Factors influencing medical students in pursuing a career in surgery: a cross-sectional survey

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Background: Many factors play a role in the decision of a medical student to pursue a career in surgery. With a decline in numbers of applications into surgical programmes seen globally, the aim of this study was to determine the factors that influence medical students in pursuing a career in surgery.
Methods: A descriptive, cross-sectional survey was distributed online to all medical students studying at a tertiary, academic institution. Survey items obtained data on demographics, surgical interest and training, as well as factors affecting a surgical career.
Results: A total of 245 medical students responded, of which 56% were female. The majority (69%) stated they were interested in pursuing a career in surgery. Despite 75% of respondents stating South Africa was a good place for surgical training, females reported significantly higher levels of agreement that surgical training would be better overseas when compared to males ($p = 0.027$). Overall, 20% were undecided on what surgical specialty they would pursue. The largest proportion of respondents (33%) stated that 'Length of training' was the main barrier to pursuing a career in surgery. Thirty-three (13.5%) respondents reported 'Female-unfriendly' as a barrier, of whom all were female. The greatest motivator to pursuing a career in surgery was 'Hands-on work', stated by 36% of respondents.
Conclusions: Though length of surgical training was deemed the principal barrier, the majority of students indicated they would pursue a career in surgery. Despite continued perceptions that surgery poses a female-unfriendly environment as a career, respondents held South African surgical training in high esteem, and were motivated by a clinically hands-on approach. These factors may play an important role in determining methods of improving numbers of surgical applications worldwide.

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Introduction

There has been increasing evidence over the past several decades illustrating an international decline in the numbers of applications into surgical programmes.[1] Studies conducted in Ireland,[2] USA,[3] as well as Australasia,[4] all demonstrated reduced numbers in general surgery programmes. South Africa has not been immune to this trend with recent evidence illustrating up to 50% of South African departments reporting unfilled general surgery posts.[5] With these unfavourable statistics in mind, determining the factors which influence an interest in surgery is vital to the continuation of surgery as a career.[4-7]

Many factors influence the decision of a medical student to pursue a career in surgery.[8] Predominant factors include: the attitudes of medical students towards a surgical career, perceptions of surgical training, lifestyle decisions, prior exposure to surgery, as well as gender discrimination.[8,9] However, further research is required to determine the specific factors at individual institutions, and to develop methods to specifically target medical students during their undergraduate medical training. Strategies should focus on fostering surgical interest through clinical rotations, research opportunities, and within surgical societies, where mentors and role models have a significant impact on medical students considering pursuing a surgical career. The aim of this study was to explore the factors which influence medical students in pursuing a career in surgery.

Background

This study was conducted within the Faculty of Health Sciences of the University of Cape Town (UCT), South Africa. The UCT Bachelors of Medicine and Surgery (MBChB) degree comprises six years of full-time academic and clinical

study. Years one to three form the foundation in which the basic sciences are taught, whereas years four to six consist predominantly of clinical teaching in the various medical and surgical disciplines. Though surgery is principally taught in years four to six, the UCT Surgical Society is a student-run society which promotes surgery amongst all undergraduate medical students.

Procedure

This descriptive, cross-sectional study was approved by the UCT Human Research Ethics Committee (HREC REF 926/2015). The population studied included all medical students, from year one to six, currently enrolled in the UCT undergraduate MBChB programme.

An anonymous, structured questionnaire was developed, and all medical students were asked to respond online. The questionnaire was distributed during student registration in each MBChB year, thereby allowing all medical students an equal opportunity to respond. Initially, the questionnaire obtained demographic data. Five-point Likert items ranging from 1 (strongly disagree) to 5 (strongly agree) were utilised when asking participants about their interest in surgery, as well as their feelings towards the standard of surgical training in South Africa compared to overseas. Additionally, closed ended and multiple choice questions asked participants about any prior exposure to surgery, their surgical specialty interest, as well as what they deemed to be the most important motivator and barrier to pursuing a career in surgery.

