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The Impact of the Eighty- Hour Work Week on Student Interest in a Surgical Career

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Abstract

Introduction—In July of 2003 an eighty- hour work week was initiated for residents across the United States, with the potential benefit of improving resident quality of life. Using a survey of medical students, we evaluated whether this change increased medical students' interest in pursuing a career in surgery.

Methods—Surveys were administered to 505 medical students prior to and after completing their surgical clerkship at a university based medical school. Results were then analyzed with significance determined as a $p \leq 0.05$.

Results—Overall, fifty-five (10.9%) medical students stated they anticipated pursuing a surgical career prior to starting their clerkship. There was no difference in the pre-rotation interest in a surgical career from before to after introduction of the 80-hour work week (8.3% vs. 12.6%, $p=0.14$). Men were also more likely than women to report a pre-rotation interest in surgery (16.9% vs. 6.1%, $p<0.001$). The most important factor influencing a student's post-clerkship interest in pursuing a career in surgery was a pre-rotation interest.

Conclusion—These data indicate that the 80-hour work week has not improved medical students' nor females' interests in surgery. Since the strongest predictor of pursuing a career in surgery is a pre-rotation interest, we need to continue efforts to appeal to medical students earlier in their education and improve upon their perceptions of surgery.

Introduction

In July of 2003, the recommendations made by the Accreditation Council for Graduate Medical Education (ACGME) regarding resident work hours were implemented by general surgery programs across the country. These new regulations limited duty hours to 80 hours per week, averaged over a 4 week period (1). Since implementation several studies have been published evaluating the effect these restrictions have had on patient care, surgical education, and resident quality of life (2,3). Few papers have examined how the work hour limitations have affected medical students' interest in the field of surgery. In a paper published less than a year after the ACGME restrictions, researchers found that work hour limitations had a positive impact on medical students' interest in surgery, but it was not the

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most important factor in choosing a residency (2). A 2005 study found that although the new regulations had a positive impact on students' perceptions of a surgeon's lifestyle, they did not necessarily increase their interest in a surgical career (3).

Similarly, several studies have been performed to elucidate why more women do not choose to enter the field of general surgery and what can be done to increase women's interest in a surgical career. Over the last few years the percentage of women enrolling in medical school has nearly doubled, but the percentage graduating from general surgery residencies has remained stagnant (4). Many studies have found that lifestyle, including time for maternity leave and child care, weighed heavily on the minds of female medical students (5,6). In the year after work hour restrictions took effect, researchers conducted a survey that found female medical students were more likely to believe that a surgical career would allow them to maintain a good balance between their professional and personal lives (3).

Given the varied findings of the studies regarding medical student interest in surgery and lack of research over the last few years, this study was conducted to examine whether residency work hour limitations increased third year medical students' interest in pursuing a surgical career either before or after completing their surgical clerkship. Our study also examined whether work hour restrictions and improvements in resident lifestyle have increased female medical student's interest in pursuing surgical careers.

Methods

Third year medical students at a university-based medical school were asked to complete a survey, prior to and after completing their surgical clerkship. The surgical clerkship consisted of a 4-week rotation on a general surgery service, and two 2-week rotations on a specialty or sub-specialty service. Surveys were distributed between October of 2001 and June of 2006, to all students. The pre-clerkship survey was composed of questions regarding the students' anticipated career choice and likelihood of pursuing a surgical career (Table 1). The post-clerkship questionnaire asked the students about their overall enjoyment of the clerkship and whether they were more or less likely to pursue a surgical residency (Table 2). The questionnaires were coded, thereby allowing a comparison of the students' pre and post-clerkship answers. The surveys were sealed and not read until students received their final grades, insuring that they did not feel coerced into giving false responses.

Both surveys consisted of multiple choice and ratings scale questions. Discrete variables, such as gender, marital status, and anticipated career choice, were summarized as proportions of the entire group evaluated. All ratings scale questions were summarized as means with standard deviations. The data was then analyzed with SPSS, version 17 using Fisher's exact test, student's t-test, or the chi-squared test. A p-value <0.05 was considered statistically significant.

