

Students' interest in becoming a general surgeon before and after a surgical clerkship in German-speaking Switzerland

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Summary

PRINCIPLES: The proportion of medical graduates entering a surgical career in Switzerland, as well as in most Western countries, is declining. The purpose of the present study was to evaluate the factors influencing medical students when choosing a career in surgery and to identify the impact of a surgical clerkship.

METHODS: Between February 2007 and July 2007, fifth- to seventh-year medical students at 15 adult surgical departments in German-speaking Switzerland were asked to participate in an anonymous survey. The survey was distributed at the beginning of the clerkship (T1) with a re-evaluation after its conclusion (T2). It included questions concerning career plans, the anticipated conditions at the workplace, lifestyle in residency and as a board-certified physician, and the perception of surgery.

RESULTS: A total of 185/344 (53.8%) medical students participated in the study. Prolonged working hours during the surgical training period compared to those of other specialties was the only significant predictor for not choosing general surgery as the future field of work ($p = 0.02$). After the clerkship, medical students rated the possibility of combining professional and personal life, and engaging in a hobby during specialty training in surgery significantly higher ($p < 0.01$ and $p = 0.03$, respectively). The specialty was named by 33% further students as one of their top three career choices.

CONCLUSIONS: A surgical clerkship might have a positive impact on the choice of a surgical career. As there might be a shortage of surgeons in the future, lifestyle as the main impediment for choosing a surgical career should be kept in mind.

Key words: *medical students; general surgery; career choice; influencing factors; clerkship*

Introduction

Profound changes are taking place in the twenty-first century, on global and national levels, affecting surgical education, and practice as well [1]. A declining interest in entering a surgical residency has led to a shortage of the workforce in many Western countries [1–3]. This development has various causes. One problem might be the changes in lifestyle and the perceptions of a career in surgery in recent decades [4–6]. Surgery has lost much of its prestige and is professionally less rewarding [1, 7, 8].

Another reason might be the shift in the gender ratio of medical students towards a majority of women graduating from medical school in Switzerland and other Western countries [5, 6, 9]. In 2008/2009, the proportion of female graduates in Switzerland was 62.1% [10]. Women are generally less interested in a surgical career [1, 11], as they set great value upon a combination of career and family and on the presence of role models [6, 12]. In contrast, for their male colleagues, participation in research projects, income and prestige, as well as the unique combination of intellectual and manual skills, are important [13].

A positive impact on the interest in a surgical career was found in terms of a clerkship in general surgery [14, 15]. Reasons for this are the possibility of actively participating in surgical operations and being able to follow the patient-treatment process, but also the role model function of the faculty [14–16].

In Switzerland, fifth- and sixth-year medical students have to perform several clerkships, each for a period of one month to four months in individually selected fields in medicine for a total of 10 months. In addition to other specialties, most of the students chose at least one clerkship in general surgery and one in internal medicine.

To date, studies investigating the influence of a clerkship in general surgery on the career choice of medical students in Switzerland are lacking. As there might be a shortage of surgeons in some Western countries, including Switzerland, in the near future, the objective of the present study was to assess the value of a surgical clerkship in attracting medical students to a surgical career.

Methods

Study design

A total of 20 from 60 directors of adult surgical departments in German-speaking Switzerland were randomly contacted by letter (U, A, B3, and B2 clinics, classified according to the Swiss Medical Association [FMH]) and asked to participate in this study (fig. 1) [17]. Randomisation was carried out by computer-generated numbers. Once directors had agreed to participate in the study, they were asked to give the anticipated number of clerkship students for the time period between February 2007 and July 2007. In Switzerland, clerkships normally take place in the fifth or sixth years of medical school. Each student received a self-administered questionnaire at the beginning of the clerkship (T1) along with a cover letter outlining the purpose of the study and was re-evaluated with an identical questionnaire after finishing the clerkship (T2).

Sample

Not all of the participants from the first (T1) and second assessments (T2) were included in the analysis. A total of 25 respondents did not answer one of the two questionnaires at T1 or T2. The study sample, therefore, consisted of 185 students (n = 110 females, 59.5%; n = 75 males, 40.5%).

