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The Effect of an Educational Intervention on the Knowledge and Management of PONV among Anesthesia Providers: A Pilot Study

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Introduction

The post-operative nausea and vomiting (PONV) conundrum poses a threat to overall patient safety and well-being post-operatively. Each occurrence predisposes patients to life-threatening co-morbidities including dehydration and electrolyte imbalance, suture tension and dehiscence, venous hypertension and bleeding, esophageal rupture and airway compromise, and the overall decrease in post-operative quality of life. PONV can strain institutional resources and manpower, prolonging post-anesthesia care unit stay to an average of 25 additional minutes, with the total financial impact extending beyond added hospitalization, delayed recovery and loss of productivity.

Purpose/Project Goals

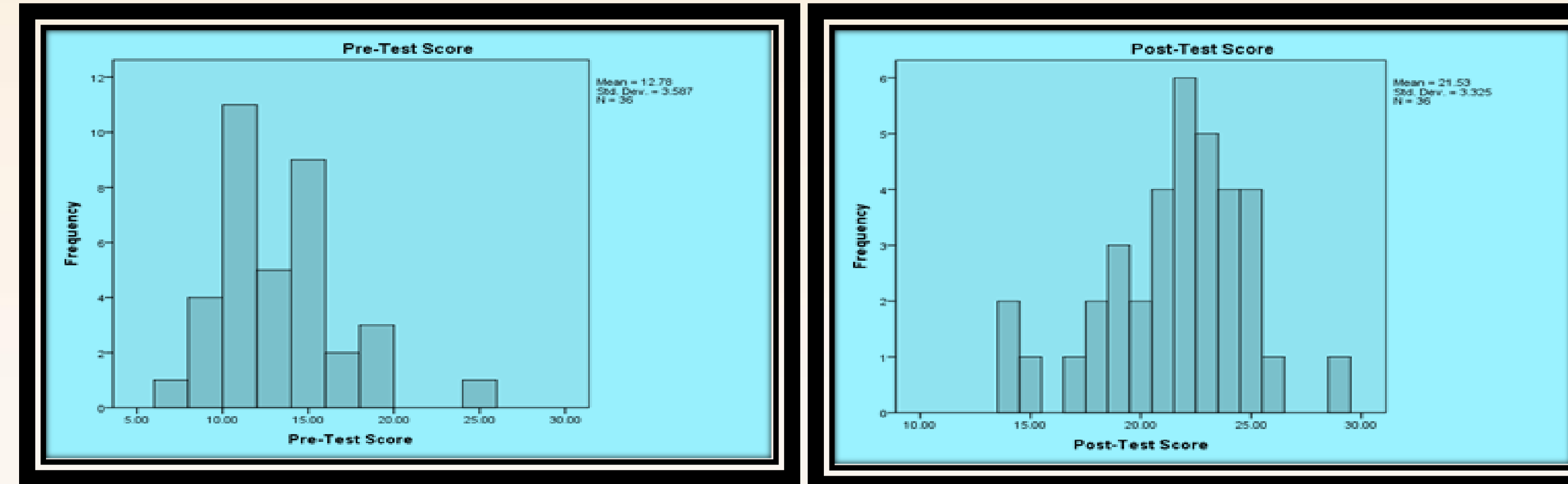
The primary goal of this study was to design a Quality Improvement Capstone Project that will broaden the knowledge and improve the ability of anesthesia providers in applying evidence-based PONV guidelines in the peri-operative area. We developed a PONV Education Module and Toolkit with the anticipation that an increased knowledge and ability to apply an evidence-based guideline will further decrease the occurrence of PONV in our facility through proper identification of high-risk patients, timely and adequate administration of prophylaxis and rescue treatment.