Data was collected and entered into a database on Microsoft Excel (Microsoft Corp, Redmond, WA). Data was imported and analysed using software on STATA SE (StataCorp LP, College Station, TX). Descriptive data was analysed, with either Pearson's chi-square test or Fisher's exact test being utilised for categorical data analysis. A p-value of ≤ 0.05 was considered as significant.

Results

A total of 245 out of 1 004 medical students completed the questionnaire (response rate of 24.4%). Females comprised 56% (n = 137), and the mean age of all respondents (n = 245)

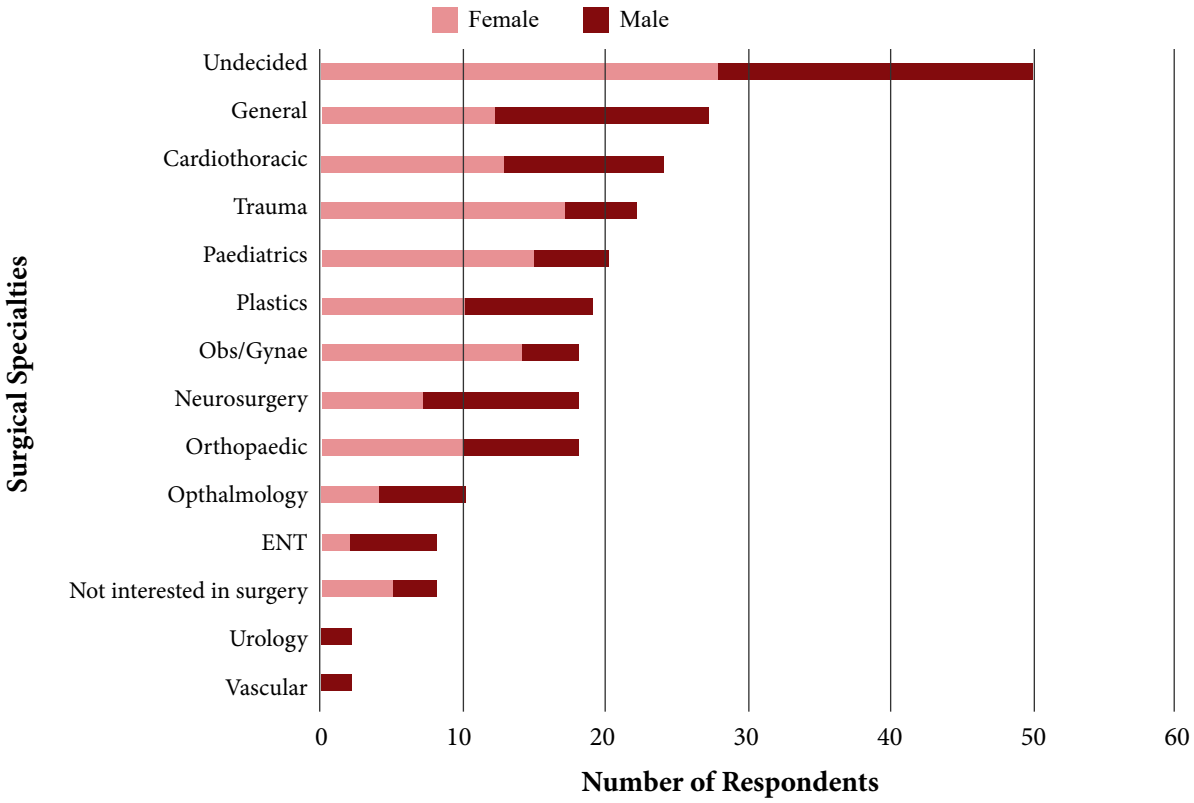
Table 1: Demographical data of respondents in each year of study (n = 245).