Survey instrument

A students-attitude questionnaire was developed in German and divided into three parts. Part 1 included socio-demographic data (age, gender, family background, aspired career, and first, second and third specialty preferences). Part 2 consisted of 20 items, derived by reviewing the literature and by holding informal discussions with a group of students [5, 18, 19]. The items addressed anticipated lifestyle in residency and as a board-certified physician, income, on-call service, work-life balance, research possibilities, intellectual stimulation at work, role models, and the impact of the new work-hour restriction. Respondents were asked to rate the influence of each item on their specialty preference on a five-point Likert scale anchored by 1 = no

influence and 5 = strong influence. The participants who did not indicate general surgery as a future career choice (n = 146) were asked to complete an additional part based on the 20 questions of Part 2 with a selection of 16 items. On a five-point Likert scale, ranging from 1 = no influence to 5 = strong influence, the impediments for choosing a surgical career were evaluated with a dichotomisation of the answers into 1, 2, and 3 versus 4 and 5 (see table 3). Part 3 addressed the perception of surgery as a profession and included 16 statements gathered by informal discussions with a group of students. All statements were scored on a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. Based on a Wilcoxon-Sign-Rank-Test, differences in mean values after (T2) versus before (T1) the clerkship were tested, and it was determined whether they tended to deviate from zero or not. Another question dealt with the probability of a career in general surgery, and the responses were based on a visual analogue scale (0 representing extremely unlikely and 100 representing extremely likely). Median values after (T2) the clerkship versus before (T1) the clerkship were compared regarding students not interested in a surgical career and students indicating general surgery as a top three specialty preference before a surgical clerkship, respectively. The questionnaires before (T1) and after (T2) the clerkship were identical except that the survey at T2 had an additional question related to students' satisfaction with the clerkship, in general. The survey was pre-tested for comprehension among 10 students from the University Hospital Basel, who were subsequently excluded from further study analysis.

Statistical analysis

The quantitative statistic assessment was performed with SPSS 17.0 statistical software package (SPSS Inc; Chicago, IL). All tests were two-sided. *p* values ≤ 0.05 were considered to be statistically significant. Data were analysed based on the Mann-Whitney U test [20]. Dichotomous variables were analysed by the Chi-square test or Fisher's exact test [21]. The logistic regression analysis as a multivariate method to predict a binary criterion (general surgery as the first career choice versus all others) was used to check for significant predictors for and against choosing a career in general surgery [21].

To avoid inflation of the first-type error due to multiple testing (α -error), stepwise forward or stepwise backward variable selections were avoided, since these highly explorative analyses usually increase the first-type error and lower the chances of being able to replicate the study results.

A multiple linear regression was performed to evaluate the influence of the surgical clerkship on the probability of entering a career in general surgery.

Results

A total of 185/344 (53.8%) medical students participated in the study at T1 and T2. Of the 185 participants, 115 (62%) were females. The demographic information is shown in table 1.

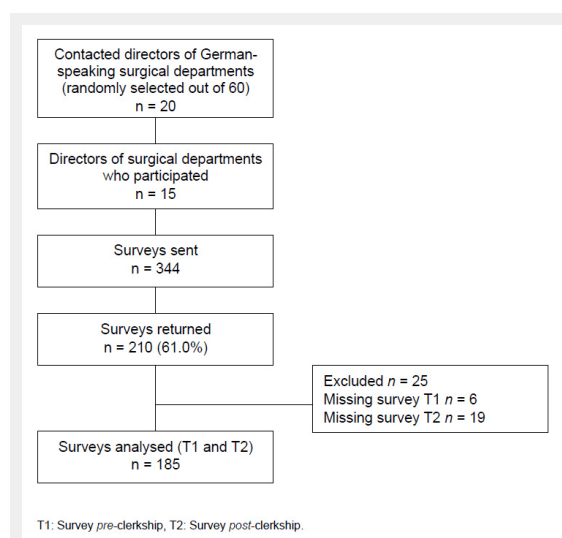


Figure 1
Study design.

Top three specialty preferences before the surgical clerkship

The 185 students indicated a total of 547 specialty preferences for their top three career preferences (8 responses were missing). The three most frequently named specialty preferences were internal medicine (104/185; 56%), surgical subspecialties (70/185; 38%) and general practice (64/185; 35%) (table 2).

