Identifying factors influencing specialty choice in urology by female medical students

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ABSTRACT

INTRODUCTION: As of 2019, females represented 11% of the urology workforce in Canada. Lack of female role models, quality of life, and gender/sex discrimination may be important deterrent factors to female applicants entering surgical specialties. Limited research exists on which factors are important in choosing urology as a specialty by female applicants. In this study, we aimed to determine which factors affect specialty choice in urology by medical school applicants and to identify any disparities by sex.

METHODS: From November 2022 to May 2023, a survey was distributed to medical students enrolled in all Canadian medical schools. The questionnaire included 23 factors that may affect specialty choice. A five-point Likert scale was used to assess each factor's influence on the student's interest in urology. Pearson-Chi squared test was used to compare response rates between sexes.

RESULTS: A total of 424 Canadian medical students responded to the survey. Common incentivizing factors for choosing urology as a specialty were medical-surgical approach, doctor-patient relationship, and financial benefits. Common deterrent factors were perception that urology is a male-dominated field, lifestyle of surgical residencies, and lack of female role models in urology. Females were more likely to report lower clinical exposure to urology and be deterred by the male predominance in the field.

CONCLUSIONS: While female medical students are more likely to be disincentivized to choose urology as a specialty due to it being a male-dominated field, early exposure through research, role models, or shadowing is essential to incentivize interest in urology among female medical students.

INTRODUCTION

Historically, the proportion of female medical students has been far underrepresented compared to their male classmates, with females accounting for 6% and 44% of Canadian medical school graduates in 1959 and 1989, respectively.[1] In more recent years, female students have made up at least half of the entering medical school classes;[2] however, sex and gender disparity remain a significant issue in several medical and surgical specialties, such as urology.

In the last two decades, there has been a significant increase in the number of female medical students applying and matching into surgical programs, with this trend extending into urology as well.[3,4] In fact, male and female applicants have a similar match rate in urology residency, following an 11-fold increase in the proportion of female applicants between 1996 and 2015.[5] Despite this positive trend, urology remains a heavily male-dominated field, with females making up merely 11% of the Canadian urology working force in 2019.[6] Similarly, the American Urological Association reported that female urologists only represent 8.5% of the practice in the U.S.[2]

Current data suggests that factors such as a lack of female role models, quality of life, negative experiences in surgery, and gender discrimination play an important role in deterring female medical students from applying to surgical specialties.[3,4,7-9] A study conducted by Wong et al demonstrated that female medical students were more likely to apply and match into urology residency if their respective medical school had more female urology faculty, further highlighting the importance of role model figures.[10]

KEY MESSAGES

- Female medical students are deterred by urology being a male-dominated field.
- Mentorship is an important way to incentivize students to apply to urology.
- Female medical students lack mentorship and shadowing opportunities in urology compared to their male counterparts.

Early exposure to clinical urology, such as mandatory urology rotations, as well as preclinical exposure through urology interest groups, were also shown to correlate with higher rates of application to urology residency.[4,10,11]

As female representation in medicine and urology continues to increase, it is especially crucial to understand the unique variables that may influence these decisions. The primary objective of this study was to determine the incentivizing and deterring factors for medical school applicants to choose urology as a specialty.

METHODS

Design and population

A survey-based study involving medical students enrolled in all 17 Canadian medical schools (University of Alberta, University of Calgary, University of British Columbia, University of Manitoba, Memorial University, Dalhousie University, McMaster University, Northern Ontario School of Medicine, University of Ottawa, Queen's University, University of Toronto, Western University, Université de Sherbrooke, Université de Montréal, Université Laval, McGill University, and University of Saskatchewan) was conducted. An electronic survey was distributed to all medical students enrolled at these medical schools between November 2022 and May 2023 through their respective medical student faculty representatives. All Canadian medical students, from pre-med to fourth-year medical students, were allowed to participate.

Survey

An electronic survey was designed and translated into both English and French in consultation with a small cohort of Canadian medical students and urologists (Appendix; available at *cuaj.ca*). The Research Electronic Data Capture (REDCap) software was used to build and manage the online surveys. The questionnaire included three different parts.

Part one (six items) included basic sociodemographic characteristics such as age, sex, university, ethnicity, year of study in medical school, and level of previous education. For sex, participants had the option to select male, female, non-binary, or abstain from answering.