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	p-value
n (% of total)	24 (9.8%)	45 (18.4%)	54 (22.0%)	37 (15.1%)	34 (13.9%)	51 (20.8%)	
Gender (% of year)							
Male	6 (25%)	31 (68.9%)	18 (33.3%)	13 (35.1%)	18 (52.9%)	22 (43.1%)	0.345
Female	18 (75%)	14 (31.1%)	36 (66.7%)	24 (64.9%)	16 (47.1%)	29 (56.9%)	
Mean age (years)							
Male	18.0	19.9	21.1	21.4	23.3	23.6	0.992
Female	18.3	19.4	21.2	21.9	22.9	23.8	

Table 2: Participant responses to Likert-items.

Likert-item	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	p-value
I am interested in a career in surgery (%)						
Total (n=245)	**3 (1.2%)**	**8 (3.3%)**	**65 (26.5%)**	**86 (35.1%)**	**83 (33.9%)**	
Male (n=108)	0 (0%)	2 (1.9%)	27 (25.0%)	31 (28.7%)	48 (44.4%)	0.115
Female (n=137)	3 (2.2%)	6 (4.4%)	38 (27.7%)	55 (40.2%)	35 (25.5%)	
I think the surgical training in South Africa is very good (%)						
Total (n=245)	**1 (0.4%)**	**5 (2.0%)**	**55 (22.5%)**	**112 (45.7%)**	**72 (29.4%)**	
Male (n=108)	0 (0%)	1 (0.9%)	14 (13.0%)	46 (42.6%)	47 (43.5%)	0.211
Female (n=137)	1 (0.7%)	4 (2.9%)	41 (29.9%)	66 (48.2%)	25 (18.3%)	
I think that surgical training would be better overseas (%)						
Total (n=245)	**22 (9.0%)**	**73 (29.8%)**	**103 (42.0%)**	**38 (15.5%)**	**9 (3.7%)**	
Male (n=108)	14 (13.0%)	35 (32.4%)	44 (40.7%)	12 (11.1%)	3 (2.8%)	0.027
Female (n=137)	8 (5.8%)	38 (27.7%)	59 (43.1%)	26 (19.0%)	6 (4.4%)	

Figure 1. Interest of surgical specialties between male (n = 108) and female (n = 137) participants.



was 21.4 years (range: 17–29). Table 1 illustrates demographic data of respondents between each year of study. No significant demographical differences were found between males and females.

Table 2 displays participant responses to questions about an interest in surgery and their perceptions about the quality of surgical training in South Africa and overseas. A total of 169 (69.0%) participants either agreed or strongly agreed to being interested in a career in surgery. Furthermore, 184 (75.1%) participants either agreed or strongly agreed that South Africa had a good surgical training programme. No significant differences were found in both items when comparing gender of those that either agreed or strongly agreed, to those that either disagreed or strongly disagreed ($p = 0.115$ and $p = 0.211$ respectively; Fisher's exact test). The majority of participants (103; 42.0%), neither agreed nor disagreed with the belief that surgical training would be better overseas. However, females reported significantly higher responses of either agree or strongly agree when compared to males (Pearson's chi-square = 4.911; $p = 0.027$).

