



Perception, Academic Performance, Gender Judgment and Barriers among Surgeons' Career Progression in Jeddah, Saudi Arabia: A Cross-Sectional Study

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ABSTRACT

Introduction: Gender discrimination continues to be an issue in different surgical subspecialties, especially in Saudi Arabia, where no studies have been conducted so far on female surgeons in academia, on gender discrimination, and on job satisfaction. Considering the increasing number of women enrolling for surgery programs in Jeddah, Saudi Arabia, this study aims to examine their perceptions about and equity in working as surgeons.

Methods: Following the STROCSS criteria, cross-sectional analyses were conducted of survey data from a multicentric online questionnaire in 2019/2020. A representative sample of medical interns and surgeons (n = 100) from Saudi Arabia responded out of 400 from the 4th iteration.

Results: Females were 53%; most participants were less than 40 years. Women ranked assistant professors were fewer than men (2% vs. 11%). The number of publications by females vs. males was 2.58 ± 2.68 vs. 11.37 ± 20.53 (p = 0.002). Surgery was not considered a profession conducive to family life according to more than half the women citing lack of flexible/part-time training or work (26/53, or 49%). However, only 1/5, or 9/47 (19.1%), of men thought there was gender attitude/bias; men also had more variety in surgical career choices. Further, most patients preferred male surgeons (p = 0.026). Both females (30/53 or 56.6%) and males (25/47 or 53.2%) agreed that the best response to an offensive question was to ignore it. Decision in choosing their specialty was influenced mostly by career and promotion prospects, enthusiasm, and commitment (females: 31/53 or 58.5% and males: 17/47 or 36.2%) with p = 0.026.

Conclusions: The findings reveal the persisting discrepancies based on gender in the surgical field in Saudi Arabia. A nationwide movement limiting working hours, encouraging medical students to enter surgery, and upholding women in leadership positions can help in overcoming this situation.

1. Introduction

Surgery is often considered a boys' club, with women experiencing limitations in the field mostly attributed to cultural beliefs that support male predominance and performance [1]. Despite the passage of almost two centuries since Elizabeth Blackwell became the first female graduate from a medical school in the United States, surgery continues to be an unfavorable career for women studying Bachelor of Medicine and joining residency programs [2–4].

Choosing a surgical specialty can be difficult and challenging for both females and males owing to many factors, such as inflexibility in scheduling and working hours, which could lead to depression and mental and emotional collapse among surgeons when compared to non-health providers. Studies have shown that women do not opt for a career in surgery considering the work-family life imbalance it involves [5–7].

However, a study by the American Medical Association has shown that in choosing a surgical specialty, 35% of the general surgery

residents were women. In a 2010 study by the UK National Health Service (NHS) female surgeons were found to occupy 10% of consultant positions [8,9]. In terms of academia, only 10% of female surgeons are full professors and 12% hold dean and department head positions. A study by Schroen showed that female surgeons holding assistant professor positions had 6 times the risk of discontinuing academic hierarchy in a 2-year period [10–12].

Other reasons for females staying out of academia positions were explained by Cropsey et al. The factors assumed were low income, departmental issues, and career development and growth. Female surgeons often perceive a sense of gender discrimination as they move from medical school to being staff surgeons, and this was found peaking when they are promoted to consultant position [13,14]. However, the Association of American Medical Colleges data predict that this status quo would change and gender equity would be achieved by 2096 [15].

To the best of our knowledge, no studies have been conducted in Saudi Arabia regarding female surgeons involved in academia, gender

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discrimination, and job satisfaction. This study therefore aims to examine the perception and equity of females as surgeons in Jeddah, Saudi Arabia, because surgery programs are now increasingly being accepted by women.

2. Methods

2.1. Registration, ethical approval, protocol and patients involvement

The work has been conducted in line with the STROCSS criteria [16]. Ethical approval was obtained, and the study was registered in the research registry (UIN researchregistry6178) [17].

