

Quality Improvement: Increasing Providers Knowledge of Tracheostomy and Laryngectomy

Kaitlyn Edwards, MD¹; Deepa Danan MD, MBA, FACS¹

¹University of Florida Department of Otolaryngology/Head and Neck Surgery

ABSTRACT

Introduction: The differences between a tracheostomy and laryngectomy airway are frequently misunderstood by healthcare professionals. Insufficient knowledge on the subject has been found to be a common source of anxiety amongst providers when caring for these patients and can potentially result in life threatening consequences in the event of an emergency airway situation. This may also result inadequate or insufficient care of the airway and patient during hospitalization. The goal of our study was to assess the knowledge of providers who frequently care for these patients on common airway scenarios as well as differences in a tracheostomy and laryngectomy airway.

Methods: We developed a seven-question quiz to assess provider's knowledge of the difference between a tracheostomy and laryngectomy airway as well as management during a respiratory event. The quizzes were administered prior to and after an informational didactic we created to instruct providers on these topics. Forty-six participants consisting of nurses, operating room staff, and anesthesia providers commonly caring for these patients at a level I trauma center were evaluated.

Results: There were significant gaps in knowledge amongst all health care professionals evaluated. While 80% of participants were able to identify the correct description of a tracheostomy airway, only 39% were able to correctly identify the description of a laryngectomy airway on pre lecture quiz. Two groups, consisting of nursing staff from the Otolaryngology ICU and OR staff, showed a statically significant improvement in knowledge base on post lecture testing (p<0.001). The group consisting of anesthesia residents and faculty, however, did not show a statistical change in pre and post testing (p = 0.052), which is not unexpected given their advance airway training. All questions regarding postoperative airway management in these patients showed a statistically significant improvement in knowledge on post lecture testing.

Conclusions: The fundamental difference in a tracheostomy and laryngectomy airway as well as how to mange different airway scenarios in these patients was poorly understood. Heath care providers showed significant improvement in understanding of these topics following an educational lecture.

CONTACT

Kaitlyn Edwards, MD
University of Florida Department of
Otolaryngology
Email: kaitlyn.edwards@ent.ufl.edu
Phone:352-273-5199

BACKGROUND

The differences between a tracheostomy and laryngectomy are frequently misunderstood by healthcare professionals and serve as a common source of anxiety. Lack of proper knowledge can result in improper care during hospitalization, or even life-threatening consequences in the event of an emergent airway situation. Fortunately, these events are rare, but they should be “never” events. As a result, outcomes are difficult to study. Therefore, this quality improvement project was designed to study provider knowledge rather than outcomes.

Due to complex anatomy and need for 3D understanding of upper airway structures, teaching the differences between tracheostomy and laryngectomy can be difficult and frustrating. However, hands-on experiences are limited, and simulation exercises are difficult to achieve across all necessary groups in the hospital.

With this in mind, we designed this study to first assess the baseline status of tracheostomy and laryngectomy knowledge in healthcare providers at a variety of levels who frequently care for these patients. We also sought to determine whether didactic lectures alone can appropriately teach this information and improve providers’ knowledge of tracheostomy and laryngectomy management, ultimately leading to prevention of these “never” errors.

METHODS

Didactic lectures with content tailored toward the participant group were created. Each lecture contained standardized slides and verbiage with respect to study content including anatomical differences between a tracheostomy and laryngectomy, routine care, and basic management in an emergent airway situation. We then administered the lectures in person to 46 participants (prior to COVID-19 pandemic) which included OR and ICU nurses, OR and ICU patient care technicians, as well as anesthesia providers commonly caring for these patients at a level I trauma center. Participant's knowledge was assessed via a 7-point assessment both prior to and after the didactic lecture. Questions assessed anatomical knowledge as well as scenario-based decision making.

RESULTS

Following these lectures, we found significant gaps in airway knowledge exists amongst all healthcare professionals at baseline. Pre lecture test score average was 3.13 out of 7 across all providers, significantly improving to 5.87 post lecture (p<0.001). Additionally, lectures alone were sufficient to improve this knowledge across all groups and all question types.