General surgery was indicated in 39/185 (21%), though this specialty was named significantly more often by male students ($p < 0.01$), when their father was not a physician ($p = 0.04$) and depending on the type of career to which they aspired ($p < 0.01$). Compared with the respondents not interested in a surgical career ($n = 146$), students indicating general surgery as a top three specialty preference aspired

to have a clinical career in a hospital more frequently (26/39 (67%) vs. 41/146 (28%)), but aspired to have a clinical career in a private practice (3/39 (8%) vs. 47/146 (33%)) and an academic career less often (3/39 (8%) vs. 15/146 (10%)). The environment in which the participants grew up in had no significant influence on the preference of general surgery as a career choice ($p = 0.83$).

Impediments to the choice of general surgery

On the basis of a logistic regression model, prolonged working hours during the training period compared to those of other specialties proved to be the only significant predictor for not choosing general surgery as a future field of work for medical students ($p = 0.02$) (table 3).

Table 1: Respondents' characteristics.

Characteristic	Value (n = 185)
Age, median (range), y	26 (22–37)
Sex ratio (M:F), No.	70:115
Academic year at medical school, No. (%) (1 missing value)	
Year 5	60 (32%)
Year 6	108 (58%)
Year 7	16 (9%)
Type of environment when growing up, No. (%) (2 missing values)	
Countryside	15 (8%)
Village	39 (21%)
Small city	60 (32%)
Major city	33 (18%)
University town	36 (19%)
Career aspiration, No. (%) (2 missing values)	
Hospital career	67 (36%)
Private practice	50 (27%)
Don't know	46 (25%)
Academic career	18 (10%)
Other	2 (1%)
Physician as progenitor, No. (%) (1 missing value)	
Yes	69 (37%)
No	115 (62%)
Participants with parent or grandparent working as a physician, No. (%)	
Father	53 (29%)
Mother	24 (13%)
Grandfather	26 (14%)
Grandmother	12 (6%)

Table 2: Career preferences (1st to 3rd place) before and after a clerkship in general surgery.

	All n = 185		Preferences of males n = 70		Preferences of females n = 115	
	Pre-clerkship	Post-clerkship	Pre-clerkship	Post-clerkship	Pre-clerkship	Post-clerkship
Internal medicine	104 (56%)	95 (51%)	37 (53%)	31 (44%)	67 (58%)	64 (56%)
Surgical subspecialty	70 (38%)	71 (38%)	39 (56%)	37 (53%)	31 (27%)	34 (30%)
Other specialties / not specified	67 (36%)	63 (34%)	23 (33%)	18 (26%)	44 (38%)	45 (39%)
General practice	64 (35%)	59 (32%)	20 (29%)	19 (27%)	44 (38%)	40 (35%)
Paediatrics	49 (26%)	52 (28%)	12 (17%)	14 (20%)	37 (32%)	38 (33%)
Anaesthesiology	46 (25%)	38 (21%)	22 (31%)	19 (27%)	24 (21%)	19 (17%)
Gynaecology / obstetrics	39 (21%)	42 (23%)	6 (9%)	9 (13%)	33 (29%)	33 (29%)
General surgery	39 (21%)	52 (28%)	25(36%)	32 (46%)	14 (12%)	20 (17%)
Radiology	23 (12%)	16 (9%)	10 (14%)	7 (10%)	13 (11%)	9 (8%)
Psychiatry	20 (11%)	20 (11%)	6 (9%)	8 (11%)	14 (12%)	12 (10%)
Dermatology	19 (10%)	19 (10%)	3 (4%)	4 (6%)	16 (14%)	15 (13%)
Ophthalmology	9 (5%)	8 (4%)	5 (7%)	5 (7%)	4 (3%)	3 (3%)
No preferences indicated	6 (3%)	20 (11%)	2 (3%)	7 (10%)	4 (3%)	13 (11%)

The surgical clerkships' influence

The surgical clerkship had a significant impact on the perception of the surgical career. After the clerkship, medical students rated the possibility of combining professional and personal life and engaging in a hobby during specialty training in surgery significantly higher ($p < 0.01$ and $p = 0.03$, respectively), whereas they estimated surgeons as significantly less daring and driven by adrenalin ($p < 0.01$) (table 4).

