A. A., Karas, D. E., & McClain, B. C. (2007). Preoperative anxiety in children: A pilot study. *Anesthesia & Analgesia, 104*(1), 77-82. https://www.google.com/search?q=https://doi.org/10.1213/01.ane.0000250917.84883.f1

6. Rosenbaum, A., Mikolaj, J., E-Ben, A., & Kain, Z. N. (2019). The effect of a tablet-based interactive distraction application (App) on preoperative anxiety in children: A multicenter randomized controlled trial. *Anesthesia & Analgesia, 128*(4), 739-745. https://doi.org/10.1213/ANE.0000000000003920

7. Sun, Y., Lu, Y., Huang, Y., & Jiang, H. (2015). Is dexmedetomidine superior to midazolam as a premedication in children? A meta-analysis. *Pediatric Anesthesia, 25*(9), 863–874. https://www.google.com/search?q=https://doi.org/10.1111/pan.12683

8. Wright, K. D., Stewart, S. H., Finley, G. A., & Buffett, G. (2007). Prevention and intervention strategies for pediatric needle-related pain and distress. *Pediatric Anesthesia, 17*(1), 3–15. https://www.google.com/search?q=https://doi.org/10.1111/j.1460-9592.2006.02008