Paired Samples T–Test

Measure 1	Measure 2	t	df	p	Cohen's d
PRE	POST	−9.318	45	< .001	−1.374
EBU pre	EBU post	−8.166	19	< .001	−1.826
FSC pre	FSC post	−5.008	19	< .001	−1.120
Anes pre	Anes post	−2.539	5	0.052	−1.037
Q1 pre	Q1 post	−1.403	39	0.168	−0.222
Q2 pre	Q2 post	−3.777	39	< .001	−0.597
Q3 pre	Q3 post	−10.140	39	< .001	−1.603
Q4 pre	Q4 post	−7.649	39	< .001	−1.209
Q5 pre	Q5 post	−2.479	39	0.018	−0.392
Q6 pre	Q6 post	−4.457	39	< .001	−0.705
Q7 pre	Q7 post	−4.149	39	< .001	−0.656

Note. Student's t–test.

Table 1: Statistical analysis showing improvement across all groups and all question types following didactic lectures

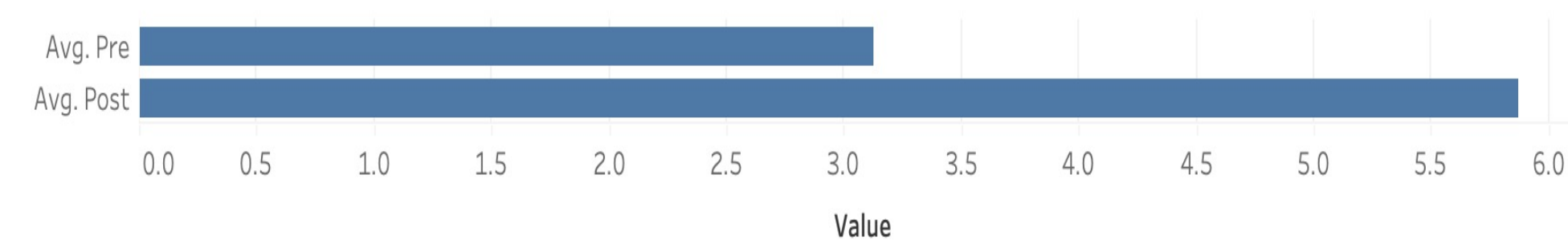
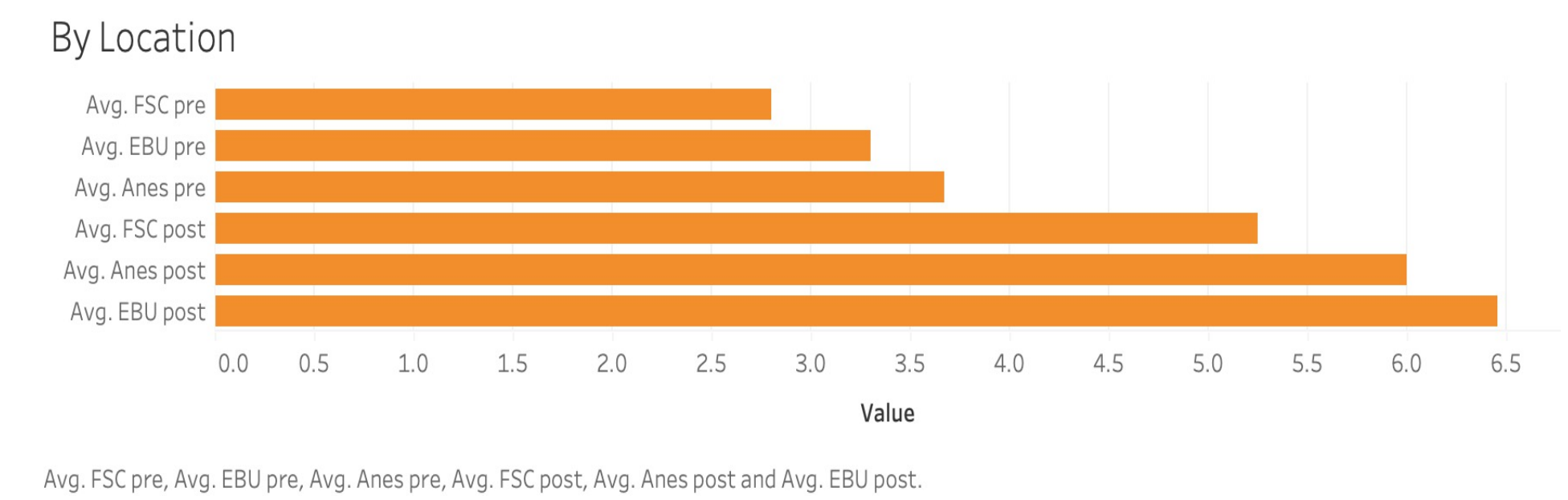


