

Perioperative Pediatric Anxiety: A Cry for Universal Scale Adoption

Romy Yun, MD*; Kristin M. Kennedy, BA†; Thomas J. Caruso, MD, MEd*

INTRODUCTION

The Agency for Healthcare Research and Quality and the Centers for Medicare and Medicaid Services launched the Pediatric Quality Measures Program (PQMP) 10 years ago to develop and enhance the quality of care measures for children's healthcare.¹ Several pediatric healthcare quality measures concentrate on behavioral health; however, the measures seldom focus on children's psyche during the perioperative period. Perioperative anxiety occurs in nearly 65% of children, with consequences of untreated perioperative anxiety including increased risk of emergence agitation and amplified pain. Long-term adverse effects may lead to separation anxiety disorders, enuresis, and healthcare avoidance.²

Targeted interventions for perioperative distress require reliable measures to assess anxiety. Existing pediatric perioperative affect scales are typically complex, time-consuming, and often require trained observers. An ideal pediatric affect scale should be simplistic, yet sensitive for different developmental age groups. Assessment scales should appeal to all care team members, as patients are also assessed preoperatively by Child Life Specialists, nurses, and advanced practice providers. Even with prompt recognition of perioperative distress, timely interventions are challenging to implement, especially during anesthetic induction.



Given PQMP's goal to expand pediatric quality measures and the high prevalence of pediatric perioperative anxiety, it would be valuable for providers to standardize clinically useful scales to guide anxiety recognition and treatment. The purpose of this commentary is to highlight pediatric anxiety assessment scales and identify opportunities for broad adoption.

SELECTED RESEARCH PERIOPERATIVE ANXIETY MEASURES

Investigators utilize a myriad of pediatric anxiety assessment scales; we report key features of three of the most commonly used in research. These scales have driven the recognition of perioperative anxiety and exemplified the need for routine identification and treatment.

Researchers frequently use the Modified Yale Preoperative Anxiety Scale (mYPAS) to assess pediatric perioperative anxiety.³ The scale contains 22 items divided into five behavioral domains that a trained observer scores over four time points. Given its complexity, researchers developed an abbreviated version, the mYPAS-Short Form (mYPAS-SF), consisting of 18 items across four domains over two time points. Although investigators observed similar construct validity with mYPAS-SF, clinicians have not adopted its routine use outside of research, presumably due to its length and complexity.

Researchers have also developed the Observation Scale of Behavioral Distress (OSBD) to assess children's behavioral responses to medical procedures.⁴ It is a 11-item scale of observed behaviors that sum to a score that is divided by procedural duration. Although the fewer items compared with mYPAS are advantageous, it is challenging to implement in real-time because most researchers who use OSBD rely on procedural recordings to provide observers adequate time to reliably assess behaviors and measure procedure length. Additionally, researchers have utilized OSBD only in procedural settings, limiting its applicability to nonsurgical environments. In an effort for more straightforward implementation, researchers developed a revised eight-item version (OSBD-R); however, it remains too complex for broad clinical adoption.

From the *Department of Anesthesiology Perioperative and Pain Medicine, Division of Pediatric Anesthesiology, Stanford University School of Medicine, Stanford, Calif.; and †Stanford University School of Medicine, Stanford, Calif.

*Corresponding author. Address: Romy Yun, MD, Department of Anesthesiology, Perioperative and Pain Medicine, Division of Pediatric Anesthesiology, Stanford University School of Medicine, 453 Quarry Road MC5663, Palo Alto, CA 94304
PH: (650) 723-5728
Fax: (650) 725-8544
E-mail: romyun@stanford.edu

Copyright © 2022 the Author(s). Published by Wolters Kluwer Health, Inc. This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

To Cite: Yun R, Kennedy KM, Caruso TJ. Perioperative Pediatric Anxiety: A Cry for Universal Scale Adoption. *Pediatr Qual Saf* 2022;7:e542.

