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# Gender-related perceptions of careers in surgery among new medical graduates: results of a cross-sectional study

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**KEYWORDS:**
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**Abstract**

**BACKGROUND:** Despite promotional measures at a national level, female surgeons account for only 10% of the consultant workforce in the United Kingdom. With rising proportions of female medical graduates, it is important that surgery continues to recruit the most able candidates regardless of sex. This study investigates the differing perceptions of surgical careers among recent medical school graduates and identifies factors discouraging female doctors from pursuing a career in surgery.

**METHODS:** Newly qualified graduates from the University of Nottingham Medical School, Nottingham, UK, were invited to complete a nonmandatory questionnaire investigating career intentions and factors influencing this.

**RESULTS:** Two hundred and eight questionnaires were returned (a 66% response rate). Male respondents were significantly more likely to rate surgery as an attractive or very attractive career ($P = .0116$). Overall, only 33 (25%) female doctors expressed interest in a surgical career as opposed to 33 (42%) male doctors ($P = .010$). Frequently cited reasons included no interest in surgery itself (21%) and negative attitudes toward women in surgery among the surgical teams (18%). Irrespective of career interests, 59% of male and 68% of female respondents believed surgery was not a career welcoming women ($P = .186$). Reasons included difficulty maintaining family life, limited flexible training, and lack of role models.

**CONCLUSIONS:** This study identifies significant sex differences in the perception of surgical careers. The majority believes surgery does not welcome female trainees. Future strategies to promote surgery must address attitudes and behaviors in both sexes while taking active steps to support female surgeons during their training and in the workplace.



Sex inequality within the medical workforce remains a topical area of debate, particularly for surgical specialties. Female consultant surgeons and trainees remain a minority within the medical profession. In March 2010, the UK National Health Service (NHS) employed 701 female and 6,276 male consultant surgeons. Therefore, female surgeons represent just over 10% of the consultant workforce compared with an average of 29% across all medical special-

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ties.[1] This is set against increasing numbers of female medical students and junior doctors, with women now representing over 60% of new graduates from many UK medical schools.

Although stark, these figures are not restricted to the United Kingdom. Problems surrounding recruitment and retention of female trainees in surgery have been reported internationally for many years,[2] particularly in the United States where 16% of approximately 37,797 general surgeons are women. This figure declines further for other surgical subspecialties.[3]

The factors influencing career choices among medical professionals are poorly understood. There is literature to suggest that women are not being excluded from surgical specialties but actively rejecting them.[4,5] More specifically, within the field of academic general surgery, women have been found to report less career advancement opportunities and compensation compared with their male colleagues with more women assistant professors contemplating leaving academia.[6,7]

Several studies have been conducted in North America to evaluate career satisfaction among female surgeons and possible deterrents to training. The United States has seen a well-publicized decline in medical graduates choosing to pursue a career in general surgery,[8] which parallels with increasing numbers of female medical graduates. The reasons cited for this decline are varied, including lifestyle, litigation, and sex. The importance of female surgical role models has been highlighted, and the lack of these role models is a detractor in recruiting more women to the field.[2,9,10] In addition to sex equality, work to increase numbers of female doctors applying for surgical training has assumed new importance to maintain adequate supplies of quality applicants.

From research previously undertaken, it is clear that perceptions of a surgical career differ between doctors in training and established surgeons. To what extent these differences are attributable to sex rather than other factors such as generational influences is difficult to establish. Furthermore, variation in demographics, medical school fees, earnings, and working hours makes the extrapolation of results from studies undertaken in other health care systems difficult to interpret in the NHS. In France, a recent study reported the male to female ratio of surgical residents as 1:1, reflecting a different workforce demographic against which comparisons are difficult.[11] Increasing numbers of graduate-entry medical students in the United Kingdom further complicate the picture, with this group also less likely to pursue a surgical career.[12]

Given the sex and demographic shifts in the future medical workforce, it is important to understand how sex may influence doctors' choice of career. In this study, we explore how the overall interest in a surgical career varies with sex among newly qualified doctors and the reasons underlying this. We also assess how "welcoming" a career in surgery is perceived and the reasons for this in order to investigate what changes might be required to address this.