Part two (12 items) included the level of interest and exposure to urology, as well as the level of understanding of urology as a specialty.

Part three included 23 factors that could potentially influence the decision to pursue a career in urology. These factors included exposure during the preclinical setting, exposure during clerkship, previous shadowing opportunities in urology, the competitive nature of the application process, the presence of family members in urology, prestige and financial earning potential, close patient contact, family/social demands, duration of training, lifestyle as a resident and as an attending, diversity of pathologies, integrated medical-surgical approaches, mentorship, research opportunities, resident contact, sex disparities, and female role models in the surgical/urology field.

A five-point Likert scale (1=strongly negative; 5=strongly positive) was used to assess each factor's influence on the student's interest in urology. We then ranked each factor by most incentivizing or deterrent by calculating the sum of responses that were very positive/somewhat positive and very negative/somewhat negative, respectively. Participants were asked to provide a unique email address to reduce duplicates, and all responses were anonymized.

Statistical analysis

The statistical analysis was performed using SAS Studio version 3.81 (9.04.01M7P08062020).

Descriptive statistics are expressed as a numeric average score (mean ± standard deviation) for continuous variables and as a frequency (percentage) for categorical variables. Ordinal variables, such as the evaluation of the effect of different incentivizing or deterring factors in choosing urology, were compared using a Likert scale and were analyzed using a parametric test on ANOVA. A Pearson Chi-squared test was used to compare response rates between sexes.

RESULTS

Respondent demographics

Between November 2022 and May 2023, a total of 424 medical students responded to the survey (Table 1).

Table 1. Demographic data of survey participants

	Number of participants (n=424)	Percentage of participants
Age		
Mean		26
18-20	23	5.42
21-25	257	60.61
26-30	78	18.40
31-35	33	7.78
36-40	25	5.90
41+	8	1.89
Gender		
Male	203	47.88
Female	219	51.65
Non-binary	2	0.47
Ethnicity		
Asian	73	17.22
African American or Black	22	5.19
Caucasian/White	259	61.08
Indigenous	42	9.91
Other	28	6.60
LGBTQIA+		
Yes	149	35.14
No	262	61.79
Prefer not to answer	13	3.07
University		
Memorial University of Newfoundland	24	5.66
Dalhousie University	22	5.19
Université Laval	31	7.31
Université de Sherbrooke	38	8.96
Université de Montréal	51	12.03
Université McGill	18	4.25
University of Ottawa	40	9.43
Queen's University	19	4.48
University of Toronto	38	8.96
McMaster University	27	6.37
Western University	6	1.42
University of Manitoba	1	0.24
University of Saskatchewan	14	3.30
University of Alberta	53	12.50
University of Calgary	16	3.77
University of British Columbia	14	3.30
Northern Ontario School of Medicine University	12	2.83
Quebec medical school		
Yes	230	54.25
No	194	45.75
School year		
Premed (applicable to QC medical schools only)	2	0.47
Preclinical - med 1	93	21.93
Preclinical - med 2	117	27.59
Clerkship - med 3	118	27.83
Clerkship - med 4	94	22.17
Highest education level before med school		
CEGEP	60	14.15
Bachelor's degree	208	49.06
Master's degree	126	29.72
Academic doctorate degree	26	6.13
Other	4	0.94

In 2022, there were 11 413 medical students enrolled in Canadian medical faculties.[12] Based on this, we conservatively estimate our response rate to be 3.7%. All Canadian medical faculties were represented, with most respondents enrolled in a Quebec medical school (54%). The average age of respondents was 26 years, with 51% of students identifying as female, 48% as male, and 0.5% identifying as non-binary. Most respondents were white (61%), followed by 17% Asian, 10% Indigenous, and 6.7% other ethnicities. Responses were available from all years of medical school, from pre-med to final year of clerkship. Other baseline characteristics are detailed in Table 1.

Interest, knowledge, and exposure in urology

Overall, 47% of medical student respondents expressed an interest in urology. When grouped by sex, 69%

of male respondents expressed an interest in urology compared to 27% of female respondents. Most (88%) respondents were able to identify urology as a surgical specialty; however, approximately 37% of respondents felt "not very" or "not at all" familiar with the field of urology, with only 36% feeling "somewhat" familiar.