The likelihood of choosing general surgery as a career, measured on a visual analogue scale ranging from 0 (extremely unlikely) to 100 (extremely likely), was significantly higher after the surgical clerkship (median 18, range 0–96 vs. 14, range 0–100; $p < 0.01$) for respondents not in-

terested in a surgical career, whereas no significant difference was found for students indicating general surgery as a top three specialty preference before a surgical clerkship (median 44, range 0–100 vs. 48, range 0–100; $p = 0.96$). A development towards a significantly higher interest in general surgery was also found regarding the students' specialty preferences for their top three career choices (table 5). There was no significant difference to this effect in terms of gender. After the clerkship, for an additional number of 19/185 (10%) participants general surgery became one of their three favourite career choices, whereas it was discarded by 6/185 (3%) participants ($p = 0.02$).

Table 3: Participants not indicating general surgery as a top three specialty choice at T1: Multivariate analysis of predictors (logistic regression) for not choosing a surgical career (n = 129, 17 missing).

Characteristic	Odds ratio	95% CI	p Value
Expected lifestyle during the training period	0.22	0.03–1.84	0.16
Expected lifestyle as a consultant	0.98	0.08–11.30	0.98
Planned duration of the training period	0.72	0.12–4.37	0.73
Prolonged working hours during the training period compared to those of other specialties	18.68	1.69 – >35	0.02
Number of services (during nights and weekends)	0.34	0.03–3.55	0.37
Gender distribution	>35		1.00
Expected income	1.59	0.05 – >35	0.80
Prestige among colleagues and within the society	0.14	0.00–7.47	0.34
Interaction with patients	0.66	0.08–5.72	0.71
Possibility to monitor the course of the patient's disease over a long period	7.40	0.45 – >35	0.16
Manual activity	1.78	0.17–19.27	0.63
Intellectual challenge	0.48	0.05–4.24	0.51
Career opportunities	0.45	0.04–5.38	0.53
Research opportunities and the possibility of an academic career	1.21	0.07–21.55	0.90
Role models	1.62	0.21–12.40	0.64
Difficulties in combining career and family	0.61	0.06–6.53	0.68

Five-point Likert scale anchored by 1 = no influence and 5 = strong influence. CI = confidence interval.

Table 4: Differences of the students' perception of general surgery as a profession between the post- and pre-clerkship periods.

Characteristic	Mean	SD	p-Value
The surgical training allows a combination of professional and personal life	0.24	1.15	<0.01
The surgical training allows an engagement in hobbies	0.20	1.14	0.03
Surgery is a challenging career	0.11	1.15	0.15
Surgery brings high professional satisfaction	0.06	1.06	0.38
Surgeons are predestined for medical malpractice	0.02	1.16	0.96
Surgeons are more health conscious than most other physicians	0.01	0.97	0.88
Surgeons work more than 50 hours per week	0.01	1.10	0.87
The manual skills that are needed to perform surgical operations are difficult to learn	0.00	1.25	0.93
Surgeons earn a lot of money	-0.01	1.10	0.94
The patients admire their surgeon more than their general practitioner	-0.03	1.18	0.63
Surgeons often combine their clinical career with clinical research	-0.04	1.08	0.62
Surgeons are often single and are childless	-0.05	1.37	0.55
Surgeons work more than most other physicians	-0.09	1.24	0.34
Surgery is a prestigious profession	-0.09	1.15	0.31
The new working conditions with a 50-hour work week increase my interest	-0.10	1.11	0.37
Surgeons are daring and driven by adrenalin	-0.36	1.09	<0.01

Table 5: Students' indication of their three favourite career choices: Changes of the top three specialty choices and of general surgery after the surgical clerkship.

	Internal medicine Total (men/women) %	Surgical subspecialties Total (men/women) %	General practice Total (men/women) %	General surgery Total (men/women) %
Less likely	9 (4/4)	7 (3/4)	8 (3/5)	3 (2/1)
Unchanged	88 (32/55)	86 (33/53)	86 (33/54)	86 (30/57)
More likely	4 (1/3)	7 (2/5)	5 (2/3)	10 (6/4)
Total n (100%)	n = 185	n = 185	n = 185	n = 185

Discussion

The present study was based on a random survey among fifth- to seventh-year medical students in German-speaking Switzerland to examine the influence of a surgical clerkship on choosing a career in general surgery. The likelihood of choosing a surgical career before and after a surgical clerkship is relatively low. However, a surgical clerkship showed a significant effect on the respondents' perception of a surgical career with a higher interest in the specialty. In total, general surgery was named by 33% more students as one of their top three career choices. A positive influence on the preference of general surgery as a career choice was also found with men, those who did not have a father working as a physician and those who aspired towards a clinical career in a hospital. The environment in which the participants grew up in had no influence.