Results

During the time period examined, 506 third year medical students began their surgical clerkships. Five hundred and five students (99.8%) completed both the pre and post-clerkship questionnaires. Of the students who completed both surveys, 196 (39%) took the surveys prior to initiation of the 80 hour work week and 309 (61%) completed the surveys after it went into effect.

There was no difference in the gender distribution before and after implementation of the work hour restrictions (Table 3). Similarly, as demonstrated in Table 3, the two groups were also comparable in age and marital status.

On the pre-clerkship survey students were asked what their anticipated residency choice was and given 16 options to choose from (Table 1). Prior to the initiation of the 80 hour work week, 16 (8.2%) medical students expected to pursue a career in general surgery and/or a surgical subspecialty compared to 39 (12.6%) students who began their rotation after the new work hours took effect ($p=0.12$) (Figure 1). The groups were further divided to evaluate whether a difference existed in those interested in general surgery compared to subspecialty surgery and once again no statistically significant difference was seen. In the pre-80 hour work week group, 6 (3.1%) students expressed an interest in pursuing general surgery, 9 (4.6%) in subspecialty surgery, and 1 (<1%) student expressing an interest in both. In the post-80 hour group, 10 (3.2%) students expected to pursue general surgery, 26 (8.4%) subspecialty surgery, and 3 (<1%) students were interested in both general and subspecialty surgery.

Students were then asked to rank on a scale of 1 to 10 (1=not very likely and 10=very likely) how likely they were to pursue a career/residency in general surgery. General surgery achieved a mean ranking of 3.13 ± 2.18 by those students completing the rotation prior to work hour restrictions compared to a mean ranking of 3.26 ± 2.26 by students who began the rotation after ($p=0.76$). Similarly, there was no difference between the two groups in ranking the likelihood of working in a surgical subspecialty (3.34 ± 2.48 vs. 3.58 ± 2.60 , $p=0.48$).

On the post-clerkship survey students were asked to rank their overall clerkship experience on a scale of 1 to 10 with 1 being the lowest ranking and 10 being the highest. The surgical clerkship earned a mean score of 6.96 ± 1.87 prior to work hour restrictions and a mean score of 6.90 ± 2.08 after work hour restrictions went into effect ($p=0.94$).

Students were also asked, based on their experience during the surgical clerkship whether they were more or less likely to pursue a general surgery or surgical subspecialty residency. Of those students who completed their rotations prior to the work hour rules being instituted, 86 (43.8%) reported an increased interest in pursuing either a general surgery or surgical subspecialty residency. The percentage of students with an increased desire to pursue a surgical residency did not change after initiation of the 80 hour work week (43.8% vs. 44.3%, $p=0.93$). When the answers of those medical students who reported a pre-clerkship interest in a surgical career were analyzed, 13 of 16 (81%) students in the pre-80 work hour group reported no change or an increased desire to pursue a surgical career. This was significantly lower than the group of students completing the clerkship after work hour regulations went into effect. Of this group, 38 of 39 (97%) of students reported no change or an increased desire in pursuing either general surgery or a subspecialty residency ($p=0.03$).

When medical student interest in surgery was analyzed according to gender there was a statistically significant difference between males and females. In the pre-80 hour group, 12 (13.6%) male medical students expressed an interest in pursuing a surgical career, but only 4 (3.7%) female medical students revealed a similar interest ($p=0.01$) (Figure 2). Similarly, after the 80 hour work restrictions went into effect, 26 (19%) male medical students compared to 13 (7.6%) female medical students believed they may pursue surgery as a career ($p=0.002$).

Prior to the ACGME work hour restrictions going into effect 48 (54.5%) male medical students reported an increased or unchanged desire to pursue a surgical career after completing their clerkship. The work hour regulations did not increase male medical student interest in a surgical career after they completed their rotation, with 76 (55.4%) reporting an increased or unchanged desire to practice surgery ($p=0.89$). Similarly, there was no difference in the percentage of female medical students demonstrating an increased desire to pursue a surgical residency on their post-clerkship survey (40 (37.0%) vs. 64 (37.2%),

p=0.97). Interestingly, when comparing all male to female respondents, there was a significantly larger proportion of male medical students showing an increased interest in a surgical career after having completed the rotation compared to female medical students (124 (55.1%) vs. 104 (37.1%), $p<0.001$).