Most respondents were able to identify benign prostatic hyperplasia (77%), urinary incontinence (73%), genitourinary cancers (72%), urinary tract infections (66%), stone disease (65%), and genitourinary reconstruction (59%) as medical conditions often encountered in urology. Meanwhile, pediatric urology (52%), renal transplantation (33%), pelvic floor dysfunction (52%), andrology/male infertility (51%) were less often identified as being medical conditions encountered in urology. Most respondents were able to identify outpatient clinic (73%), inpatient clinical activities (83%), endoscopic surgery (82%), minimally invasive surgery (59%), and open surgery (53%) as elements of urologic practice.

At the time of the survey, 68% of respondents felt they had adequate exposure to urology. When grouped by sex, 83% of males affirmed adequate exposure to urology compared to only 53% of female respondents ($p<0.05$). Respondents had been exposed to urology through classes (61%), shadowing (33%), research projects (27%), and conferences (17%). Interestingly, females (16%) were less likely than males (32%) to be involved in urology research projects ($p<0.05$). Of all the medical students in their senior year of clerkship, 31.91% had completed a mandatory rotation, while 34.04% had completed an elective rotation.

Incentivizing and disincentivizing factors to choosing urology

Of the 23 factors that were asked within the survey, most were viewed as positively impacting their choice of the specialty. The top five incentivizing and deterrent factors — by sex and combined — are listed in Figure 1. Exposure-based factors, such as preclinical curriculum, clerkship rotations, shadowing, mentoring, and having a family member or friend in the specialty, were viewed as somewhat or very positive by 40% or more of medical student participants. Factors that were specialty-based, such as urologist lifestyle, diversity of pathologies, and medical-surgical approach, were also viewed predominantly as incentivizing factors. Meanwhile, factors such as competitive selection process, training duration, residency lifestyle, and gender disparity produced more neutral responses.

Overall, the top five incentivizing factors in order were: medical-surgical approach (66.5%), doctor-patient relationship (61.6%), financial benefits (61.3%), diversity of pathologies (58.5%), and mentoring (54.5%). Overall, the top five deterrent factors in order were: perception that urology is a male-dominated field (45.0%), lifestyle of surgical residencies (42.7%), perception that there are not enough female role models in urology (40.3%), perception that urology is more focused on male pathologies (36.3%), and competitive selection process (31.60%).

When separated by sex, the top five incentivizing/deterrent factors were similar to the overall results, but response frequency (and thus rank by sex) differed. For example, while financial benefits were a common top five incentivizing factor for both sexes, this was male respondents' first incentivizing factor at 74.0% compared to the fourth most incentivizing factor for female respondents at 49.8% ($p<0.05$). Similarly, while the top deterrent factor for females was the perception that urology is a male-dominated field (60.3%), it was the third most deterrent factor for males (28.1%, $p<0.05$).

Perception and opportunities in urology by sex

Overall, 81% of respondents believed urology focuses mainly on male pathologies. Just over half (51%) of females viewed this somewhat or very negatively compared to only 20% of males ($p<0.001$). Similarly, 81% of respondents identified urology as a male-dominated field; 59% of females viewed this somewhat or very negatively compared to 27% of males ($p<0.001$). In terms of shadowing opportunities and number of female role models, 42% and 39% of respondents agreed there were sufficient opportunities, respectively. When grouped by sex, 55% of males compared to 36% of females believed they had enough shadowing opportunities in urology ($p<0.001$). Meanwhile, 59% of males compared to 20% of females believed there were enough female role models in urology ($p<0.001$).

DISCUSSION

Understanding factors that incentivize or disincentivize medical students to apply to urology is crucial to ensuring that urology residency programs can attract a diverse and qualified pool of applicants. Closing the gender/sex gap in specialities such as urology is important, given the positive ramifications female physicians have on the quality of patient care. For example, multiple studies have shown that female physicians are more likely than male physicians to focus on patient-centered communication, and a recent study in Canada demonstrated that female surgeons are less likely to have adverse postoperative