The objectives of the study were to compare the academic performance of men and women in surgical fields, assess barriers in the field of surgery, and relate well-being to gender judgment. The study participants were selected through a multistage stratified random sample technique.

2.2. Study design, setting, participants, study size

A cross-sectional study was conducted for 1 year during 2019–2020 in Jeddah, Saudi Arabia. The study was targeted toward surgeons of different majors, including students in their internship year who wish to pursue surgery as their field of interest. Several hospitals (both public and private hospitals) were included in the study, including the University of Jeddah, King Abdul-Aziz University, King Faisal Specialist Hospital-Research Center, National Guard Hospital, King Abdul-Aziz Hospital, King Fahad Armed Hospital, King Fahad General Hospital, and the International Medical Center, Jeddah, Saudi Arabia. Of the 400 surgeons invited to participate in the study, only 100 responded after the fourth iteration by email and WhatsApp.

A validated confidential questionnaire consisting of an 18-item web-based survey was sent to surgeons at all levels, starting from interns to consultants via email and WhatsApp. For preparing the survey, searching and reviewing all previous research on the topics “women in surgery,” “gender differences,” “women perception,” and “career satisfaction” was carried out through searches on multiple databases for published studies until 2019, which include PubMed, EMBASE, the Cochrane Library, and websites of Google Scholar. Four articles were selected for conducting the survey [14,18–20]. The content validity was determined by two experts.

Survey questions addressed 3 main categories: (1) demographics, (2) perception, and (3) career satisfaction. The survey questions included multiple choices, yes and/or no questions. The survey was sent to different hospitals in Jeddah by email and WhatsApp. Data collection and data entry were secured by a Google document that could be accessed only by the first coauthors.

3. Statistical analysis

Data analysis was performed using the Statistical Package of Social Sciences (IBM SPSS Statistics 21, IBM Corporation, Armonk, NY, USA, 2014). Both descriptive and inferential statistics were used. Continuous data were presented as mean \pm standard deviation and range and categorical data as numbers and percentages. The paired *t*-test was calculated with *p*-values <0.05 , which was considered statistically significant.

4. Results

4.1. Demographic information

Females comprised 53% of the participants. Most participants were less than 40 years (ranging from less than 40 years to above 65 years). An equal number of interns and residents together comprised 31% of the participants, followed by consultants and specialists at 22% and 16%,

respectively. Among the consultants, 11% were assistant professors, 6% full professors, and 1% associate professors. However, women ranking assistant professors were fewer than men (2% vs. 11%). The data are as illustrated in graph 1.

Almost half the number of physicians (48%) who completed the questionnaire were general surgeons, followed by surgeons of other specialties – 9% orthopedic, 8% neurosurgery, and 3% pediatric surgery. In terms of lifetime publications, the mean \pm SD of the total number of publications by females vs. males was 2.58 ± 2.68 vs. 11.37 ± 20.53 ($p = 0.002$).

4.2. Perception

Most women, almost half (26/53 or 49%), considered surgery a profession not conducive to family and children, mentioned lack of flexible/part-time training or work, and listed social barriers as the most perceived obstacle to a career in a surgery. Next, 21/53 (39.6%) of the women participants mentioned the existence of a gender attitude/bias, men having more variety in surgical career choices, and patients' preference for male surgeons. In contrast, only 1/5, or 9/47 (19.1%) of men mentioned the existence of a gender attitude/bias; men also mentioned that they have more variety in surgical career choices and that patients prefer male surgeons ($p = 0.026$). The data are as shown in Table 1.