Figure 1: Average test scores improved from 3.13 out of 7 pre didactic to 5.87 post didactic



Avg. FSC pre, Avg. EBU pre, Avg. Anes pre, Avg. FSC post, Avg. Anes post and Avg. EBU post.

Figure 2: Average test score by location. An improvement in post didactic lecture scores was demonstrated across all participant group (FSC: outpatient surgery center, Anes: anesthesia providers, EBU: ENT ICU/intermediate care)s. As expected, participants from our outpatient surgery center (FSC) had the lowest pre didactic scores as they care for these patients less frequently than other groups tested

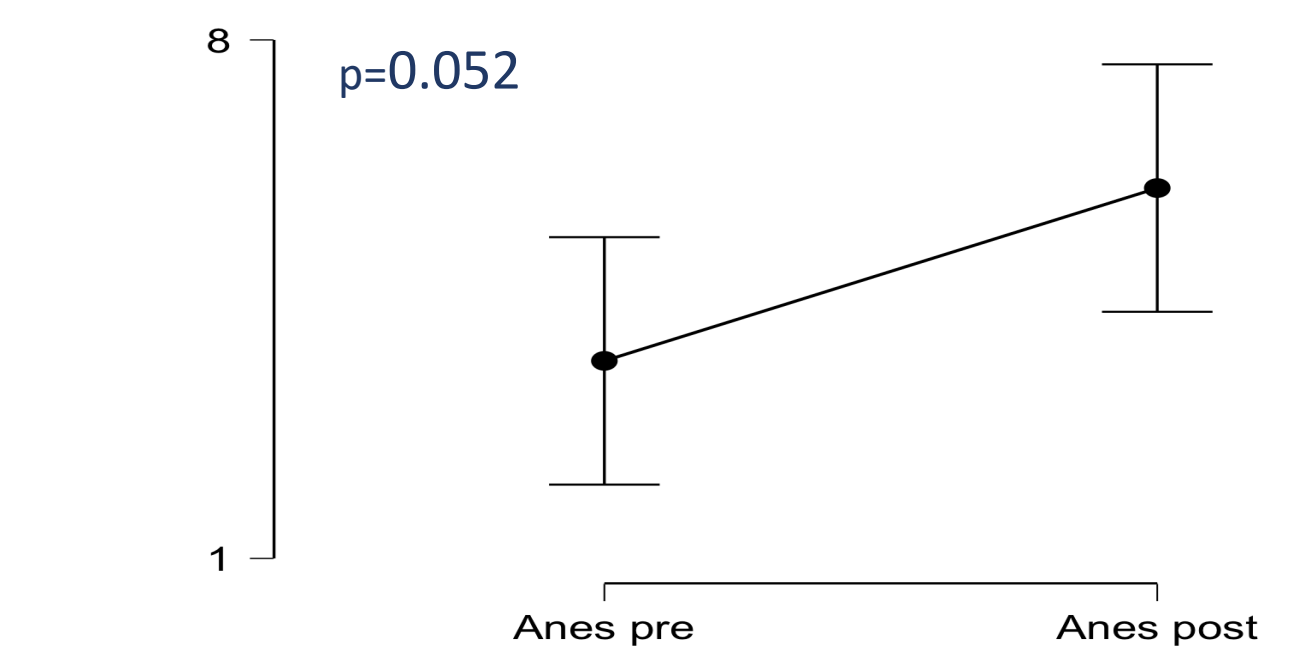
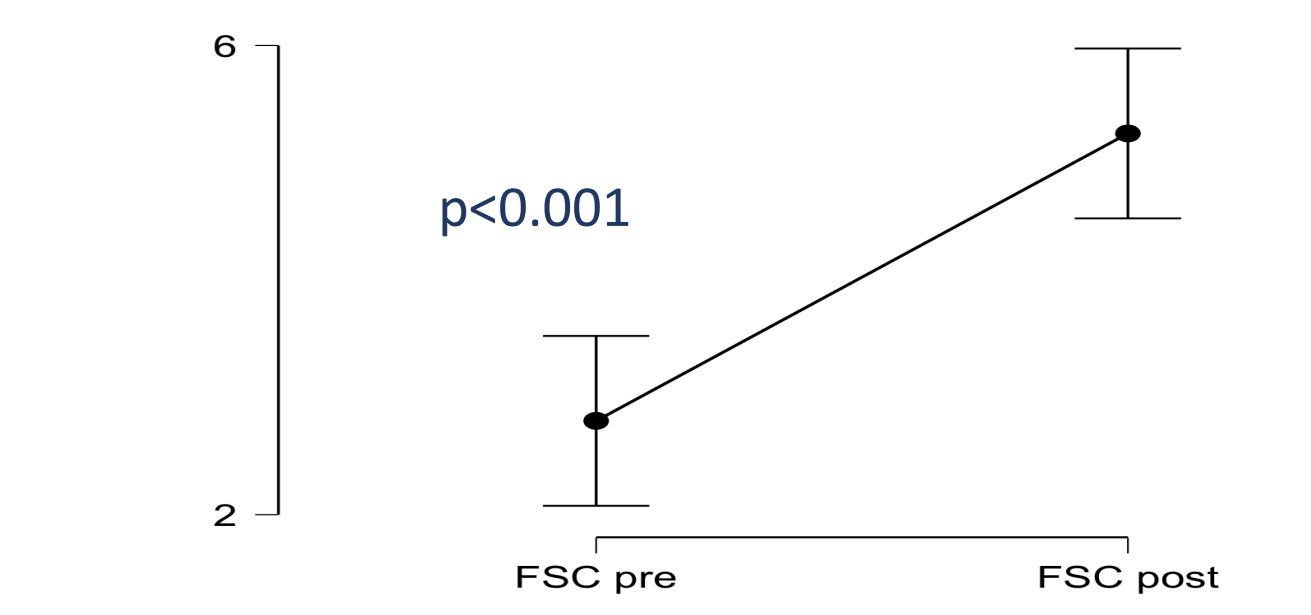
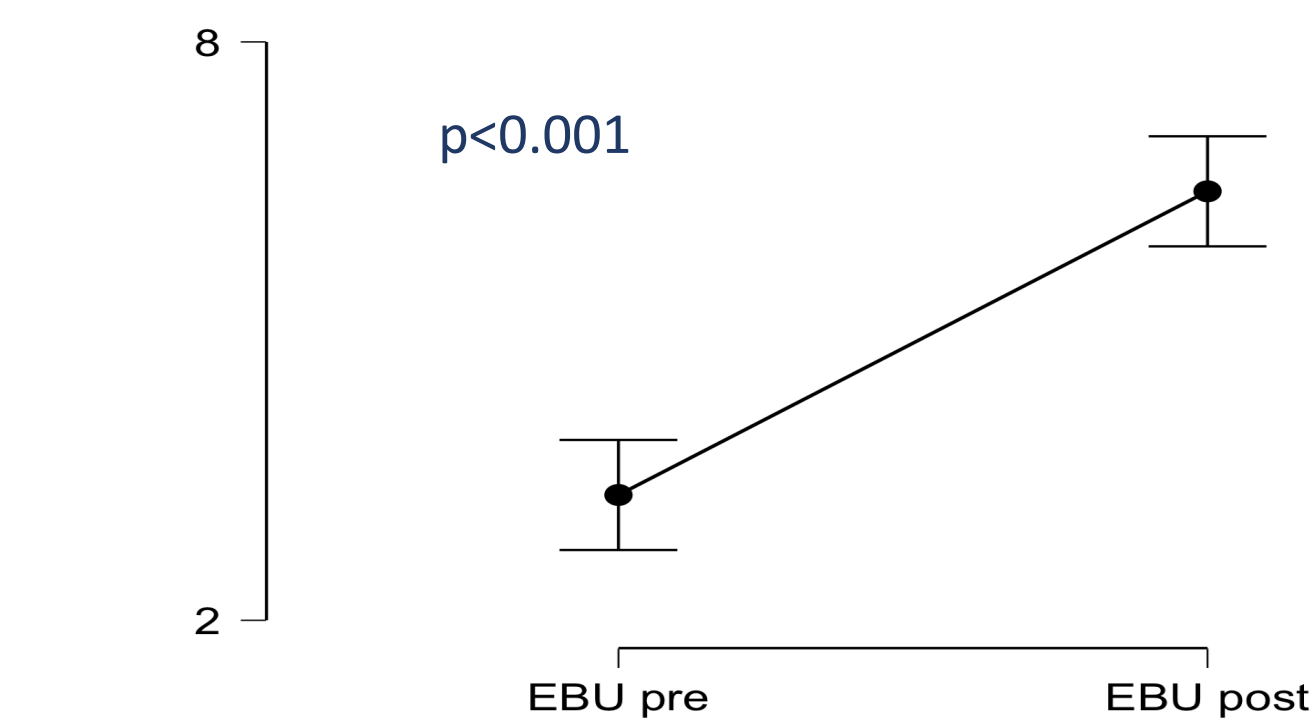
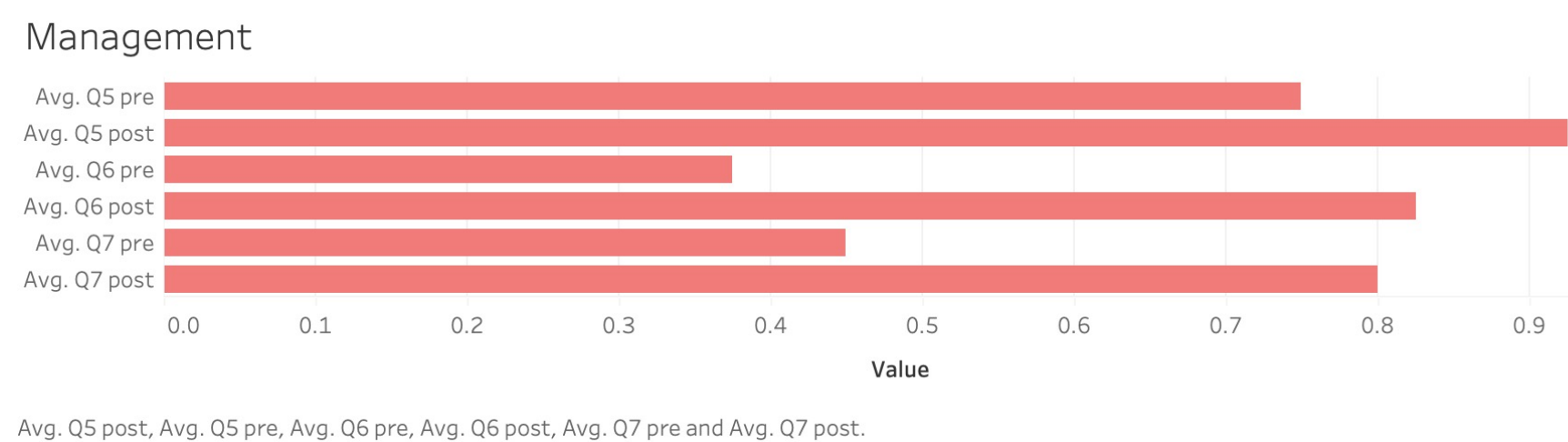
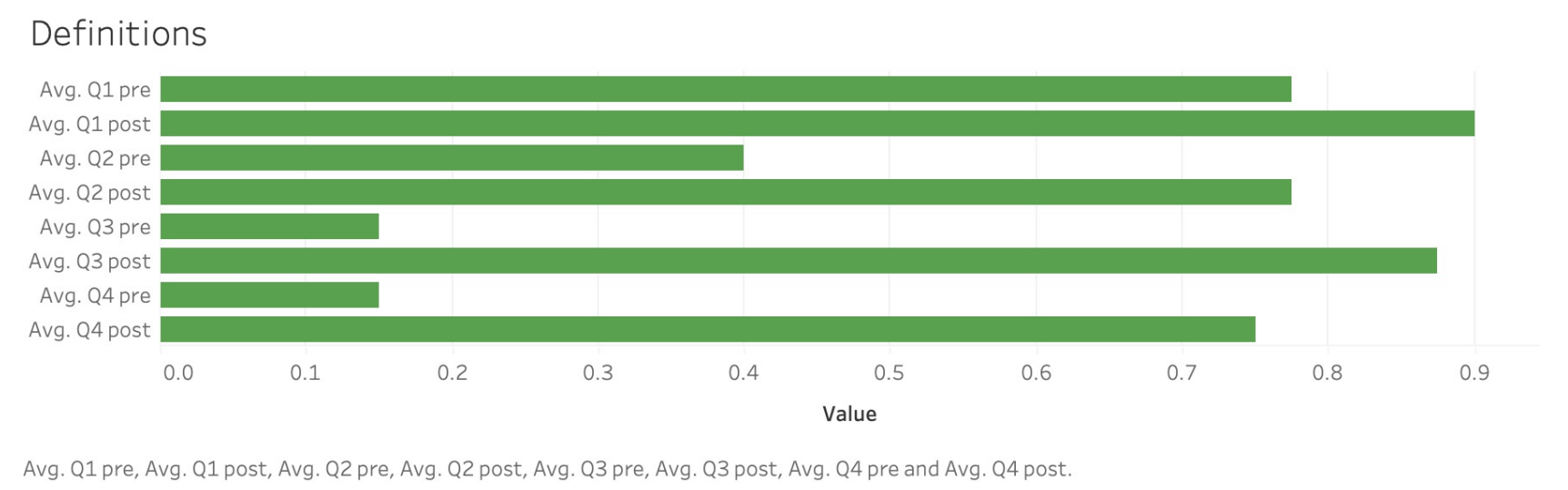


Figure 3: Average test scores based on question type. An improvement in post didactic lectures scores was demonstrated across all questions and all question type. Results based on anatomical definitions showed participants were more familiar with the anatomy of a tracheostomy than that of a laryngectomy (Q1 & Q2) on pre didactic testing. This gap in knowledge significantly improved on post didactic testing. Results from questions based on basic airway management again showed knowledge was higher regarding basic tracheostomy management compared to laryngectomy management

Figure 4: Overall, all groups showed improvement in knowledge based on post-group testing. Two groups, consisting of nursing staff from the Otolaryngology ICU (EBU) and OR staff (FSC), showed a statically significant improvement in knowledge (p<0.001) while the anesthesia group only approached significance (p=0.052), likely reflecting anesthesia providers’ higher baseline level of knowledge and airway training.

CONCLUSIONS

There are significant gaps in airway knowledge amongst all non-Otolaryngology healthcare professionals, even Anesthesia providers. Didactic lectures increase providers knowledge on subjects, and providers can be educated via didactic lectures alone. This shows promising results for improving care of our patients and future directions for airway education. Limitations include small sample size due to cessation of in-person lectures, as well as comparison to teaching with simulation sessions.