Received for publication September 14, 2021; Accepted January 4, 2022.

Published online March 30, 2022

DOI: 10.1097/pq9.0000000000000542

Another common scale that perioperative researchers utilize to measure pediatric anxiety is the State Trait Anxiety Inventory-Children (STAI-C).⁵ Unlike the OSBD and mYPAS, which are observational scales, it is a self-reported 20-item questionnaire. Like other self-reported scales, the STAI-C is limited to literate children who can accurately interpret the survey, excluding young children who tend to be more susceptible to perioperative anxiety. Also, STAI-C requires 5–10 minutes to complete, which is not practical in a fast-paced perioperative environment.

SELECTED CLINICAL PERIOPERATIVE ANXIETY MEASURES

The most common clinical anxiety assessment scales are the Visual Analog Scale (VAS) and Facial Affective Scale (FAS). The VAS is a self-reported scale used to assess anxiety, mood disorders, quality of life, and pain.⁶ It consists of a 100-mm scale with anchor descriptors such as “not anxious at all” and “most anxious I can imagine.” Although clinicians favor the simplicity of the VAS, its use is limited, since children under 7 years may not comprehend the scale. Also, typical with self-reported scales, input from the child is difficult to obtain during anesthetic mask induction.

The FAS is a self-reported scale that consists of nine faces portraying degrees of distress.⁷ Children select a face that represents their feelings at the time. Because pictures can facilitate children’s ability to conceptualize their affective state, the FAS is popular. Drawbacks include limited applicability in younger children and inability to self-report during procedures and anesthesia induction.

Clinicians have developed the Pediatric Anesthesia Behavior (PAB) scale to rapidly assess anxiety during anesthesia mask induction.⁸ Anesthesiologists rate behaviors as happy, sad, or mad, corresponding to a score from one to three. The PAB’s simplicity allows for an efficient and real-time assessment. However, the PAB does not include a measure of cooperation. A sad and compliant child connotes a different experience compared with a sad patient who will not cooperate. Differentiation of affect and cooperation carries high clinical significance, particularly in the perioperative setting.

The HRAD± scale (Happy, Relaxed, Anxious, Distressed with a yes/no answer to Cooperation) is an observational anxiety scale that can be rapidly completed with a measure of compliance.⁹ The HRAD± scale demonstrated a strong correlation to mYPAS and OSBD and substantial inter- and intra-observer reliability amongst physicians and nurses. The scale addresses timeliness, inclusivity with the extended care team, and patient cooperation.

Despite the recognition of perioperative anxiety and need for routine identification and treatment, current research scales do not encompass characteristics to promptly and effectively diagnose perioperative distress. Clinical affect scales, such as the PAB and HRAD± scales, encompass several ideal characteristics, yet investigators must study

these scales on larger populations. Additionally, a single, efficient scale may not be optimal for all perioperative periods, particularly if used to predict negative behaviors throughout the perioperative experience. For instance, preoperative anxiety may not correlate with mask induction cooperation or emergence agitation. Further research should study the relationship between perioperative anxiety and negative postoperative outcomes.

THE COMPELLING IMPERATIVE

In North America, nearly five million pediatric patients annually are at risk for perioperative anxiety.¹⁰ The impact of poorly or untreated perioperative anxiety leads to significant consequences for patients and their families. Post-traumatic stress, generalized anxiety, and fear of hospital settings have been reported up to 12 months after an anesthetic event.¹¹ These longitudinal consequences have severe implications for public health measures. Disproportional anxiety and fear are linked to needle-phobia, which is present in nearly two-thirds of children and a quarter of adults, leading to one of the most common reasons for vaccine avoidance.¹² Beyond vaccine avoidance, childhood fear of healthcare settings results in general avoidance of adult medical care, resulting in noncompliance with routine preventative healthcare.¹³ Conversely, positive experiences during childhood medical care results in more affable and constructive participation during adult medical care.¹³ Despite the sequelae of high anxiety and fearful medical encounters, most perioperative providers do not quantifiably assess perioperative distress. Rather, providers rely on experiential assessments, which may lead to unrecognized and inconsistent treatment of perioperative anxiety. To minimize variation and guide intervention, perioperative providers require an objective scale that is both easy to use and effective in the fast-paced perioperative setting.