However, among a little over half of the participants found that to have flexible training and career options and improve the work/life balance were the most important factors that could attract people to the field of surgery. Further, 2% of the men as against 20% of women considered that the field of surgery was perceived to be dominated by men, showing a statistical significance of $p = 0.007$. Around two-fifths of the participants believed that more collaborative approaches and financial support would attract people to the field of surgery. Most participants considered orthopedic and urology as predominantly male specialties by 64% and 57%, respectively, as shown in graph 2. In addition, both females and males agreed that the best reply if someone offended them would be ignore or refuse to respond (30/53 or 56.6% and 25/47 or 53.2%, respectively). Females mentioned multiple factors that influenced their decision to choose their specialty, but most common were career and promotion prospects, enthusiasm, and commitment (31/53 or 58.5%), followed by self-appraisal of one's own skills/aptitudes (23/53 or 43.4%), experience in subject chosen while a student (16/53 or 30.2%), and a particular teacher/department, inclinations before medical school, or advice from others (16/53 or 30.2%). Men were influenced by the same factors: career and promotion prospects, enthusiasm and commitment, and self-appraisal of one's own skills/aptitudes (17/47 or 36.2%), each with a *p* value of 0.026. The data are as illustrated in Table 2.

4.3. Career satisfaction

In terms of career satisfaction, women reported a mean of 7.13 in a range from 1 to 10, with 10 referring to most satisfied, unlike men who

Table 1
Participant-perceived barriers to a career in surgery.

Barriers	Females (n = 53)	Males (n = 47)	p value
Not a profession conducive with family and children, lack of flexible/part-time training or work and social barriers	26.00	22.00	0.82
Gender attitude/bias, men have more variety in surgical career choices and patients prefer male surgeons	21.00	9.00	0.02575
Less confident in their abilities and personal expectations	6.00	6.00	0.83
Hard to establish a private practice	6.00	10.00	0.43588746
No barriers	15.00	15.00	0.697495

Table 2

Factors had influenced their specialty choice a great deal.

Factors	Females (n = 53)	Males (n = 47)	p value
Domestic circumstances, hours/working conditions	13	9	0.521749
Career and promotion prospects, enthusiasm and commitment	31	17	0.025753
Self-appraisal	23	17	0.466671
Self-appraisal of own skills/aptitudes	16	11	0.45072
Experience of chosen subject as a student	16	16	0.683767

reported a mean of 7.79. In addition, nearly half of the surgeons (47%) said they would make the same career choices if they were given another choice. Surgeons considered that the best aspect of being a surgeon is performing surgery (84%) and doing diverse duties (50%), respectively.

In contrast, all participants agreed that the worst aspect of being a surgeon was the impact on family life (77%). Thus, changes are required to help attract women to the surgical field and to implement flexible work hours, as mentioned by 60% and reduced work hours as mentioned by 42% of the participants. The data are as shown in Table 3.

Nearly 33% of the participants worked almost 41–50 h per week, and 10% worked for more than 80 h per week. More than 1/3 of the participants (35%) entered the operating room less than 4 days per month, followed by 7–8 days/month, and 4 days/month, that is, 20% and 12% respectively.

5. Discussion

Over the past half a decade, there has been a major evolution in technology that has had a positive effect on the surgical field [21]. Although the number of women in medical schools and surgical residencies is on the rise, the number of women surgeons in practice is still low. In the past, women were discouraged from pursuing a surgical specialty because of the bias that women and surgery do not mix, and hence, women tried to challenge these views and stereotypes to reduce their struggle in having to take care of everything [22]. This raises a concern as women consistently make up one of the lowest percentages in the surgical profession as compared to other specialties [23], which is a result of the discrimination against female surgeons that still exists.

Our study is unique because it is the first study that studies female surgeons' discrimination in Saudi Arabia and in the Middle East. It tackles physician perception barriers that female surgeons face on the road to success, along with factors affecting academic performance and job satisfaction.

This study was conducted among 100 participants (interns, residents, specialists, consultants), with a mean age of 40 years, with half of them specialized in general surgery because the number of consultants specializing in general surgery is high. In comparison to a study conducted among 18 board-certified surgeons (F = 12, M = 8), the mean age was (F = 42 years, M = 43 years), practicing for 8.5 years [24].