Discussion

The ACGME limited the work hours of all residents to 80 hours per week in July of 2003. This was in part in response to growing concerns across the country regarding resident fatigue and role this played in the incidence of medical errors. To implement the work hour restrictions at our own institution, a night float system was established. Compliance to the 80 hour work week restrictions at our institution has been monitored via a computerized self-reporting database and has not been an issue.

In recent years there has been a trend toward medical students choosing specialties perceived to have a more 'controllable lifestyle', such as anesthesia or radiology. Studies done prior to and immediately after the initiation of work hour restrictions found that the majority of students viewed these changes positively and their perceptions of a career in surgery improved (2,3). Our study demonstrates that although students may view the field more positively, work hour restrictions have not increased their interest in either general or subspecialty surgery prior to beginning their third year clerkship.

Many studies have attempted to answer the question of why medical students choose careers in surgery. One such study found that medical students continue to rank interest in the field as the most important factor when choosing a career (2). Lifestyle after residency was ranked second highest, followed by lifestyle as a resident, and finally projected future salary. In our study we found that a prior interest in surgery strongly correlated with a continued desire to pursue a surgical career. This was the one group that demonstrated a significant change in their wish to pursue surgery with the initiation of work hour regulations. Therefore, attempts need to be made to appeal to medical students prior to their third year surgical clerkship. This coincides with the 2004 Blue Ribbon Committee Report on Surgical Education which recommended recruiting medical students into the field during their first and second years of medical school (7). This can be accomplished through mentorship programs, panel discussions, and surgical interest groups.

Exposure to positive or negative role models has also been previously cited as being an important factor in a medical student's decision to pursue a particular career path (8). Some have argued that by reducing resident work hours and improving their lifestyles, this would be reflected during their interactions with medical students and medical students on a surgical rotation may perceive that positively and thereby become more interested in a surgical career. Conversely, resident work hour restrictions may limit the time residents have for teaching and thereby have a negative impact on medical students. Our study demonstrates that although students enjoyed their surgical rotations, there was no significant difference in the overall percentage of students expressing an interest in the field after work hour restrictions were implemented. This is further indication that surgeons need to appeal to medical students prior to the interactions during the third year clerkship.

Another area of interest is that of recruiting more women to the field of surgery. Previous studies have demonstrated that women begin medical school less interested in pursuing surgery and more women than men lose interest in the field during medical school (9). In our study we found that prior to beginning their surgical clerkship female medical students were significantly less likely to be interested in surgical careers when compared to their male colleagues. Many have postulated that women are deterred from a surgical career

because it continues to have an aura of being an ‘old boys club’ (10). A study done by Snyder and colleagues found that women were more likely to be interested in surgery if a 6-week maternity or paternity leave during residency was more acceptable, if part-time training were an option, and if child care were available at their hospital (6). Although work hour restrictions may have improved resident lifestyle, the issues raised by these studies are not addressed by the new regulations and may explain why we did not find a substantial increase in the percentage of female medical students expressing an interest in surgery after initiation of the regulations.

A study by Saalwachter and colleagues on the training needs of male and female surgeons and their trainees found that women frequently referred to a positive experience on their clerkship as a reason for selecting a surgical career (4). This coincides with our results, with 37.1% of all female students expressing an increased interest in a surgical field after having completed their surgical rotation. Yet, even with this increase, it was significantly lower than that of their male counterparts suggesting that more needs to be done in order to increase the number of women entering the field of surgery.

There are limitations to this study. This survey was administered at a single institution and there may be biases based on first and second year rotations or geographical location that can not be accounted for. Similarly, all factors involved in a medical student’s choice of specialty could not be specified in this survey. Finally, the survey asked about medical students’ interest in surgery, but we did not gather data on which students went on to enter surgical residencies. Therefore, although the numbers of students expressing interest in pursuing surgical careers increased on their post clerkship survey, we are unable to confirm whether or not they pursued a surgical residency.

Our study suggests that work hour regulations have not improved medical students’ interest in surgery. Similarly, we continue to see a trend toward more male medical students expressing an interest in surgery when compared to their female colleagues, and this remains consistent both before and after the initiation of work hour regulations. We did find that those students that reported an interest in a surgical career on their pre-clerkship survey were more likely to have an increased or unchanged desire in pursuing surgery after the completion of the rotation when compared to all other students. Therefore, we need to continue to improve medical students’ views of surgery as a career by appealing to medical students both prior to their surgical clerkships and during their rotations.

