Acute situational anxiety is a subjective fearful feeling of emotion that is influenced by an immediate situation. It can vary in intensity and duration among patients in the preoperative period of hospitalization. In adults, the incidence of preoperative acute situational anxiety ranges from 11% to 80%. Untreated anxiety in the perioperative period can lead to multiple deleterious effects for patients. Previous reviews on instruments to measure anxiety have not focused on the preoperative period of hospitalization for surgical patients. The objective of this integrative review was to synthesize and describe the instruments used over the last decade to measure preoperative anxiety in the surgical setting.

A systematic search strategy of the PubMed, Cumulative Index to Nursing and Allied Health Literature, and PsycINFO databases was used to review the literature. A total of 370 articles were identified, but only 5 met the inclusion criteria for this review. In the 5 articles, varying levels of reliability, validity, and feasibility of the instruments were reported as well as context considerations. Reliability and validity are not consistently reported among instruments that measure preoperative anxiety, making it difficult for providers to measure preoperative anxiety and provide treatment based on the instrument results.

Keywords: Anxiety, anxiety index, complementary therapy, instrument, preoperative period.

Review of the Literature

• Theoretical Framework. The Stress Response Theory was used as a guide to define acute situational anxiety in the preoperative period of hospitalization. The Stress Response Theory postulates the breakdown of acute situational anxiety as follows: the threat (ie, stress); the individual reaction (ie, fear, anxiety, elation); and physiological fight or flight response of health and survival that includes the central nervous system and hormonal
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<tr>
<td>State-Trait Anxiety Index (STAI)</td>
<td>No framework; reported BIS monitoring</td>
<td>Adult surgical patients undergoing general or regional anesthesia at Ankara Training and Research Hospital of Ministry of Health, Ankara, Turkey (n = 52)</td>
<td>Consists of 2 20-item sections for state anxiety (STAI-S) and trait anxiety (STAI-T)</td>
<td>Reported as “supported by studies that demonstrated reductions in BIS and STAI correlated well with anxiolysis.” Correlations between propofol dose for BIS of 65 and S-STAI was $r^2 = 0.033$ and T-STAI was $r^2 = 0.067$ from the original study.</td>
<td>Reported as “supported by studies”</td>
<td>20-30 minutes to complete on average, 40-item questionnaire potentially time consuming</td>
<td>2: prospective, randomized, single-blinded, controlled study</td>
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<td>Standard visual analog scale (VAS) to measure anxiety</td>
<td>No framework; reported RR, HR, DBP, SBP</td>
<td>Adult surgical patients scheduled for abdominal surgery in Tehran, Iran (n = 70)</td>
<td>Visual analog scale from 0 to 10 to measure anxiety; mean anxiety scores were compared before and after intervention</td>
<td>Reported as proved reliable from its use in several different research studies; correlation coefficient ($r$) of 0.55-0.84 between VAS and STAI</td>
<td>Reported as proved valid from its use in several different research studies; correlation coefficient ($r$) of 0.55-0.84 between VAS and STAI</td>
<td>Simple tool, data are limited based on 1 scale rating, easier to use in difficult clinical settings</td>
<td>2: randomized controlled clinical trial</td>
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<td>20-item Spielberger State Anxiety Scale (SAI)</td>
<td>No framework; reported MAP, pain scores</td>
<td>Convenience sample of women with breast malignancy undergoing mastectomy at an urban hospital in western Tennessee (n = 30)</td>
<td>20-item scale, anxiety level scores from T1 to T2 were compared</td>
<td>Internal consistency values for the SAI were reported as 0.988 at T1 and 0.973 at T2</td>
<td>Not reported</td>
<td>10 minutes to complete 20-item scale</td>
<td>3: quasi-experimental design</td>
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<td>Visual Analog Scale (VAS)</td>
<td>No framework; reported HR variability</td>
<td>Adults waiting for surgery without premedication at a metropolitan teaching hospital in Taiwan (n = 167)</td>
<td>VAS is a 10-cm horizontal line marked by vertical lines at 1-cm intervals; scores range from 0 indicating “not anxious at all” to 10 indicating “extremely anxious”</td>
<td>Not reported</td>
<td>Report reference data for criterion validity of VAS for measuring anxiety, correlation with hospital anxiety ($r = 0.28$) and STAI ($r = 0.5-0.6$ or 0.78)</td>
<td>Simple tool, 5 seconds for patient to communicate anxiety level, patient can remain lying flat</td>
<td>2: randomized controlled clinical trial</td>
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responses. The theoretical definition of acute situational anxiety guided by the Stress Response Theory that was used in this review is a subjective fearful feeling of emotion influenced by an immediate situation that is variable in intensity and duration among patients in the preoperative period of hospitalization. The Figure (adapted from the work of Rice, 2012) represents the underlying principles of the Stress Response Theory.