NEXT STEPS

Ideally, behavioral affect scales would be reliable, timely, intuitive, and multi-contextual (Fig. 1). It would reliably measure anxiety and be easily utilized by all medical personnel, offering appeal across medical disciplines. Next steps for developing a pragmatic perioperative anxiety assessment scale would include convening a multi-site, multi-disciplinary panel to examine key elements of an ideal anxiety scale. After extensive research, the goal would be to propose a common scale that the majority of pediatric perioperative providers would feel comfortable adopting. The scale would be a real-time, observer-based assessment tool that demonstrates strong concordance with well-studied anxiety scales such as mYPAS, STAI-C, and OSBD. Investigators would test the scale for clinical utility in multiple healthcare contexts. After testing and iterative refinement led to a clinically reliable scale, widespread distribution via electronic medical record

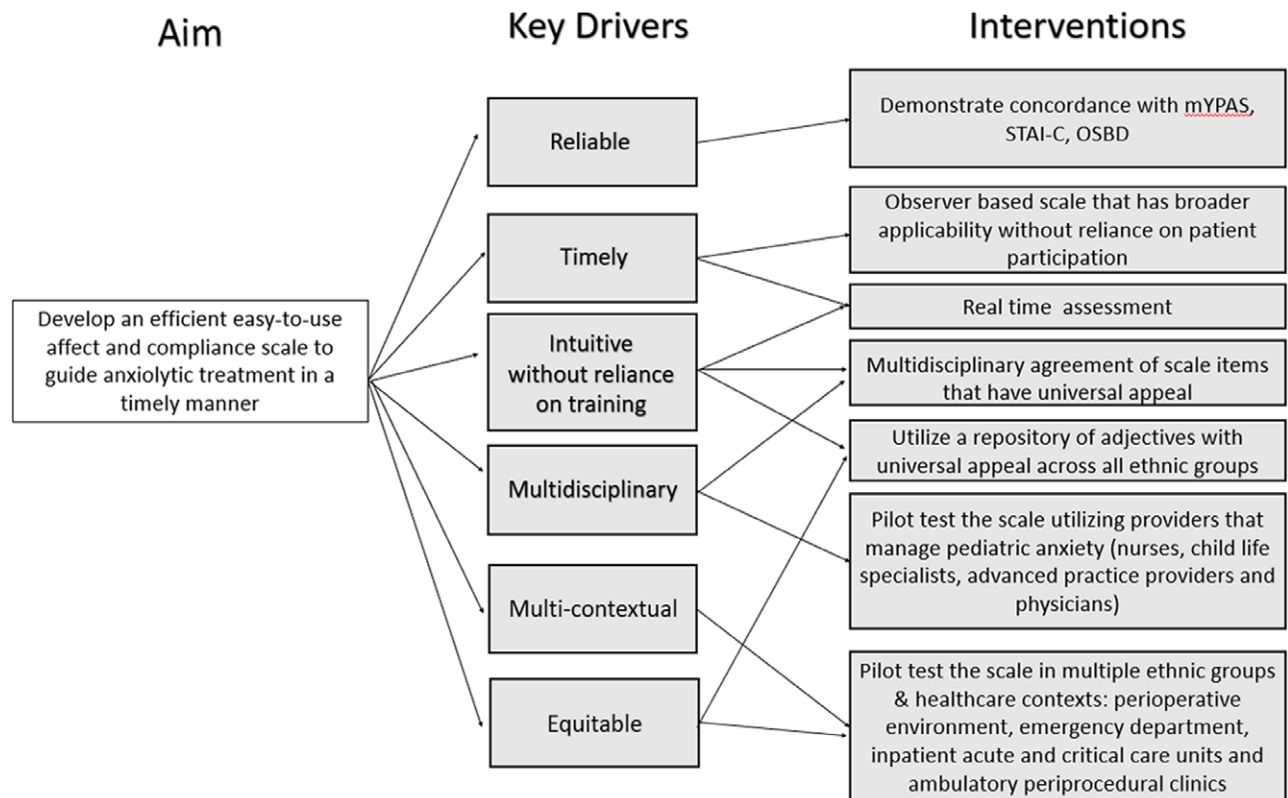


Fig. 1. Key Driver Diagram for the Development of a widely-adopted clinical affect and compliance scale. mYPAS, modified Yale Preoperative Anxiety Scale; OSBD, Observation Scale of Behavioral Distress; STAI-C, State Trait Anxiety Inventory-Children.

integration could represent an avenue for standardization across institutions.

CONCLUSIONS

The high incidence and undesirable consequences of perioperative anxiety warrant a clinically relevant standardized measurement tool that can effectively drive population-based changes in the delivery of quality care. The development of novel pharmacological and nonpharmacologic perioperative anxiolytics is dependent on a reliable measurement tool. Researchers and clinicians must align their efforts given the importance of expanding pediatric quality of care measures and effectively treating pediatric perioperative anxiety to reduce poor postoperative outcomes.

DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

REFERENCES