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Figure 1.

The percentage of medical students anticipating pursuit of either a general surgery or subspecialty surgery residency prior to beginning their third year surgical clerkship was similar pre and post 80 hour work week.

Figure 2.

Significantly more male medical students anticipated pursuing a surgical residency on the pre-clerkship survey than female medical students. This difference was unchanged after initiation of the 80 hour work week.

Table 1

Pre-clerkship survey questions, including demographic information, choices for anticipated residency/career and rating scale.

PRE-CLERKSHIP SURVEY																			
1	Demographic Information																		
a.	Name:																		
b.	Age: a. 20–24, b. 25–29, c. 30–34, d. 35–40, e. 40–44, f. ≥45																		
c.	Marital Status: a.Single, b.Married, c.Significant other, d.Separated, e.Divorced, f.Widowed																		
2	What is your anticipated residency/career choice at this time?																		
	(if you had to choose TODAY . Please do not respond “Undecided”)																		
	<table border="1"> <tbody> <tr> <td>A. Family Practice</td> <td>I. Ophthalmology</td> </tr> <tr> <td>B. OB/GYN</td> <td>J. Dermatology</td> </tr> <tr> <td>C. Pediatrics</td> <td>K. Neurology</td> </tr> <tr> <td>D. IM/Med Peds/Medicine</td> <td>L. Phys medicine and rehab</td> </tr> <tr> <td> Subspecialty</td> <td>M. Pathology</td> </tr> <tr> <td>E. Radiology</td> <td>N. General Surgery</td> </tr> <tr> <td>F. Anesthesia</td> <td>O. Surgical Subspecialty</td> </tr> <tr> <td>G. Psychiatry</td> <td>P. Other</td> </tr> <tr> <td>H. Emergency Medicine</td> <td></td> </tr> </tbody> </table>	A. Family Practice	I. Ophthalmology	B. OB/GYN	J. Dermatology	C. Pediatrics	K. Neurology	D. IM/Med Peds/Medicine	L. Phys medicine and rehab	Subspecialty	M. Pathology	E. Radiology	N. General Surgery	F. Anesthesia	O. Surgical Subspecialty	G. Psychiatry	P. Other	H. Emergency Medicine	
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E. Radiology	N. General Surgery																		
F. Anesthesia	O. Surgical Subspecialty																		
G. Psychiatry	P. Other																		
H. Emergency Medicine																			
3	On a scale of 1 to 10, how likely are you to pursue a career/residency in General Surgery?																		
	(1=Not Very Likely; 10=Very Likely)																		
4	On a scale of 1 to 10, how likely are you to pursue a Surgical Subspecialty career?																		
	(1=Not Very Likely; 10=Very Likely)																		

Table 2

Post-clerkship survey questions regarding overall enjoyment and experience on the surgical clerkship.

POST-CLERKSHIP SURVEY QUESTIONS

- 1** Did you enjoy your overall surgical clerkship rotation?
(scale of 1=lowest (ie. "I hated it") to 10=highest (ie. "This is the best rotation ever."))
- 2** Based on your experience during your surgical clerkship, do you feel at this time that you are:
 - a.** More likely to pursue a general surgery residency
 - b.** Less likely to pursue a general surgery residency
 - c.** More likely to pursue a surgical subspecialty residency
 - d.** Less likely to pursue a surgical subspecialty residency
 - e.** Not likely to change your residency plans

Table 3

Demonstrates no statistically significant difference between the pre-80 hour work week and post 80 hour work week groups in terms of gender, age, and marital status.

DEMOGRAPHIC DATA			
	Pre 80 hour week restrictions (n = 196)	Post 80 hour work restrictions (n = 309)	P-value
Male	88 (45%)	137 (44%)	P=0.90
Female	108 (55%)	172 (56%)	P=0.90
Age	20-24	20-24	P=0.12
	25-29	25-29	P=0.07
	≥ 30	≥ 30	P=0.54
Marital Status	Single	Single	P=0.65
	Married/ Significant Other	Married/ Significant Other	P=0.40
	Divorced	Divorced	P=0.06