
Impact of a Third-Year Surgical Apprenticeship Model: Perceptions and Attitudes Compared with the Traditional Medical Student Clerkship Experience

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- BACKGROUND:** Current literature suggests that medical students may have negative misconceptions of a surgical career partly due to the traditional hierarchical structure of the surgical clerkship. We hypothesized that a novel medical student apprenticeship would result in positive changes in perceptions of both surgeons and surgical careers.
- STUDY DESIGN:** In the 2011 academic year, third-year medical students were offered a 2-week apprenticeship elective, in addition to the standard 8-week surgical clerkship. Unlike a traditional service, students apprenticed directly with participating faculty on a one-on-one basis. At the clerkship's end, students received a structured questionnaire assessing perceptions and attitudes toward surgeons and a career in surgery. Subjects responded anonymously using a 5-point Likert scale. A Wilcoxon Rank-Sum was performed comparing students who participated vs those who did not participate in the apprenticeship.
- RESULTS:** There was a 99% survey response (105 of 106). Of those, 50 (48%) participated in the apprenticeship. Apprenticeship students were more likely to view surgeons as content ($p < 0.001$), well-balanced ($p < 0.01$), respectful ($p = 0.01$), and as role models ($p < 0.005$). Apprenticeship students were also more likely to participate in the operating room ($p < 0.05$) and in patient management ($p < 0.05$). There was no difference in an interest to pursue a surgical career between groups both before and on completion of the clerkship.
- CONCLUSIONS:** Students participating in a surgical apprenticeship had a more positive view of surgeons and the field of surgery compared with students not participating. An apprenticeship model enhances the surgical clerkship experience and improves medical student perceptions of surgery as a career. (J Am Coll Surg 2014;218:1032–1037. © 2014 by the American College of Surgeons)
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Adequacy of the future general surgery workforce in the United States has been increasingly under scrutiny. Despite previous predictions indicating a sufficient supply or even a surplus of surgeons,¹ it has recently become clearer that an impending shortage of surgeons in the United States is likely.²⁻⁸ Fraher and colleagues⁹ predicted that by 2028 there will be an 18% decrease in the general

surgery workforce. Even though the population of the United States is rising, the number of certifications granted by the American Board of Surgery has remained unchanged for the past 30 years.^{1,10} Several explanations for this shortage have been proposed. A continued decline in new applicants and a larger proportion of residents planning part-time careers, contribute, at least in part, to a decreasing national pool of surgeons.^{9,11}

The third-year medical student surgical clerkship is an integral component of medical school curricula. The clerkship has been identified as a key formative experience that has the potential to influence medical students' decision to pursue a surgical career.¹²⁻¹⁴ Patient interaction including suturing, controlling the laparoscope, and actively participating in the operating room have been linked as predictors of selecting surgical careers.¹⁵ Other studies have documented the positive impact that faculty and housestaff have as educators, mentors, and role models in attracting future surgical trainees.¹⁵⁻¹⁹

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The perception of surgeons may also affect career decisions. Previous surveys have demonstrated that perceived length of surgical training and increasing student financial debt may negatively affect a desire to pursue surgery. Furthermore, evidence suggests that medical students, by and large, may view surgeons as less respectful to colleagues and less satisfied in their career choice. Other less quantifiable considerations, such as “lifestyle,” may also dissuade applicants from a surgical career due to the perception of sacrificing family and overall personal well-being.^{12,20,21}

Recently we initiated a new apprenticeship model of surgical education designed to facilitate more meaningful professional and personal interactions between medical students and surgical faculty. This educational initiative provides students with opportunities to develop a realistic and encompassing impression of surgeons and surgery as a possible surgical career. We hypothesized that the introduction of an apprenticeship model would improve the medical student perception of surgeons, and consideration of pursuing a surgical career.

METHODS

During the 2011 academic year, third-year medical students were offered an elective 2-week surgical apprenticeship elective rotation, which was incorporated as an adjunct to their 8-week surgical clerkship. Faculty members were solicited to participate as mentors on a volunteer basis and a variety of surgical specialties were represented, including surgical oncology, breast, plastic, cardiothoracic, colorectal, general, bariatric, pediatric, endocrine, and general surgery. All faculty were clinically active and had faculty appointments at our tertiary, referral academic center. The structure of the apprenticeship consisted of a one-on-one 2-week clinical rotation with a faculty member that was all encompassing. Students participated in all clinical, educational, professional, and training-related activities alongside their respective faculty member for the entirety of the 2 weeks. Students had limited interaction with housestaff, with the exception of clinical situations in which assigned faculty were present. There was limited resident-led service-related activity from participating students aside from efforts directly carried out by their faculty. In addition to the apprenticeship, students also completed the required 8-week surgical rotation (divided into two 4-week rotations).

At the end of the clerkship, students received a structured questionnaire assessing perceptions and attitudes toward surgeons and a surgical career (Table 1). Students responded anonymously to the 23 questions using a 5-point Likert scale assessing their level of agreement with

each statement. Responses of students who participated vs those who did not participate in the apprenticeship were compared. The distribution of responses to survey questions was compared using the Wilcoxon Rank-Sum test. A p value less than 0.05 was considered significant for this analysis. Statistical analysis was performed using IBM SPSS Statistics version 20.0 for Windows.

RESULTS

There were 106 students who completed the surgical clerkship in the study period, and there was a 99% ($n = 105$) response rate to the survey. Of the 106 students, 50 (48%) participated in the surgical apprenticeship elective. Importantly, there was no significant difference in reported interest in pursuing surgery as a career between those who did and those who did not participate in the elective before the clerkship ($p = 0.14$) (Fig. 1).

Of the 23 questions asked in the survey, 12 questions had statistically significant differences in the responses between the 2 groups (Figs. 2 and 3). Questions pertaining to a student's perception of surgeons are listed in Figure 2. Questions pertaining to a student's perception of the clerkship experience are listed in Figure 3. Grouping themes together, students who completed the surgical apprenticeship believed surgeons are content with career choice ($p < 0.001$), lead well-balanced lives ($p = 0.003$), and encourage the pursuit of surgery as a career ($p = 0.026$). Furthermore, the apprenticeship group responded that surgeons are respectful of their colleagues ($p = 0.014$), are not ill-tempered ($p < 0.001$), are appropriate role models ($p = 0.004$), and provide strong mentorship ($p = 0.017$). Regarding students' perceptions of the overall surgical clerkship, those completing the apprenticeship felt more strongly that they participated in patient management ($p = 0.044$), actively participated in the operating room ($p = 0.040$), were active members of the surgical team (0.042), and believed that surgeons were respectful of medical students ($p = 0.013$). Interestingly, at the completion of the clerkship, there was no significant difference between groups in pursuing surgery as a career ($p = 0.063$).

DISCUSSION

The structure of third-year medical student rotations has varied surprisingly little since the recommendation of clerkship structure by Abraham Flexner in 1910. Beyond the important core educational facets of any third year clerkship, it is well documented that the experience of a clerkship can have a profound impact on the career selection of medical students. Indeed, Berman and colleagues

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