REVIEW

The Learning Preferences of Applicants Who Interview for General Surgery Residency: A Multiinstitutional Study

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BACKGROUND: Learning styles theory posits that learners have distinct preferences for how they assimilate new information. The VARK model categorizes learners based on combinations of 4 learning preferences: visual (V), aural (A), read/write (R), and kinesthetic (K). A previous single institution study demonstrated that the VARK preferences of applicants who interview for general surgery residency are different from that of the general population and that learning preferences were associated with performance on standardized tests. This multiinstitutional study was conducted to determine the distribution of VARK preferences among interviewees for general surgery residency and the effect of those preferences on United States Medical Licensing Examination (USMLE) scores.

METHODS: The VARK learning inventory was administered to applicants who interviewed at 3 general surgery programs during the 2014 to 2015 academic year. The distribution of VARK learning preferences among interviewees was compared with that of the general population of VARK respondents. Performance on USMLE Step 1 and Step 2 Clinical Knowledge was analyzed for associations with VARK learning preferences. Chi-square, analysis of variance, and Dunnett's test were used for statistical analysis, with $p < 0.05$ considered statistically significant.

RESULTS: The VARK inventory was completed by a total of 140 residency interviewees. Sixty-four percent of participants were male, and 41% were unimodal, having a preference for a single learning modality. The distribution of VARK preferences of interviewees was different than that of the general population ($p = 0.02$). By analysis of variance, there were no overall differences in USMLE Step 1 and Step 2 Clinical Knowledge scores by VARK preference ($p = 0.06$ and 0.21, respectively). However, multiple comparison analysis using Dunnett's test revealed that interviewees with R preferences had significantly higher scores than those with multimodal preferences on USMLE Step 1 (239 vs. 222, $p = 0.02$).

CONCLUSION: Applicants who interview for general surgery residency have a different pattern of VARK preferences than that of the general population. Interviewees with preferences for read/write learning modalities have higher scores on the USMLE Step 1 than those with multimodal preferences. Learning preferences may have impact on residency applicant selection and represents a topic that warrants further investigation. (J Surg Ed ▮:▮▮▮-▮▮▮. © 2016 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: learning styles, USMLE, surgical education, surgical residents, VARK

COMPETENCIES: Medical Knowledge

INTRODUCTION

The concept of learning styles is based on the assertion that learners have preferences for the method by which they assimilate new information and knowledge.[1] The implication for surgical education is that it may be possible to improve learning efficiency if teaching methods are tailored to the preferred learning style of the trainee.[2] Maximizing learning efficiency is, especially important in the current environment of medical education, with duty hour restrictions that place constraints on time available for trainees to learn and clinical productivity pressures on faculty that place constraints on time available to teach.[3-7]

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Among the various models proposed for learning styles is the VARK model developed by Neil Fleming, in which learners are categorized based on their preferences for the sensory modalities: visual (V), aural (A), read/write (R), and kinesthetic (K), or as multimodal (MM).[8] The validity of the VARK model has been demonstrated across a broad spectrum of population of learners.[9-15] The VARK learning preferences has been examined previously among surgical residents and applicants who interview for general surgery residency: these studies demonstrated that these groups have different distribution of VARK preferences than that of the general public.[16,17] In addition, performance on standardized tests such as the United States Medical Licensing Examination (USMLE) and the American Board of Surgery In-Training Examination (ABSITE) is associated with VARK learning preferences.[17,18] However, these studies were only conducted in single institution settings; VARK has not been previously studied in surgical education in a multiinstitutional setting.

Therefore, we conducted a multiinstitutional study of VARK learning preferences among applicants who interview for general surgery residency. We hypothesized that residency interviewees have a distribution of VARK preferences different from that of the general population and that VARK learning preferences of residency interviewees are associated with their performance on USMLE Step 1 and Step 2 Clinical Knowledge (CK).

METHODS

The study protocol was reviewed and received exempt status from the Institutional Review Board of the Louisiana State University Health Sciences Center—Shreveport. The Fleming VARK learning styles inventory (http://www.vark-learn.com/) was administered to resident applicants who interviewed at 3 general surgery residency programs during the 2014 to 2015 academic year. The 3 residency programs consisted of 2 community hospital-based programs with university affiliations and 1 university hospital-based program. Only applicants who attended their in-person interviews were offered the inventory. Interviewees were instructed not to complete the VARK inventory if they had completed it previously at another participating institution.

The VARK inventory consisted of 16 multiple choice questions, each with 4 possible responses. The VARK administration instructions were followed: interviewees were instructed that they could choose 1, more than 1, or none of the 4 possible responses to each question. Responses to the inventory were scored to determine the learning style preferences for each interviewee. All responses and other participant data were deidentified. VARK inventories were scored centrally by VARK Learn, Ltd (Christchurch, New Zealand). Interviewees were classified as having a dominant unimodal preference for visual (V), aural (A), read/write (R) or kinesthetic learning styles, or as having a multimodal (MM) preference. The MM classification encompasses all possible combinations of 2, 3, or 4 of the learning styles.

The distribution of VARK preferences of interviewees was compared with that of the general population of VARK respondents. Interviewee performance on the United States Medical Licensing Examination (USMLE) Step 1 and Step 2 CK scores were examined for association with learning style preferences. Interviewees with missing data for either Step 1 or Step 2 CK scores were excluded from the respective analyses.

Statistical analysis was performed using SPSS 21 (IBM Corporation, Armonk, NY). Chi-square analysis, analysis of variance (ANOVA), and multiple comparison analysis (Dunnett's test) were performed for statistical analysis, with a $p < 0.05$ considered significant.

RESULTS

Across the 3 general surgery programs participating, there were a total of 140 residency interviewees who completed the VARK inventory. Sixty-four percent of participants were male. Thirty-eight percent were residency interviewees at the university hospital-based program and 62% were interviewees at one of the community hospital-based university affiliated programs.

The distribution of learning style preferences among resident interviewees is shown in Figure 1. Most interviewees had a MM preference (58.6%). Interviewees with dominant kinesthetic (K) preferences represented the largest proportion among those with unimodal preferences (21.7%). Visual (V) and aural (A) preferences were the smallest groups, at 6.4% each. The distribution of learning style preferences of resident interviewees was different than

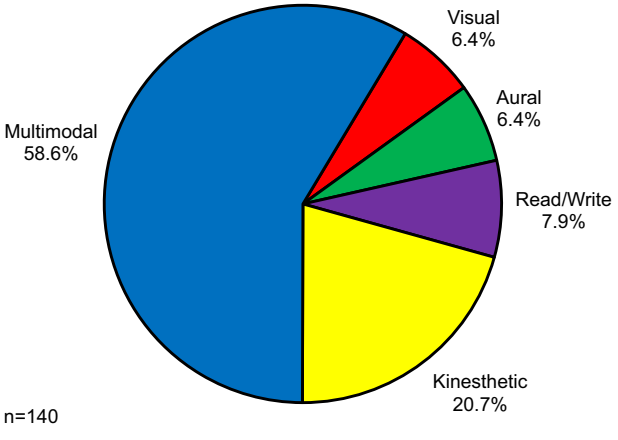

FIGURE 1. Distribution of VARK learning style preferences among resident interviewees.