Consistent with previous data from U.S. studies, we found a higher interest in surgery in the postsurgical clerkship period [14, 22]. O'Herrin et al. even found a two-fold increase in the number of students choosing a surgical residency after the clerkship [14]. It is a fact that moving students from the classroom into the operating room increases their interest in surgery [14]. Several authors have thus proposed to set a priority in improving the exposure of medical students to general surgery [23–25].

In the present study, the only impediment for choosing general surgery as a future field of work was the prolonged working hours during the training period compared to those of other specialties. Lifestyle during the training period or the time as a consultant did not have a significant effect on the choice. The definition of lifestyle varies widely [26]. The surgical community considers lifestyle to mean "wealth and laziness", but for most students its definition is time [26]. Although in the literature, lifestyle is, in contrast to our results, named as the main obstacle for a career in surgery [5, 23, 27–29], our findings of prolonged working hours compared to those of other specialties as the main impediment can be considered equivalent according to the latter definition of lifestyle. Students of both genders increasingly select specialties with more controllable lifestyles than those of general surgery as they attach great importance to flexible working hours with time for outside interests [27, 28].

Whereas Cochran et al. only found a little change in the negative perceptions of surgical lifestyle during a clerkship in surgery [15], the respondents in our study reported a significant improvement. There was a positive trend regarding the combination of professional and personal life and the possibility of engaging in hobbies. The finding of an improvement in the opinion of surgeons was in accordance with the results of Cochran et al. [15]. Surgeons were regarded as less daring and driven by adrenalin after a surgical clerkship.

The gender-related pattern with men favouring surgery and women favouring gynaecology and obstetrics, paediatrics and general practice is well known [5, 9, 30]. The results of previous studies which showed that relatively more female than male students discovered new attractive aspects of surgery due to the clerkship could not be confirmed in the current study [30].

We did not find that a close family member practicing medicine was a positive influence on the interest in pursuing a surgical career before the surgical clerkship. On the contrary, general surgery was more often named as a career choice when the father was not a physician. The results regarding this aspect differ in the literature. Whereas Pinchot et al. found a positive influence by the exposure to a surgeon within the medical student's family, Scott et al. showed the contrary [31, 32]. A positive influence of parents living in a rural environment could not be confirmed in our study [32]. The prevalence of 37% of close family members practicing medicine is comparable to the results of Scott et al. [32]. However, the results regarding this fact differ widely.

A limitation of this study was the methodological setting as the survey was based on subjective information only and objective data on the surgical clerkship was missing. We cannot definitely link cause and effect. As the survey was only administered at 15 surgical departments in German-speaking Switzerland, there may be selection bias in the subjects. Whereas a bias due to loss of follow-up cannot be excluded, the drop-out rate was comparable to other prospective studies [33, 34]. Furthermore, the ultimate career choice of the participants remains unknown as they were only surveyed during their medical studies. Even during residency, changes in career choices are possible [35]. The logistic regression was used for exploratory purposes only. The sample size of the variables showing increased odds ratios was high enough and they were significant in a univariate logistic regression. The main strength of this study is that it was conducted on a prospective cohort, allowing us to identify the changes that occurred during the surgical clerkship. A further distinct advantage is the large sample size, including medical students from a variety of working arrangements.

Conclusion

A surgical clerkship might have a positive impact on the choice of a surgical career due to a change in the perception of the specialty. The main reasons for this are that the respondents expect more spare time for their personal lives and the opportunity to engage in a hobby during specialty training. Thus, the general opinion on lifestyle during the surgical training does not seem to correspond with the facts. Still, as there might be a shortage of surgeons in the future, lifestyle, in the sense of time, as the main impediment for choosing a surgical career should be kept in mind, and students should be encouraged to complete surgical clerkships.

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Figures (large format)