In addition, this study shows that only 2% of female doctors held the

Table 3

Factors that attract to surgery profession.

Factors	Females (n = 53)	Males (n = 47)	p value
Flexible training and career options, improve the work/life balance	29	23	0.568191
More collaborative approaches, financial support	19	21	0.373325
Project a less masculine image/address this	10	1	0.007239
Remove the perception of the need to be an academic	9	11	0.427985
I don't know	8	6	0.740802

position of assistant professor. These low numbers in academia was because of the low number of women at consultant levels, and response rate was maximum from female interns. This is in contrast to a large study conducted by the Association of American Medical Colleges (AAMC), where 46% of assistant professors' positions were held by females and 37% were associated professors [25]. In pediatric surgery, 17% women were ranked as associate professors and 28% as professors [26]. After 12 years of entry into the surgical faculty, 22% of men and 10% of women became full professors [27].

In this study, the number of publications by females was 1–5 publications (48/53 = 71.6%), 6–15 publications (5/53 = 9.4%), and 16–25 publications (1/53 = 1.9%). The results agree with a study conducted by Seemann N and her group that the number of publications among females in their lifetime were 1–5 publications (30%), 6–15 publications (28%), 16–25 publications (16%), and >25 publications (26%) [14].

5.1. Gender discrimination

Gender discrimination was experienced in medical school, residency, and practice by 87%, 88%, and 91%, respectively, where most observed recipients were female by a percentage of 89, and most of the discrimination (75%) occurred in the operating room [28]. In comparison to our study, female participants showed a gender bias of 39.6% compared to 19.1% in males.

5.2. Barriers

In our study, most perceived barriers in the field of surgery for females were that it was not a profession conducive to family and children, followed by gender attitudes/bias, men have more variety in surgical career choices, and patients prefer male surgeons (21/53 or 39.6%). In contrast, only 1/5, or 9/47 (19.1%) of men think that gender attitude/bias exists, and that men have more variety in surgical career choices and patients prefer male surgeons.

Gender bias was a barrier for career advancement in 4 papers targeted toward surgeons and surgical residents, and one survey of 100 staff cardiothoracic surgeons reported a major income difference between both genders and that surgeons of either gender were significantly less likely to encourage women to enter surgical careers [10,12,29,30].

Medical students make career decisions based on the duration of training and work–life balance [31–34]. Lifestyle changes included prolonged work hours, the perceived barrier to achieving work–life balance, and the nature of patient interactions in surgery.

Almost 84% of female pediatric surgeons ranked lifestyle issues as one reason for female medical students not choosing a surgical career, where surgeons less than 44 years listed lifestyle as the number one reason followed by lack of positive female faculty role models (75%) [26].

Factors that influenced decisions to pursue surgery among general surgery residents were technical challenges as mentioned by both genders (100%), followed by intellectual challenges and women colleagues (95% and 90%, respectively) [35]. Women related development and satisfaction in surgical careers to factors related to their personal time, predictable time, and time for relationships (34.1%) [24]. However, men's satisfaction factors were mainly about their job (53%), independent personal time, predictable time, and time for relationships (8.7%) [24]. In our study, factors that enhance satisfaction with surgery include flexible work hours (3/5 or 60%) and reduced work hours (42%).

5.3. Career satisfaction

In our study, career satisfaction was assessed using a 10-point scale, where 1 indicated least satisfied and 10 most satisfied. It was found that females were satisfied by a mean of 7.13, and males were satisfied by a mean of 7.79. Surprisingly, in another study, male surgeons rated surgery at 4.8, and female surgeons rated it as 6 on a 7-point scale, with

most surgeons choosing surgery as a major again [36].

The worst aspects of being a surgeon were impact on family life (77%) and loss of personal time (59%). This agrees with a study that stated reasons for dissatisfaction in the surgical field were with work, where 17% of women's responses were about lack of credit and lack of support (17% versus 0% by men) and 55% of men's responses were about internal job characteristics (e.g., too much competition, lack of autonomy, too much clinical pressure) [24].