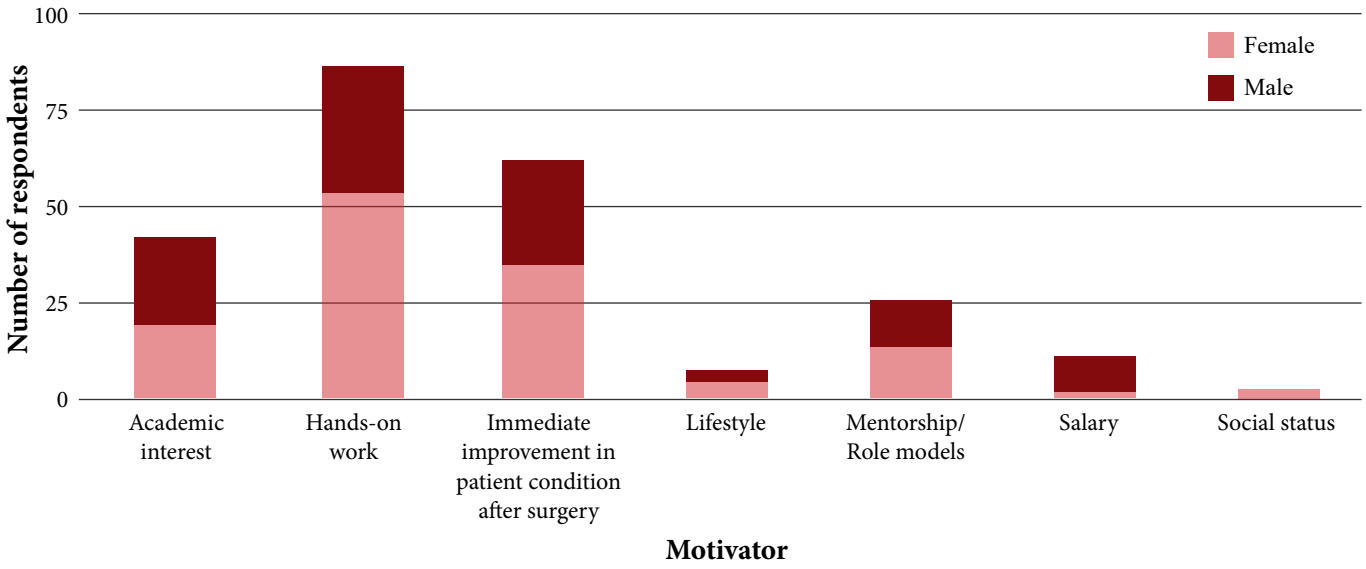
Figure 1 displays participant interest in various surgical specialties. A total of 50 (20.4%) participants were undecided, with general surgery and cardiothoracic surgery being reported by 27 (11.2%) and 24 (9.8%) participants respectively. Besides the majority of participants being undecided, females (n = 138) were mostly interested in trauma surgery (12.4%), paediatric surgery (10.9%) and obstetric and gynaecological surgery (10.2%), whereas males (n = 107) were mostly interested in general surgery (13.9%), cardiothoracic surgery (10.2%) and neurosurgery (10.2%).

One hundred and fifty students (61.2%) had been exposed to medicine and surgery prior to their undergraduate medical training. No significant correlation was found between said exposure and an interest in surgery (Pearson's chi-square = 3.098; $p = 0.078$). Furthermore, 198 (80.8%) participants reported not having parents in the medical profession. Similarly, no significant correlation was established between these participants and an interest in surgery (Pearson's chi-square = 0.943; $p = 0.332$).

As displayed in Figure 2, the most significant motivators to pursue a career in surgery were 'Hands-on work' and 'Immediate improvement of patient condition after surgery', which was reported by 87 (35.5%) and 63 (25.7%) participants respectively. 'Academic Interest' was stated by 43 (17.6%) participants. No differences were reported between genders, with both males and females stating similar motivators to be most significant.

The most commonly stated barriers to pursue a career in surgery, as depicted in Figure 3, were 'Length of training', reported by 80 (32.7%) participants, and 'Working hours', which was reported by 65 (26.5%) participants. Although these barriers were stated to be most significant by both males and females, 33 (13.5%) participants reported 'Female-unfriendly', of whom all were female.

Figure 2. The most significant motivator to pursue a career in surgery between male (n = 108) and female (n = 137) participants.