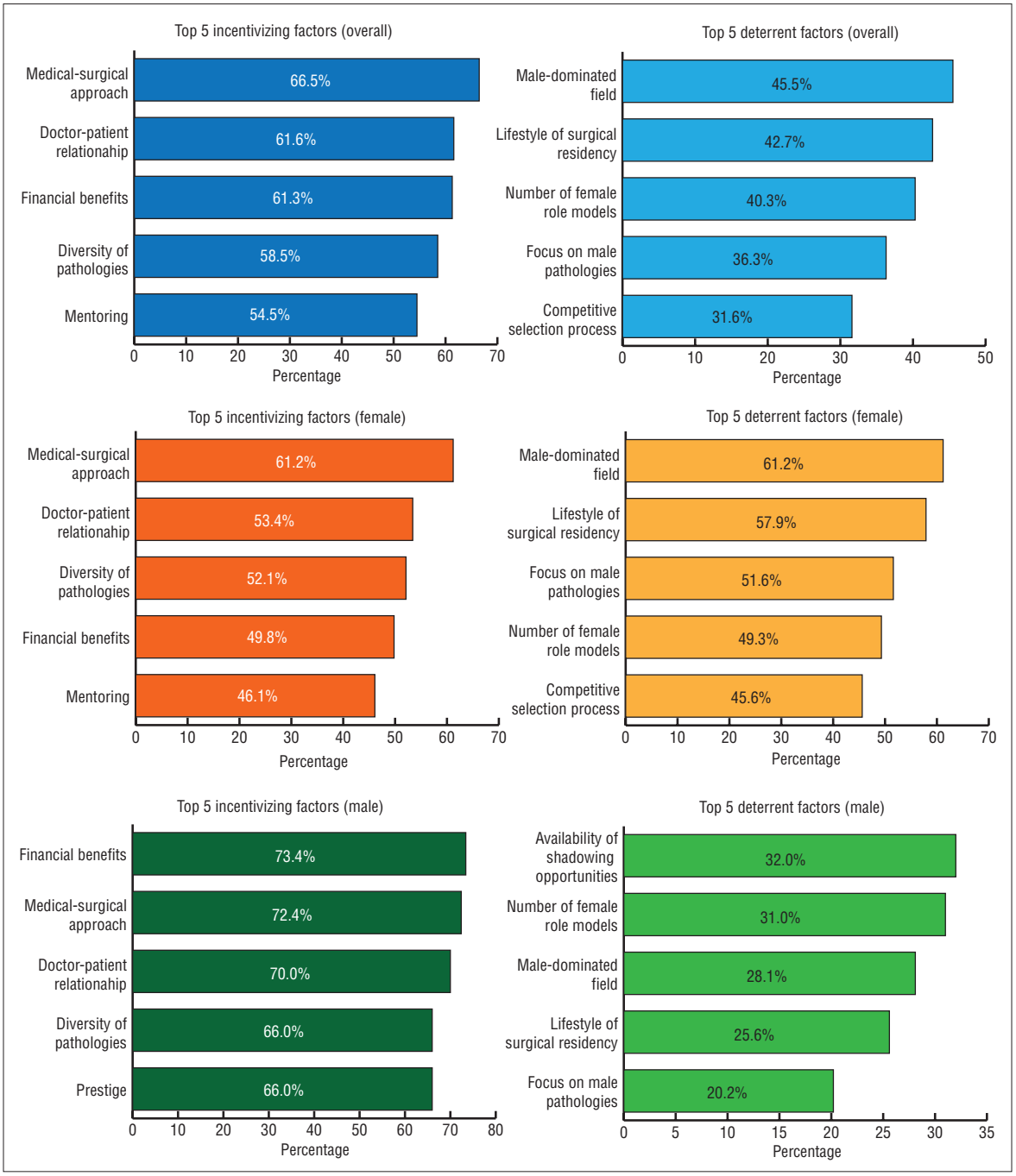

Figure 1. Top five incentivizing/deterrent factors impacting specialty choice by sex and overall.

outcomes compared to their male counterparts.[13,14] Given the paucity of studies on factors impacting specialty choice in urology among medical students, our study can provide useful insights into how to increase recruitment of female medical students.

In the present study, we were able to determine that specialty characteristics of urology, such as medical-surgical approach, diversity of pathologies, and lifestyle, were common incentivizing factors for both sexes. Furthermore, clinical exposure through clerkship rotations, shadowing, and mentorship also work to positively influence medical students to apply to urology. Our results also demonstrate that there appears to be a discrepancy between sexes in the availability of

such opportunities, as females are less likely to report sufficient access to shadowing opportunities, female role models, and research exposure. Other sex-based differences included females being more likely to be deterred by the perception of urology being a male-dominated field with a focus on male pathologies.