## Methods

### Participants

Newly qualified medical graduates from a single-year group at the University of Nottingham Medical School were invited to participate in this study. Three hundred twenty individuals graduated including those from the standard undergraduate entry course (235 doctors) and the graduate-entry medicine course (85 doctors).

The standard undergraduate course is a 5-year program offered as a first degree to school leavers; this is common with other medical schools in the United Kingdom. This consists of 4 semesters of basic medical science, with a fifth semester undertaking a dedicated research project. The remaining period is devoted to clinical training. In contrast, the graduate-entry medicine course is an intensive 4-year program offered to those already holding a UK bachelor's (honors) university degree or the equivalent. The initial 18-month basic science component is taught independently of the standard undergraduate course. The 2 groups of students then combine after the fifth semester of the standard undergraduate course to run through a shared clinical training program. This includes 2 clerkships in the third and final years of the course totaling 16 weeks of surgical training delivered across 5 different hospitals.

Upon graduation, newly qualified doctors undertake a basic 2-year internship rotating across different specialties of their choice, satisfying the basic requirement of general medicine and general surgery in their first year. Those who then wish to pursue hospital-based specialty training enroll in a specialty-specific 2- to 3-year core training program before applying for a further 5 to 7 years of higher specialty training. Table 1 compares British and American surgical training pathways.

**Table 1** British and American surgical career pathways

| US | UK |
|---|---|
| Attending surgeon | Consultant surgeon |
| Fellowship | Fellowship |
| Fellow | Fellow |
| Residency | Higher surgical training (5 y) |
| Resident | Specialty registrar<br>Core surgical training (2 y)<br>Core surgical trainee |
| Internship | Foundation program (2 y) |
| Intern | Foundation doctor |
| Medical school | Undergraduate or graduate entry |
| Medical student | medical training (4–6 y)<br>Medical student |

Premedical.
Premed student.

### Questionnaire

A questionnaire was devised exploring career intentions and factors influencing career choice consisting of free-text, binomial, and 5-point Likert scale responses. This was piloted among local faculty staff, and the feedback received was used to further refine question items. Comments received were discussed, and the revised nonmandatory questionnaire was then distributed to all participants.

This study was undertaken by the University of Nottingham Medical School Medical Education Unit as part of an internal audit of medical student experience of surgical teaching attachments and teaching provision. Questions on the field of "surgery" related to all 9 recognized surgical specialties in the United Kingdom (ie, general, cardiothoracic, urology, orthopedics, oral and maxillofacial, otorhinolaryngology, plastics, neurosurgery, and pediatric surgery). The authors gave due consideration to the ethical dimensions of this anonymous questionnaire survey, and no concerns were identified. The questionnaire was optional, and completion was taken as consent to participate.

### Data analysis

An analysis of the results was undertaken using the Statistical Package for the Social Sciences version 15.0 (SPSS Inc, Chicago, IL). *P* values were calculated using the Pearson chi-square test. Free-text responses were independently categorized into groups for analysis by 2 of the authors.

## Results

### Response

We received 208 returned questionnaires (response rate = 66%). The demographics of the responding groups were not significantly different from the population sampled. The median age was 24 years (range 23–51) with 130 women (63%) and 78 men (37%). The standard undergraduate course yielded 148 replies (71% of returned questionnaires), with 60 from the smaller graduate-entry course (29% of returned questionnaires). The response rate of doctors from the graduate-entry medical course was 70% versus 63% from the standard undergraduate course. This was not significantly different.

**Table 3** A summary of reasons cited by female respondents for the lack of interest in a surgical career

| Reason cited | Proportion (%) |
|---|---|
| No interest in surgery | 21 |
| Poor attitudes of surgical teams | 18 |
| Theater/work environment | 16 |
| Difficulty maintaining family life | 12 |
| Surgical lifestyle | 10 |
| Lack of patient contact | 10 |

### Interest in surgical careers

Overall, 33 female doctors (25%) expressed interest in pursuing a surgical career as opposed to 33 men (42%). This difference was statistically significant ($P = .010$). Four (3%) of the female graduates were undecided. Among the women who were interested in a future surgical career, 27 (82%) completed the standard undergraduate course, and 6 (18%) were from the graduate-entry course. When comparing interest in surgery between the male and female graduate-entry course doctors, there were no significant differences ($P = .114$). These findings are summarized in Table 2.