Stress (psychological, physical, and perceived) leads to an individual reaction as well as a central nervous system response often commonly known as fight or flight. When a stressful situation arises, sympathetic activation occurs, which subsides once the stressful encounter ends. In addition to a subsiding sympathetic activation, parasympathetic activity also engages. Collectively, these 2 systems work together to achieve autonomic nervous system balance. Unfortunately, perfect balance is often not achieved because of recurring bouts of acute stress as well as overarching chronic stress. This occurrence often allows sympathetic drive to remain increased and over time damages the vasculature and other regulatory systems. In 1993, McEwen and Stellar labeled this imbalance “allostatic load” and demonstrated that if it is not properly assessed, managed, and treated, it can lead to poor health outcomes. Physiological indicators for determining allostatic load and overall health include, but are not limited to, systolic and diastolic blood pressure, levels of total cholesterol, serum dehydroepiandrosterone, 24-hour urinary cortisol excretion, urinary noradrenaline, and adrenaline.

**Search Strategy.** A systematic approach was used to review the literature. Three databases were queried: PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and PsycINFO. In the first step of the search, the keywords *preoperative period* and *anxiety* were used to retrieve relevant articles as well as additional keywords related to the concept of interest in each database. The terms *acute*, *situational anxiety*, and *surgery* did not yield additional results. In the second step of the search, the following keywords were added to the searches: *complementary therapy* and *anxiety index* in PubMed, and *instruments* in CINAHL and PsycINFO. In the third step of the search, the following filters or limiters were employed: English language, adults (18 years and older), and publication within the last 10 years.

During the literature search, many studies related to preoperative anxiety were designed to assess a specific complementary therapy. As a result, the keyword *complementary therapy* was added to narrow the scope of this literature review. Additionally, 3 studies from this search addressed the psychometric properties of instruments that measure preoperative anxiety for application in languages other than English. These studies were excluded because of the heterogeneity of preoperative clinical settings between countries.

**Results**

The 5 studies included in this review all used instruments to determine acute situational anxiety in the preoperative period of hospitalization: the State-Trait Anxiety Inventory, State Anxiety Inventory, Standard Visual Analog Scale for Anxiety (VAS for Anxiety), Visual Analog Scale (VAS), and Anxiety Specific to Surgery Questionnaire. None of the studies reviewed reported a guiding theoretical framework; however, they all reported psychophysiological response data. The psychophysiological responses included all of the following: bispectral index monitoring, heart rate, respiratory rate, diastolic and systolic blood pressure, mean arterial pressure and pain score, heart rate variability, and the Multidimensional Scale of Perceived Social Support. Four of the 5 studies were conducted outside the United States. A total of 819 adult subjects were assessed in the 5 studies. The description details of instruments varied widely across studies. Overall, the quality of the studies ranged from medium-level (3) to low-level (2) evidence informing the results. The instruments’ psychometric properties of
reliability and validity are reported in the Table.16,7,15-20

• Levels of Evidence. The Oxford Centre for Evidence-Based Medicine (2011) grades the quality of a study based on a hierarchy of questions to find the likely best evidence.17 There are 5 levels of studies. The Oxford Centre’s Levels of Evidence aim to assist clinicians in conducting a rapid appraisal of research. Three of the 5 studies were randomized trials and thus considered level 2 studies (Table). The remaining 2 studies were a quasi-experimental design and descriptive study, which are considered level 3 studies (Table).

• Reliability. Four of the 5 studies reported some measure of reliability. Reliability describes the consistency of an instrument or method to assign scores to subjects.3 As a subjective concept, acute situational anxiety can be measured only by asking the patient about his or her current level of anxiety. Thus, stability is often not expected, and the internal consistency of a tool to measure a transient fearful emotion such as anxiety is commonly reported as Cronbach α coefficient vs split-half reliability.21 Two of the 5 studies reported reliability in terms of internal consistency with Cronbach α coefficient scores. However, there was significant variation in the Cronbach α coefficient scores reported. Another 2 of the 5 studies reported that reliability of their instrument was based on its use in previous research. To quantitatively define reliability, we reviewed the studies referenced regarding reliability, and additional information, if available, was added to the Table. Only 1 of the 5 studies examined did not report reliability.