- Bardach NS, Burkhart Q, Richardson LP, et al. Hospital-based quality measures for pediatric mental health care. *Pediatrics*. 2018;141:e20173554.
- Kain ZN, Caldwell-Andrews AA, Maranets I, et al. Preoperative anxiety and emergence delirium and postoperative maladaptive behaviors. *Anesth Analg*. 2004;99:1648–1654.
- Kain ZN, Mayes LC, Cicchetti DV, et al. The Yale Preoperative Anxiety Scale: how does it compare with a “gold standard”? *Anesth Analg*. 1997;85:783–788.
- Jay SM, Elliott CH, Ozolins M, et al. Behavioral management of children’s distress during painful medical procedures. *Behav Res Ther*. 1985;23:513–520.
- Spielberger CD. *Manual for the State-Trait Anxiety Inventory for Children*. Palo Alto, Calif.: Consulting Psychologists Press; 1973.
- Freyd M. The graphic rating scale. *J Educ Psychol*. 1923;14:83–102.
- McGrath PA, Seifert CE, Speechley KN, et al. A new analogue scale for assessing children’s pain: an initial validation study. *Pain*. 1996;64:435–443.
- Beringer RM, Greenwood R, Kilpatrick N. Development and validation of the Pediatric Anesthesia Behavior score—an objective measure of behavior during induction of anesthesia. *Paediatr Anaesth*. 2014;24:196–200.
- Kennedy KM, Wang E, Rodriguez ST, et al. Development and assessment of an efficient pediatric affect and cooperation scale. *J Clin Anesth*. 2022;76:110569.
- Perry JN, Hooper VD, Masiongale J. Reduction of preoperative anxiety in pediatric surgery patients using age-appropriate teaching interventions. *J Perianesth Nurs*. 2012;27:69–81.
- Kain ZN, Mayes LC, O’Connor TZ, et al. Preoperative anxiety in children. Predictors and outcomes. *Arch Pediatr Adolesc Med*. 1996;150:1238–1245.
- Taddio A, Ipp M, Thivakaran S, et al. Survey of the prevalence of immunization non-compliance due to needle fears in children and adults. *Vaccine*. 2012;30:4807–4812.
- Pate JT, Blount RL, Cohen LL, Smith AJ. Childhood medical experience and temperament as predictors of adult functioning in medical situations. *Child Heal Care*. 1996;25:281–298.