### Lack of interest among women: reasons cited

The reasons stated for a lack of interest among female respondents were further explored. The comments were categorized and are summarized in Table 3. The reasons most frequently cited were no interest in surgery (21%) and negative attitudes toward women in surgery among the surgical teams (18%).

### Attractiveness of surgical careers

All respondents were asked to rank the "attractiveness" of a surgical career regardless of their personal interest in the specialty. Attractiveness was not defined to allow respondents to apply their own criteria of what might make the career attractive to them. Male respondents were signif-

**Table 2** A summary of the overall interest in a surgical career

| | Male | | | Female | | |
|---|---|---|---|---|---|---|
| Interest in surgical career | Undergrad | Grad | Total (%) | Undergrad | Grad | Total (%) |
| Interested | 23 | 10 | 33 (42) | 27 | 6 | 33 (25) |
| Not interested | 22 | 21 | 43 (55) | 72 | 21 | 93 (72) |
| Undecided | 1 | 1 | 2 (3) | 3 | 1 | 4 (3) |
| Overall | 46 | 32 | 78 | 102 | 28 | 130 |

Grad = graduate-entry medical course; Undergrad = standard undergraduate-entry medical course.

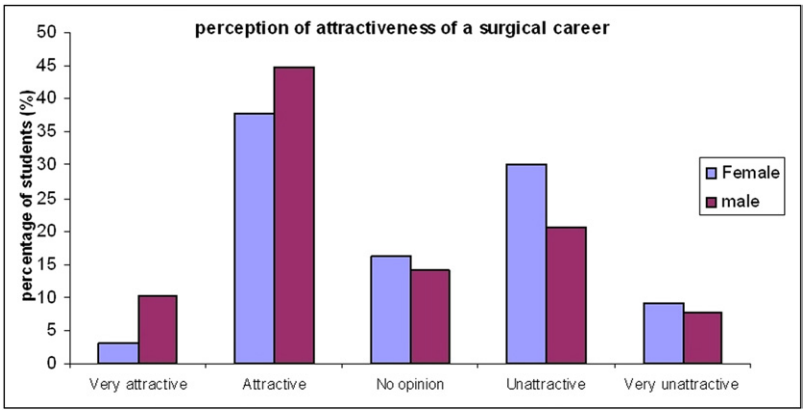


**Figure 1** Sex-related perceptions of the attractiveness of a surgical career.

icantly more likely to rate surgery as an attractive or very attractive career ($P = .0116$). This significant sex difference was not present among those who undertook the graduate-entry course. Overall, only 4 (3.1%) women ranked surgery as a very attractive career option, 49 (37.7%) ranked it as attractive, 20 (15.4%) had no opinion, 39 (30%) felt it was an unattractive career, and 12 (9.2%) perceived it to be a very unattractive career choice. These results are contrasted against the male responses in Figure 1.

### Insight into a surgical career

We examined whether doctors felt they had gained sufficient insight during their medical school course into what a surgical career would involve. Overall, 50% of male respondents thought they had received sufficient insight into a surgical career compared with 56% of women. There were no significant differences between the views of men versus women or between those who had followed the undergraduate compared with the graduate-entry courses.

### Does a surgical career welcome women?

We asked the question "does a surgical career welcome women?" without specifically defining "welcome" so that respondents were able to apply their own criteria in light of their experiences to date. Analyzing responses from both sexes, 10 respondents were neutral. Of the remainder, 59% of male and 68% of female respondents believed surgery was not a career welcoming women (65% total). There was no significant sex difference ($P = .186$).

### Why does surgery not welcome women?

Respondents who thought surgery was not a career welcoming women were invited to cite reasons for this. Two authors categorized the free-text comments received, and no differing results were encountered. These are summarized in Table 4. A representative sample of verbatim comments is given in Table 5.