Despite female surgeons having high self-efficacy (confidence in leadership and surgical skills) at the beginning of their career, along the course of their career, they began leaving the profession. Some of the reported reasons for attenuation hindered career advancement, low wages, and chair/leadership issues [10]. When comparing surgery to other fields of medicine, women receive less personal support and career advancement and markedly lower salaries despite working long hours and years out of training [30,37].

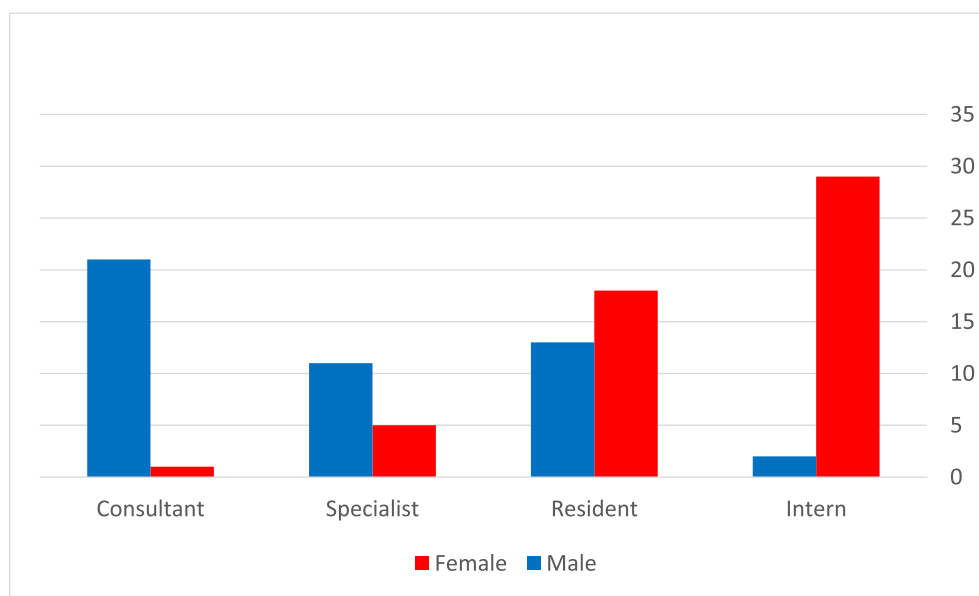
Thus, changes must be considered to increase female students entering the surgical field. Participants in the study think that flexible and reduced work hours would attract more women to join surgery. In this study, the range of hours of work per week was less than 40 h per week to more than 80 h per week and most participants (33%) had a 41–50 h range. This partially agreed with a study conducted by Seemann N that the average hours per week was 40 h, and that the majority of participants were in the 51–60 h range [14]. The mean work hours of female surgeons was 10.5 h per day per 5-day work week, excluding calls, in contrast to men with an average of 10.8 h per day per 5-day work week, excluding calls [24].

Work hour restrictions have been shown to improve students' experience of their surgical rotations and enhance their interest in surgical careers [33,38,39]. Nearly 53% of pediatric surgeons desired to have more time for nonprofessional activities, 44% more time for their spouse, and 35% more time to pursue hobbies and interests outside of surgery [26].

Appendix B. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.amsu.2020.12.009>.

Appendices.



Interns (29 females, 2 males) and residents (18 females, 13 males)

6. Conclusion

One of the main limitations of this study was the low response rate from surgeons, and there were few women who held consultant positions or were in the academia. This study concludes that there are some discrepancies in the surgical field in Saudi Arabia that are the main reason for the low number of women entering the field of surgery. This can be overcome by a nationwide limitation of working hours, encouraging medical students to enter surgery, and recruiting more women in leadership positions.

Declarations

No conflicts of interests. There is no funding in this research.

Electronic informed consent was obtained from participants for publication of cross-sectional study and accompanying images.

