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# Comparison of the Yumul Faces Anxiety Scale to the Categorization Scale, the Numerical Verbal Rating Scale, and the State-Trait Anxiety Inventory for Preoperative Anxiety Evaluation

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**Abstract :** Background: It is crucial to detect the patient's existing anxiety to assist patients in a perioperative setting which is to be caused by the fear associated with surgical and anesthetic complications. However, the current gold standard for assessing patient anxiety, the STAI, is problematic to use in the preoperative setting, given the duration and concentration required to complete the 40-item questionnaire. Our primary aim in the study is to investigate the correlation of the Yumul Visual Facial Anxiety Scale (VFAS) and Numerical Verbal Rating Scale (NVRS) to State-Trait Anxiety Inventory (STAI) to determine the optimal anxiety scale to use in the perioperative setting. Methods: A clinical study of patients undergoing various surgeries was conducted utilizing each of the preoperative anxiety scales. Inclusion criteria included patients undergoing elective surgeries, while exclusion criteria included patients with anesthesia contraindications, inability to comprehend instructions, impaired judgement, substance abuse history, and those pregnant or lactating. 293 patients were analyzed in terms of demographics, anxiety scale survey results, and anesthesia data via Spearman Coefficients, Chi-Squared Analysis, and Fischer's exact test utilized for comparative analysis. Results: Statistical analysis showed that VFAS had a higher correlation to STAI than NVRS ($r_s$=0.66, $p<0.0001$ vs. $r_s$=0.64, $p<0.0001$). The combined VFAS-Categorization Scores showed the highest correlation with the gold standard ($r_s$=0.72, $p<0.0001$). Subgroup analysis showed similar results. STAI evaluation time (247.7 ± 54.81 sec) far exceeds VFAS (7.29 ± 1.61 sec), NVRS (7.23 ± 1.60 sec), and Categorization scales (7.29 ± 1.99 sec). Patients preferred VFAS (54.4%), Categorization (11.6%), and NVRS (8.8%). Anesthesiologists preferred VFAS (63.9%), NVRS (22.1%), and Categorization Scales (14.0%). Of note, the top five causes of preoperative anxiety were determined to be waiting (56.5%), pain (42.5%), family concerns (40.5%), no information about surgery (40.1%), or anesthesia (31.6%). Conclusıons: Both VFAS and Categorization tests also take significantly less time than STAI, which is critical in the preoperative setting. Combined VFAS-Categorization Score (VCS) demonstrates the highest correlation to the gold standard, STAI. Among both patients and anesthesiologists, VFAS was the most preferred scale. This forms the basis of the Yumul Faces Anxiety Scale, designed for quick quantization and assessment in the preoperative setting while maintaining a high correlation to the golden standard. Additional studies using the formulated Yumul Faces Anxiety Scale are merited.

**Keywords :** numerical verbal anxiety scale, preoperative anxiety, state-trait anxiety inventory, visual facial anxiety scale
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