## Comments

This study adds to the ongoing debate surrounding the medical workforce in surgery. Sex has previously been shown to have the strongest influence on specialty choice, even after controlling for personality traits, career motivation, and life goals.[13] Our findings highlight the importance of this in the selection of a surgical career, with women significantly less likely to express interest than their male colleagues. Most male and female respondents do not perceive surgery as a career welcoming women.

For some years, the sex disparity among surgeons has been a source of concern, both in the United Kingdom and internationally. Despite increasing proportions of female graduates from medical schools in recent decades, this underrepresentation has proven to be remarkably resistant to change. UK workforce data showing the changing numbers of male and female consultant surgeons over the past decade is presented in Table 6.

In the United States, the Association of Women Surgeons was founded in 1981 to support the professional growth and advancement of women. In the United Kingdom, the Royal College of Surgeons of England joined with the Department of Health in 1991 to create the national Women in Surgical Training organization. Its goal is to "encourage, enable and inspire women to fulfill their surgical ambitions." Since its foundation, there has been a doubling in the number of female consultant surgeons, and

**Table 4** A summary of reasons why a surgical career does not welcome women

| Reasons cited | Proportion (%) |
|---|---|
| Male dominated | 18 |
| Difficulty maintaining family life | 12 |
| Limited flexible training | 12 |
| Few female role models | 7 |
| Poor attitudes in surgical teams | 6 |
| "Old boys' club" mentality | 6 |
| Long hours | 5 |
| Others | 34 |

**Table 5** Quotations from representative free-text responses

| |
|---|
| "Maternity leave interferes with training" "Choices between career and family are needed" |
| "Not many [women] in it" "Lack of female role models" |
| "Feedback from surgeons has been quite negative for women" |
| "Not great for career breaks or childcare" "Flexible training opportunities are poor" |
| "The female surgeons I have met are of a particular type" |
| "Still has somewhat of a men's club feel to it a lot of the time" |
| "Depends on the woman—if she wants to be a surgeon she can be" |
| "Many of them [surgeons] are patronizing and sexist" |
| "Emphasis on working hard and working long hours" |
| "We [women] don't appear to be quite so naturally arrogant or ruthless" |
| "Lady registrar on my last attachment was successful—but I have no other reference" |
| "No different from any other medical specialty" "Females are not actively encouraged" |
| "More female surgeons are encouraging more women into the profession" |
| "Attitudes [of surgeons] put most women off" "I've been told by female surgeons it's harder" |
| "It doesn't matter what sex you are, as long as you don't want a family" |
| "Senior female surgeons seem like a very specific, hard personality type" |
| "It depends on the sacrifices you are willing to make" |

partly in recognition of this, the organization has recently been re-established as Women in Surgery (WinS). Through annual meetings, career talks, and school visits, the organization seeks to raise the profile of women in surgery and encourage others to apply. Existing literature has suggested focusing recruiting women to surgery at the beginning of medical school and toward the end.[5]

Our study indicates that the effects of this work may be undermined by the experiences of doctors during their time at medical school and the lack of support provided for women working in the NHS. An important finding of this study is that it is not just women who think that a career in surgery is unwelcoming for them; most male respondents (59%) believed this too. Limiting the promotion of surgical careers to female trainees may limit its success when most of their male peer group also holds the same negative perceptions.

Significantly, the primary reason cited for a lack of interest in a surgical career by women was a lack of interest in surgery itself. This was stated by 21% of female respondents, which was more frequently than "conventional" reasons reported in other studies such as surgical lifestyle and difficulty maintaining family life. This helps to explain the overall disparity of interest in surgical careers between the sexes. It also indicates that there will be a limit to how successful future "outreach" programs may be in encouraging women into surgery.

Previous studies examining the role of sex-related traits in career planning indicate women are likely to prefer fields with intensive patient contact, whereas men favor more instrumentally oriented, "high-tech" specialties.[14] Therefore, one reason for the lower than expected proportions of female surgeons must be that many women are never interested in the first place. This finding is supported by a recent survey of first-year medical students at a London medical school who had not yet experienced the potential negative aspects of surgeons, their lifestyle, or their workload. This showed only 18% of female students were interested in a surgical career compared with 50% of male students.[15] However, female medical students who express an initial interest in surgery are over 4 times more likely to enter the specialty than those who do not.[5] The remaining proportion of students who are interested decreases over the course of medical school,[16] and it is this group that must be salvaged.