Methods/Project Description

- The evaluation phase of the Capstone Project was designed using the pre-test-post quasi-experimental research design with an educational intervention.
- The assessment tool was divided into two parts. Part one is a twenty-item multiple-choice questionnaire designed to measure the knowledge base of anesthesia providers on PONV. Part two is composed of three clinical scenarios (total of 10 questions) that will determine the effect of the education module on the clinical management of PONV among anesthesia providers. Demographic and research variables in this study include gender, years of practice (experience levels) and practitioner's classification.
- The Wilcoxon signed rank paired test analysis was utilized to determine the effect of the intervention on the scores for knowledge base and clinical management of PONV among anesthesia providers. Descriptive statistics, such as means, standard deviations and percentages, were used to analyze relationships of variables and test scores. The *p* value was set at <0.05 for the pre-post comparisons. The Statistical Package for the Social Sciences (SPSS) 19.0 software was used for data input and data analyses.
- Estimation of the reliability of the questionnaire was performed using the internal consistency approach (Cronbach alpha). The reduced-item (18-item tool) has a Cronbach alpha of 0.690.

	Post-Test Score - Pre-Test Score	Knowledge Base Post-Intervention - Knowledge Base Pre-Intervention	Clinical Management Post-Intervention - Clinical Management Pre-Intervention	Reduced post-test score - Reduced pre-test score	Reduced post-test knowledge base score - Reduced pre-test knowledge base score	Reduced post-test clinical score - Reduced pre-test clinical score
Z	-5.240 ^a	-5.243 ^a	-4.910 ^a	-5.025 ^a	-5.074 ^a	-4.549 ^a
Asymp. Sig. (2-tailed)	.000	.000	.000	.000	.000	.000

a. Based on negative ranks.
 b. Wilcoxon Signed Ranks Test



A total of 36 respondents participated in the study, of which 52.8 % were men (n=19) and 47.2% were women (n=17). Twenty-one respondents were CRNAs (58.3%), and the rest were MDs and DOs (41.7%, n=15). Fourteen (38.9%) had between 0 and 5 years of experience, eight (22.2%) had 6-10 years of experience and 14 (38.9%) had more than 10 years of experience. Majority of the CRNAs (52.4%, n=11) had little experience (0-5 years), whereas a majority of the MDAs/DOs (66.7%, n=10) had more than 10 years. A chi-square test between experience and practice classification indicated that the experience of the CRNA subjects was significantly different than the experience of the MD/DO subjects ($\chi^2_{2df} = 8.376, p = 0.015$).

Results

- With a *p* value of < 0.01, there was a significant difference in the pre and post-test scores.
- The findings indicate no significant differences in the scores (pre and post-test) when compared to experience levels. There was a tendency for the 0-5 years group to perform better both in the pre and post-test in all six composite scores. The 6-10 years group had the lowest success rate in all six composite scores both in the pre and post-test.
- Overall comparisons of practice groups found no significant differences in scores when compared to practice group. Although the CRNA group showed a lower success rate in the knowledge base total score pre-intervention and in the reduced post-test base knowledge score, we have to be weary of non-parametric comparisons between small groups because of the low power of the tests. A bigger sample size can illustrate real statistical power and actual differences in the sampled population.

Discussion

- The significant difference in the composite pre and post-test scores as well as in the theoretical and clinical subsets showed that the developed PONV Education Module and Toolkit instruments appear to be effective in increasing knowledge and the ability to apply evidence-based guidelines to given clinical scenarios among anesthesia providers in this study. The larger increase in post-test scores was noted in the theoretical section, which underscores the need for an educational intervention that focuses more on the clinical management of PONV using evidence-based PONV guidelines.
- The inclusion of patient outcomes as a result of this intervention would be an excellent recommendation for the future expansion of the QIP. At this point in time, we can only speculate that the outcome of our intervention and the eventual change in practice patterns among our anesthesia providers will lead to a significant improvement and reduction in the incidences of PONV.

Implications

The education module and the PONV toolkit present an excellent opportunity for anesthesia practitioners to increase their base knowledge on the clinical problem and increase their ability to apply evidence-based PONV practice guidelines. Its usefulness can be expanded to the entire healthcare practitioners involved in the peri-operative area. For example, a modified PONV education module can be incorporated and utilized in the didactic training of specialty practice nurses and we have envision an expanded QIP that incorporates a PONV teaching module designed for surgical patients. Furthermore, the reduced-item scale (18-item questionnaire) has good internal consistency and can be used to assess knowledge acquisition between pre and post administration in future studies.

PONV Educational Module and Toolkit