When comparing our results to those produced by Chung et al, in which they studied similar factors at a single Canadian medical school, we can see similar response trends appear across Canada.[15] Similar to our study, Chung et al demonstrated that working in a male-dominated field with male-dominated pathologies was more of a deterrent to females than males; however, unlike our study, there did not appear to be a sex-based difference in clinical exposure. We believe that the discordance in results between our studies with regard to clinical exposure is likely due to the way our survey questions differed in structure. While their study asked respondents to rate their clinical exposure, we directly asked participants to conclude if their clinical exposure was adequate or not.

Furthermore, our study offers more granularity into why exposure is likely to differ, given that we also demonstrated sex-based differences in the availability of female role models, as well as research and shadowing opportunities. Interestingly, while access to any mentor or role model is beneficial, the ideal mentor is often one that shares a similar background of gender, ethnicity, and cultural characteristics as their mentee.[16] In fact, a study of urology resident matches in the U.S. demonstrated that programs were more likely to recruit female residents and residents from backgrounds underrepresented in medicine if they had faculty of these identities.[17] For this reason, Orzel et al suggest that promoting diversity among faculty is key to providing more role models and mentorship opportunities for those of underrepresented backgrounds in urology, including women.[18]

The discussion of clinical exposure and mentorship, whether through clerkship or other extracurricular opportunities, is of particular importance, given they are the main mediators through which medical students are positively influenced to apply to urology. This finding is not surprising; similar trends have been established in other male-dominated specialities. In orthopedic surgery, for example, successful recruitment of female medical students was increased when they had access to role models and early exposure.[8]

This is further supported by studies about formal outreach programs. In outreach programs, medical students are provided an opportunity for early exposure and networking with future mentors. One such initiative in orthopedic surgery demonstrated a positive shift in specialty perception among their participants.[19]

In urology, outreach programs for women do exist. For example, the Society of Women in Urology is a group whose goal is to promote the professional advancement of women urologists. SWIU has created its own scientific and mentoring programs and provides numerous networking opportunities to its members, including residents and medical students. Within Canada, the Association of Women Surgeons has several active chapters that provide mentorship opportunities and exposure to surgical specialties to medical students.[20] Finally, Dell Medical School has provided a model for supporting women applicants by creating a medical school curriculum with encouraging training environments, strong student supports, and ample mentorship opportunities that has resulted in a high number of female medical applicants and match rate into urology from their institution.[21]

As we look for solutions to bridge the opportunities available to female medical students in urology, we should continue to study the impact of initiatives that work on the incentivizing factors of clinical exposure and mentorship.

Limitations

Our study has a few limitations. First, our survey is not validated, reducing the reproducibility of our results; however, we do not believe this would greatly impact our findings, given they are in concordance with other similar studies.[5,8,9,15,22]

Second, while we provided a French translation of our survey, most participants from French-speaking medical schools chose to respond to the survey in English. Given that our study is survey-based, this may have impacted the internal validity of our results if most medical students from French-speaking medical schools identify French as their first language.

Third, our survey did not specifically question certain potential disincentivizing factors, such as the ability for family planning and compensation inequality, which have been reported as factors contributing to dissatisfaction among female urologists in Canada.[23]

Fourth, our survey did not clearly differentiate between sex and gender, potentially confounding respondents' ability to correctly self-identify. This may, in part, explain why there was a high number of respondents identifying as LGBTQ+, as it includes more definitions of gender.

Fifth, we were unable to compare non-binary respondents to other groups, given their small number.

And finally, our results may be subject to sampling bias, given that the total response rate of 3.7% is very low, and certain medical schools had higher response rates than others. That said, our ability to gather responses across all Canadian medical schools makes our results more generalizable than if we had conducted the survey at one institution.

CONCLUSIONS

Common incentivizing factors to choose urology as a specialty were specialty-specific characteristics and having had a form of previous exposure. Common disincentivizing factors were the perception of urology being a male-dominated field and the predominance of male pathologies, which was more of a deterrent for females than males. Female medical students also have less exposure to urology, whether through shadowing, female role models, or research opportunities. Providing opportunities for better exposure to urology through outreach programs is essential to incentivize interest in urology among female medical students.

COMPETING INTERESTS: The authors do not report any competing personal or financial interests related to this work.

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