Regardless of sex-variations in preferred career choices, it is clear from our results that a substantial number of female doctors are discouraged from pursuing surgery for many other potentially addressable reasons. Preconceptions formed or broken by experiences during medical school can undoubtedly determine future career preferences. This study reveals that the negative attitude of surgical team members is a major factor in discouraging women from pursuing surgical training. Several respondents note that this is more prevalent among older surgeons, referred to as "dinosaurs." Sexist behavior and comments together with patronizing attitudes and misogynistic behaviors were cited by 18% of respondents. These figures are comparable to those published by a study of Canadian female surgical trainees; 15% reported discrimination during the process of selection for residency.[10] Although this "old boys' club" mentality is clearly unacceptable, it is interesting to note that this is substantially lower than the sex discrimination reported by more than 50% of Swiss female surgical trainees[2] or the negative

**Table 6** UK workforce data from the Information Centre for Health and Social Care showing changing numbers of male and female consultant surgeons (with the percentage of the female consultant surgeon workforce): 1996–2010

| Year | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Female | 175 | 185 | 211 | 240 | 275 | 309 | 336 | 371 | 429 | 476 | 503 | 526 | 591 | 646 | 701 |
| Male | 3,739 | 3,909 | 3,975 | 4,191 | 4,365 | 4,584 | 4,752 | 5,018 | 5,325 | 5,512 | 5,626 | 5,734 | 5,810 | 6,063 | 6,276 |
| % female | 4.5 | 4.5 | 5.0 | 5.4 | 5.9 | 6.3 | 6.6 | 6.9 | 7.5 | 7.9 | 8.2 | 8.4 | 9.2 | 9.6 | 10.0 |

experiences reported by 50% of final-year students at 2 Australian medical schools. In the latter study, only 44% of respondents considered surgeons as "approachable."[17]

Our results support those of other articles indicating that "lifestyle" issues are increasingly important to newly graduated doctors. The surgical lifestyle with long hours, difficulty maintaining a family life, and limited opportunities in flexible training accounts for the majority of negative perceptions in this study. Increased emphasis on a "controllable lifestyle" and work-life balance has been featured strongly in other studies. One North American article reported 69% of a graduating medical school class citing this as a contributing factor in choosing their preferred specialty.[18] Others studies also revealed significant sex differences in the importance of a controllable lifestyle when selecting specialties.[19,20] Men are more likely to identify technical challenge, earning potential and prestige as factors influencing their career choice.[21] Additionally there is also a reported student perception that surgeons do not enjoy spending time with patients, which may also act to discourage female trainees who are more likely to seek patient contact.[21]

The paucity of female role models in this male-dominated profession is another area frequently cited as discouraging female doctors. Several other studies also highlight difficulties in encouraging women without visible successful female surgeons to inspire and encourage them, with 5.6% to 35% of female trainees being discouraged by this.[19,22,23] One study sought to quantify the numbers of trainees entering surgery based on the relative numbers of women surgeons on the faculty at their respective hospitals; however, no significant differences were identified.[24]

In the hospitals training University of Nottingham medical students, there are successful female surgeons in several specialties prominent within both academic and clinical settings. However, because they are few in number in comparison with students, it is possible that students may not have met or been taught by them. It is clear that a vicious circle exists whereby it is difficult to encourage more female trainees into surgery without more role models (academic or clinical),[6,7] and it is difficult to find more role models without increasing the number of female trainees entering surgery.