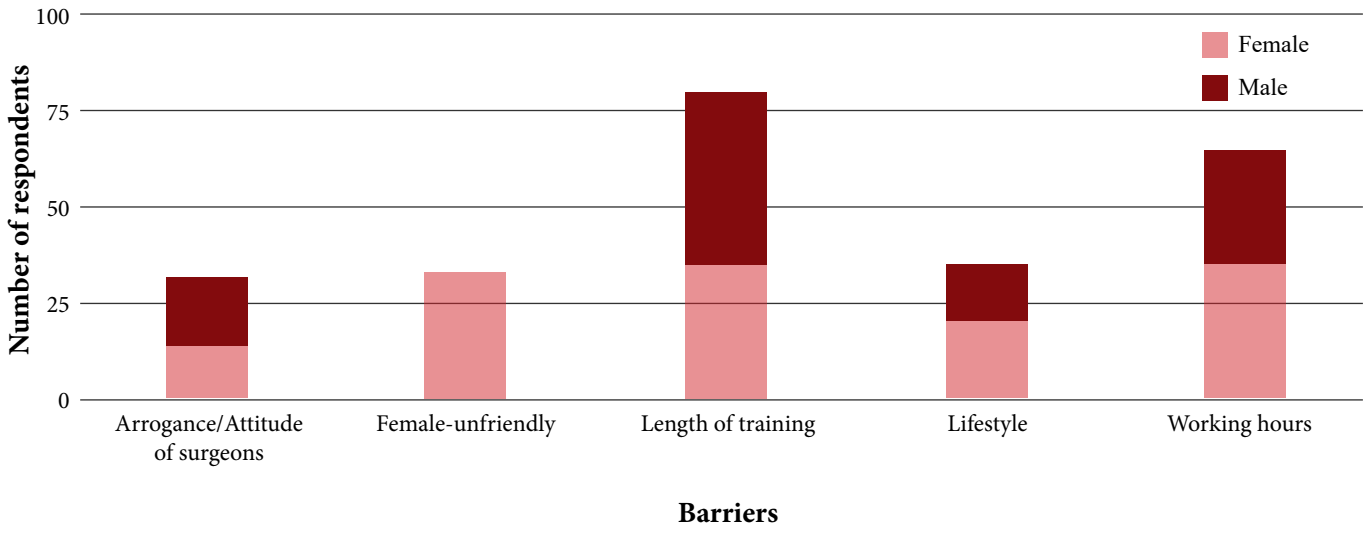


Discussion

The aim of this study was to explore the factors which influence medical students in pursuing a career in surgery. There is a suggestion that interest in general surgery amongst medical students has decreased.[10] This perception is supported by the declining numbers of surgical applications seen worldwide.[1-5] However, in the current study the majority of participants indicated an interest in a career in surgery. Furthermore, despite the socioeconomic challenges facing many South African undergraduate students, the majority of participants believed that South African surgical training was favourable. Although no extrapolations could be made internationally, the high level of surgical interest, as well as the high approval for national surgical training, bodes well for the future of surgery as a career in a developing country like South Africa.

It has been well known that developing countries suffer from losses of doctors and specialists through emigration to developed nations such as the United Kingdom, Canada, the United States of America and Australia.[5,11] One factor which has been thought to promote such relocation, is the perception that surgical training in these nations is of a higher quality and may perhaps offer a better lifestyle experience. The current study found that most of the participants neither agreed nor disagreed with this statement. However, females reported significantly higher responses of either agree or strongly agree when compared to males. A large body of research has been conducted on gender-based factors which influence career choice, and the predominant factors which affect

Figure 3. The most significant barrier to pursue a career in surgery between male (n = 108) and female (n = 137) participants.



females include: remuneration, working hours and family obligations.[12,13] It is possible that the females in the current study believed that these factors were less of a problem overseas.