• Validity. Validity describes that an instrument or method measures what it is intended to measure.3 Of the 5 studies reviewed, 3 reported some measure of validity. One of the 5 studies reported reference data for criterion validity of the VAS as an instrument for measuring anxiety.16 Two of the 5 studies reported that the validity of their instrument is based on its use in previous similar research. To quantitatively define validity, we reviewed the studies referenced regarding validity, and additional information, if available, was added to the Table. The remaining 2 studies did not discuss or report measures of validity. Although not reported as convergent or discriminant validity, all 5 studies used psychophysiological responses among participants to corroborate the level of anxiety measured with the study’s selected scale.21

Discussion

Five instruments that measure acute situational anxiety in the preoperative period of hospitalization met criteria for inclusion in this integrative review. Previous reviews on instruments to measure anxiety have not focused on the preoperative period of hospitalization for surgical patients. Thus, the 5 studies included in this review represent the instruments used in the last decade to measure preoperative anxiety. Additionally, descriptions and implications of their psychometric properties are discussed.

According to this literature review, the Spielberger State-Trait Anxiety Inventory and the VAS for Anxiety are the 2 most commonly used instruments to measure anxiety in the clinical setting.1,7,8,15 The State-Trait Anxiety Inventory measures both state anxiety (feelings when subjected to an anxiety-provoking stimulus) and trait anxiety (disposition of responses to stressful situations).22 State and trait anxiety are each assessed by answering 20 items using a 4-point scale. Higher scores are indicative of greater anxiety.22 Historically, the internal consistency coefficients have ranged from 0.86 to 0.95, with evidence to attest to the concurrent and context validity of the scale.22 The VAS for Anxiety is a simple instrument to measure anxiety. Along an equally divided continuum (0 to 10 or 0 to 100), the subject selects his or her level of anxiety. Psychometric scoring for both reliability and validity was sparse among the included studies. Multiple studies reported that both reliability and validity of the instrument was based on its use in previous research. To quantitatively define reliability and validity of the instrument, we also reviewed the references cited in the 5 studies. Unfortunately, the referenced studies offered additional references to other studies regarding reliability and validity or no information regarding psychometric information on reliability or validity of the instruments used in the preoperative period to assess anxiety. Therefore, one must consider that previous results of these instruments may not be generalizable when used in the preoperative setting.

Acute situational anxiety is a subjective concept and can be measured only by asking the patient about his or her current level of anxiety. For providers to reduce measurement error and make appropriate clinical decisions from these subjective reports, it is important to use an instrument with adequate reliability and validity. Researchers should not continue to perpetuate the use of anxiety indexes without first acquiring new data on the reliability and validity of a tool for their patient population and setting. Identification and adequate treatment of anxiety are patient-centric concerns because reducing allostatic load is important to optimize patient health. Acute situational anxiety in the preoperative period of hospitalization is a complex concept. Consequently, a single score on a questionnaire or scale may not encapsulate all the psychophysiological clinical indicators of anxiety. Across the 5 studies reviewed, the following indicators were captured: heart rate, heart rate variability, blood pressure, mean arterial pressure, pain, bispectral index, social support, and respiratory rate.1,7,15,16

Further research aimed at establishing a reliable and valid instrument (and corroborative physiological metric) to measure acute situational anxiety in the preoperative period of hospitalization is warranted.
Understanding the central nervous system response to stress and accurately assessing a patient’s level of anxiety with a reliable and valid instrument in the preoperative period will enable providers to best tailor an anesthetic plan for each patient. Finally, research in the United States attempting to reduce acute situational anxiety through complementary therapies in the preoperative period of hospitalization are in their infancy, making additional research warranted.

Conclusion

Only a few instruments are available to measure the concept of acute situational anxiety in the preoperative period of hospitalization. In the 5 studies presented, reliability and validity were not consistently reported. This inconsistency should raise concerns for providers who wish to use these instruments to measure preoperative anxiety and provide treatment based on the instruments’ results. As a practicing CRNA, the lead author (C.B.J.) can attest to the need for a deeper understanding of the concept of acute situational anxiety in the preoperative period and the need for reliable and valid instruments to measure it. The physiological imbalance that occurs because of acute stress is important for practitioners because early detection and treatment of acute situational anxiety has the potential to reduce the deleterious effect of anxiety on the body and lead to improved patient outcomes.

REFERENCES


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DISCLOSURES

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