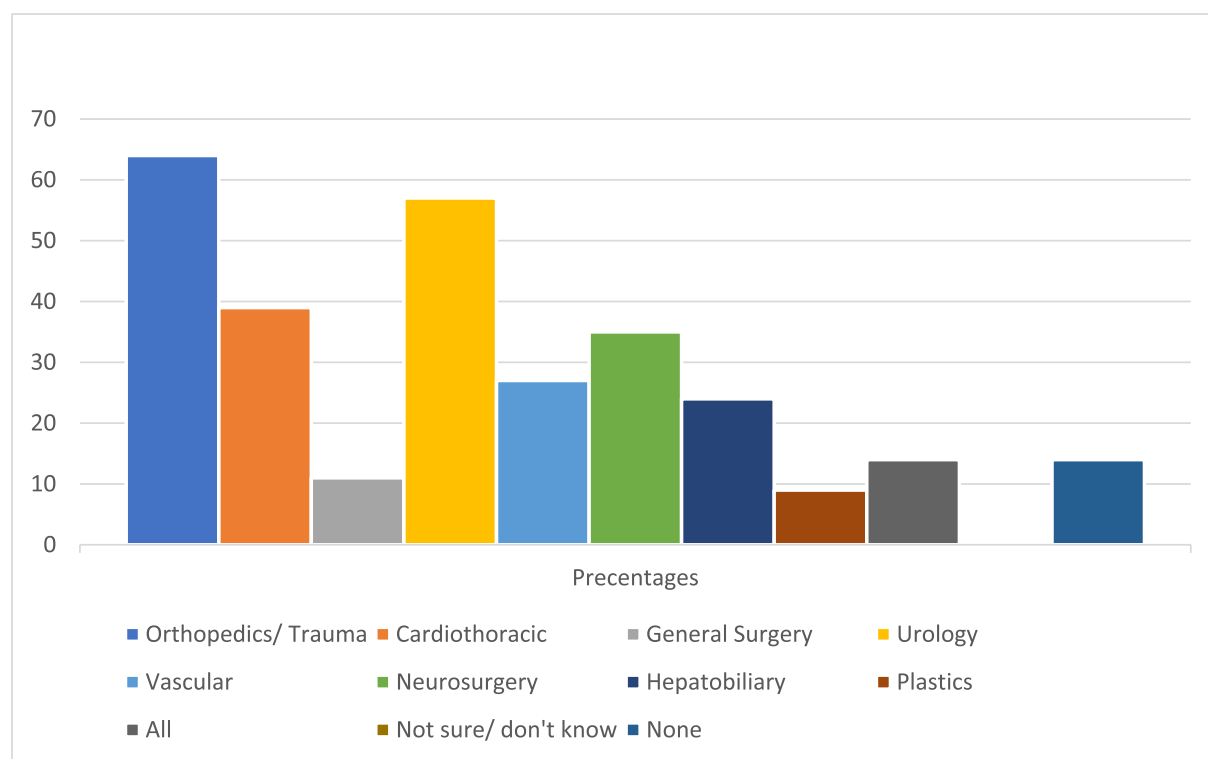
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CRediT authorship contribution statement

Rana Moshref: Conceptualization, Methodology, Software, Validation, Formal analysis, Data curation, Investigation, Writing - original draft, Writing - review & editing. **Leena Moshref:** Conceptualization, Methodology, Software, Validation, Formal analysis, Data curation, Investigation, Writing - original draft, Writing - review & editing. **Hisham Rizk:** Methodology, Supervision, Writing - review & editing. **Raad Fayez:** Writing - review & editing. **Abdulrahman Alotaibi:** Writing - review & editing.

had an equal number of participations of 31% each followed by consultants (1 female, 21 males), and specialists (5 females, 11 males) at 22% and 16% respectively.



The most perceived male predominant fields are: Orthopedics/Trauma by 64%, followed by Urology and Cardiothoracic Surgery, 57% and 39% respectively.

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