The majority of participants in the current study were undecided on which surgical specialty interested them. It has been suggested that very few medical students determine their career paths in the early years of undergraduate training, due to focus on the basic sciences and lack of clinical exposure.[9] As the current study included medical students from years one to six, this may offer an explanation for the participant indecision regarding choice of surgical specialty. There has been a well-researched association between gender and specialty choice, with many studies, including the current study, demonstrating females being more interested in paediatric as well as obstetric and gynaecological disciplines, with males being more interested in general surgery.[14] However, recent anecdotal evidence found no difference in surgical specialty preference between males and females, suggesting a decline in such gender discriminations.[15]

Many studies have shown that medical students often come from families with health professionals.[8] In contrast, this study found that the majority of participants did not have parents who were in the medical profession. This disparity may be due to the setting of relative studies, with the differences noted between developing and developed countries. Furthermore, most of the participants in the current study had been exposed to medicine and surgery prior to their undergraduate medical training. A national study conducted in the UK[8] found similar results with nearly all respondents having completed work experience prior to medical school, suggesting that despite potential barriers, there was a willingness amongst prospective medical students to seek such exposure outside of the curriculum.

The most significant motivators to pursue a career in surgery, in both males and females, were 'Hands-on work', 'Immediate improvement of patient condition after surgery' and 'Academic interest'. These results were corroborated by similar findings by Are et al.,[6] who suggested that certain personalities select general surgery, and this decision is based primarily on personal fulfilment from working with their hands and obtaining swift results from their work. Although it is assumed that training at medical school may not alter an individual's predetermined choice of career into surgery, it has been proposed that academic interest in surgery may be one of the most influential aspects for those eager to enter a surgical career.[4] As the current study supports this argument, it is imperative that medical schools and surgical societies find effective methods to encourage medical students to involve themselves in academic surgical pursuits, whether through mentoring surgical research or educational lectures and tutoring.

Both males and females reported 'Length of training', 'Working hours' and 'Lifestyle' to be the most significant barriers to pursuing a career in surgery. These findings are in keeping with international trends.[2] More significantly, developing countries such as South Africa are faced with alarming shortages of medical professionals. These vacant posts add strain to an already burdened medical community, and result in increased working hours, elevated levels of stress and more cases of burnout. A further disquieting result of the current study illustrated 33 participants reporting 'Female-unfriendly' as a barrier to pursuing a career in surgery, of whom all were female. These findings indicate a continued perception that surgery as a career poses an unfriendly environment, especially for women. Cochran et al.[12] suggested that although women have high self-efficacy in surgery, they may not pursue a career in surgery due to anticipated negative consequences, which may comprise gender-based discrimination. Additionally, recent evidence has illustrated that the prevalence of bullying in the surgical workplace was significantly higher in females, with over half the female contingent in the study experiencing some form of work- or person-related bullying.[16] A possible solution may be to immerse students, both male and female, into the surgical environment where surgical mentors and role models can attempt to eradicate such perceptions and behaviours.

Although the authors of the current study are reasonably assured of the trends seen in data analysis, several methodological limitations have been identified. A descriptive, cross-sectional study design was utilised which inherently compromises validity, as well as the inability to report on individual changes over time. A higher response rate would have been desirable, however it is still within the expected limits of an online questionnaire survey.[17] Furthermore, there is evidence to suggest that lower response rates do not automatically equate to poorer study validity.[18] It may be possible that medical students who participated in the study may have already possessed an interest in surgery and therefore introduced selection bias. Finally, it could be argued that, given their limited exposure to surgical training, the inclusion of students in years one to three may have altered the overall trend of results.

Conclusion

The results of our study indicate a positive reflection of surgical enthusiasm amongst undergraduate medical students. The three most significant influences on surgical career choice amongst medical students were personal fulfilment, academic interest and lifestyle factors including working hours and length of training. Although these results are supported by studies conducted both nationally and internationally, our study also found a continued perception that surgery poses a female-unfriendly environment as a career. It is recommended that faculty and relevant organisations utilise the findings in both the current, and corroborated studies, to design initiatives to increase medical student interest in surgery.

Conflicts of interest

The authors declare that there was no conflict of interest in this study.

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