Once in the surgical profession, female surgeons are positive about their career choices.[25] Studies in the United Kingdom, North America, and Europe have indicated comparable career satisfaction between the sexes in surveys of plastic,[26] cardiothoracic,[27] and pediatric surgeons[28,29] together with other core specialties.[30] There is also evidence that shows female surgeons combining productive careers and rewarding family lives despite the compromises that are involved.[31] However, when asked to quantify satisfaction, women trainees responded that they were moderately satisfied with their professional and private lives.[2]

These findings need to be communicated to potential female surgical trainees although there is an argument that these views simply reflect the opinions of those female surgeons who have been successful in the profession. However, it is important to note that many of these studies also reveal a desire for more family time and significantly higher childcare and household responsibilities than their male surgical colleagues. Significant differences in marital status and number of children also exist.[26,29,32] Interestingly, despite similar training experiences and success in their chosen field, female surgeons remain more likely to perceive that their sex has restricted training experiences or proved a barrier to progress.[25,33,34] Their male colleagues seem less likely to perceive sex as an issue although it is difficult to assess whether such barriers are real or perceived.

Encouraging surgical electives at medical school may be another option,[21] and encouraging attendance in the operating room has also been shown to increase interest in a surgical career.[35] One national Canadian study found that a significant proportion of surgical trainees found it difficult to identify clear institutional policies on maternity leave and job sharing, highlighting these as issues to be addressed.[10] Changes in training structure with the availability of flexible training and childcare support would address frequently cited concerns. More female role models will then come with time.

In the United States, recommendations for program directors to address lifestyle and employment issues have already been suggested,[16,36] and similar moves in the United Kingdom would be welcome. However, our results indicate that the most important intervention in the United Kingdom will be a change in the attitudes of male surgeons toward females in surgery. Several studies have already indicated that positive interactions by surgeons with medical students and junior doctors can favorably influence interest in a surgical career.[37–39]

It is also important to note that career choices are not stable over time. Surgery remains a popular career choice at entry to medical school, perhaps because of preexisting familiarity through positive media exposure. A North American survey indicated that only 37% of students interested in a career in surgery at entry to medical school still held this choice in their senior year.[40] Significant changes in postqualification career choice have been described in the British Medical Association cohort study in the United Kingdom, which followed new medical graduates over a 10-year period from 1995 to 2005.[41] The desire to pursue a surgical career declined markedly over this period for both sexes. For female graduates, 9.1% intended to pursue a career in surgery in 1995; this decreased to 3.6% in 2004. This rate of attrition was similar in men, with 27.1% choosing surgery in 1995 compared with 14.7% in 2004. Introduction to other specialties followed by the reality of postqualification experience may lead to further career changes throughout training. Therefore, our study offers a single snapshot of these career preferences, which may alter as respondents progress through postgraduate training. Given the high attrition rates, it is likely that our findings overestimate the numbers of male and female doctors who will ultimately achieve a career in surgery.

This study is limited in that it reviews a 1-year group at 1 UK-based medical school, and it is uncertain to what extent the findings can be extrapolated elsewhere. However, given the paucity of recent UK-specific research in this area, this remains an important indicator of the current sex imbalance in surgery. All studies of this nature are prone to responder bias; however, our response rate of 66% was favorable for this type of study. Even assuming that all unreturned responses had been positive toward women in surgery, this would still leave a concerning proportion of doctors with negative perceptions of a surgical career.

Future research should seek to expand and develop the results of this study on both a national and international level. Nationally, particular areas that would benefit from investigation include sex-related differences in training needs, the experiences of UK female surgeons already established in the profession, and the efficacy of different measures to promote interest in surgery among female medical students and junior doctors. On an international level, one way of comparing systems would be to compare the relative availability of opportunities for maternity leave, part-time training, and part-time work as a consultant to see if there is a link with perceptions of surgical careers.

## Conclusions

Despite active promotion of surgical careers for women, significant sex differences in the perception of these remain. It is apparent that negative attitudes and behaviors among surgical teams, the perceived difficulty in work-life balance, and the lack of interest in surgery are major factors influencing this. Although it is important to strive for sex equality, the increasing feminization of the medical workforce and the continued development of graduate-entry medical school courses might in the future impact our ability to fill surgical training programs with high-quality applicants. Surgeons themselves need to reflect on how their attitudes and behaviors may influence others in their perception of a surgical career. Similarly, training groups need to reflect on how female surgeons can be better supported both in and out of the workplace.

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