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Gender differences among surgical fellowship program directors

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ABSTRACT

Background: Although women are increasingly represented in American surgery, data regarding sex and academic rank of the leadership of fellowship programs are lacking.
Methods: Demographics and academic ranks for fellowship program directors were analyzed for 811 surgery fellowship programs across 14 specialties. Associations between academic rank and sex were assessed using a χ^2 independence test. Correlation between subspecialty compensation and percentage of female fellowship program directors was assessed using Pearson *r*.
Results: Women represented 18% of all fellowship program directors. Eighteen percent of fellowship program directors were assistant professors (25% women vs 17% men, $P = .049$), 36% were associate professors (39% women vs 35% men, $P = .379$), and 46% were full professors (36% women vs 48% men, $P = .018$). The percentage of women program directors was greatest in breast surgery (65%) and least in minimally invasive surgery (6%). There was a negative correlation between subspecialty compensation and percentage of female fellowship program directors ($r = -0.62$, $P = .04$).
Conclusion: Women are underrepresented among surgery fellowship program directors. Female fellowship program directors had lesser academic ranks compared with males. It remains unclear whether women surgeons achieve program director appointments at lesser academic ranks or if promotion among fellowship program directors is influenced by sex.

Introduction

Despite the increasing presence of women in medicine, sex discrepancies continue to impact academic leadership. During the past 3 decades, there have been robust efforts to increase the number of women in medicine and studies to understand why women continue to be underrepresented in academic leadership positions.[1–4] Although the percentage of female faculty has increased during the past 5 years, female physicians are still less likely than male peers to have a faculty position at an academic medical center (32% women vs 68% men in 2005; 35% women vs 65% men in 2010).[5]

These sex discrepancies are particularly evident in the house of surgery. In 2015, women represented only 23% of all full-time surgery faculty and 3% of all department chairs.[6] A recent study evaluating leadership among general surgery residency programs revealed a majority of men in the positions of program director and associate program director in the United States; women accounted for only 18% of all program director positions and 30% of all associate program director positions.[7] National data on fellowship program leadership are lacking. To address this knowledge gap, we analyzed academic rank and sex of all surgical fellowship program directors in the United States with the null hypothesis that women and men would be equally represented and hold similar academic ranks among surgery fellowship programs.

Methods

Fellowship programs accredited by the Accreditation Council for Graduate Medical Education (ACGME) were identified using the ACGME 2018 list of programs by subspecialty. Non-ACGME accredited programs were identified using the respective society websites for each subspecialty, which included the Fellowship Council, the Society of Surgical Oncology, the American Association

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of Endocrine Surgery, the American Association for the Surgery of Trauma, and the American Council of Academic Plastic Surgeons. Only surgical subspecialties that follow completion of general surgery residency were included in the dataset. From June 1, 2018, to August 20, 2018, each fellowship program website was queried, and all fellowship programs available at this time were included in the initial database. Demographics and academic ranks for fellowship program directors were collected for 811 surgery fellowship programs across 14 specialties in the United States using a combination of information from the society websites and the individual program's websites. Data on academic rank were missing for 157 fellowship program directors, which were excluded from the analysis without imputation. The subspecialty and sex of these 157 fellowship program directors are listed in Supplemental Table I. Sex of the program director was assessed by reviewing first names and professional photographs. The association between academic rank and sex of program directors was assessed using a χ^2 test of independence. Specialties with different proportions of female program directors were also stratified by median compensation for each subspecialty, which was derived from physician salaries reported by the American Medical Group Association.[8]

Descriptive statistics were calculated using SAS software version 9.4 (SAS Institute Inc., Cary, NC). After a statistically significant χ^2 test of independence, a cell-by-cell comparison of the observed and estimated expected frequencies was performed to better understand the nature of the dependence. Standardized Pearson residuals were calculated. When the null hypothesis is true each adjusted residual has a large sample normal distribution; *P* values were determined by treating these statistics as Z-scores and referencing a normal distribution table.[9]

Results

Women represented 18% of all surgery fellowship program directors. Among female program directors, 24% were assistant professors, 39% were associate professors, and 36% were full professors. The cohort of male program directors had a lesser proportion of assistant professors (17%) and a greater proportion of full professors (48%). The *P* values associated with a 2-tailed Z-test comparing academic rank among female and male fellowship program directors were $P = .379$ for $Z = |0.88|$, $P = .049$ for $Z = |1.97|$, and $P = .018$ for $Z = |2.37|$. Therefore, there are significantly more female program directors who are assistant professors and more male program directors who are full professors than predicted by the hypothesis of independence.

Surgical subspecialties were stratified by median compensation, demonstrating that the highest-paying subspecialties had the least proportion of female program directors. The percentage of female program directors was greatest in breast surgery (65%) and endocrine surgery (35%) and least in thoracic surgery (6%) and minimally invasive surgery (6%; Fig 1). There was a negative correlation between subspecialty compensation and percentage of female fellowship program directors ($r = -0.62$, $P = .04$, Fig 2).

Discussion

Our findings demonstrate that men continue to occupy more positions of surgery fellowship program director and especially so in high-income specialties. Furthermore, men occupying the position of fellowship program director were more likely to be of higher academic rank. To our knowledge, this is the first study to characterize the association between gender and the leadership of surgery fellowship program directors. These findings are consistent with a recent report investigating gender differences among program director and associate program directors of general surgery residency programs.[7]

A recent comprehensive analysis of women's progression from medical student to surgery trainee and to surgery faculty during the past 20 years highlights the immense progress women have made, but the overall proportion of women at the highest academic leadership positions remains low.[10] The delayed advancement of female physicians to leadership positions despite the increasing pool of potential leaders has been researched extensively over the past decade and has come to be known as the glass ceiling effect.[3,11] There also exists a pipeline effect, which refers to the insufficient number of women that have been in academia long enough to have reached leadership positions.[4] Implicit bias, a subset of cultural and

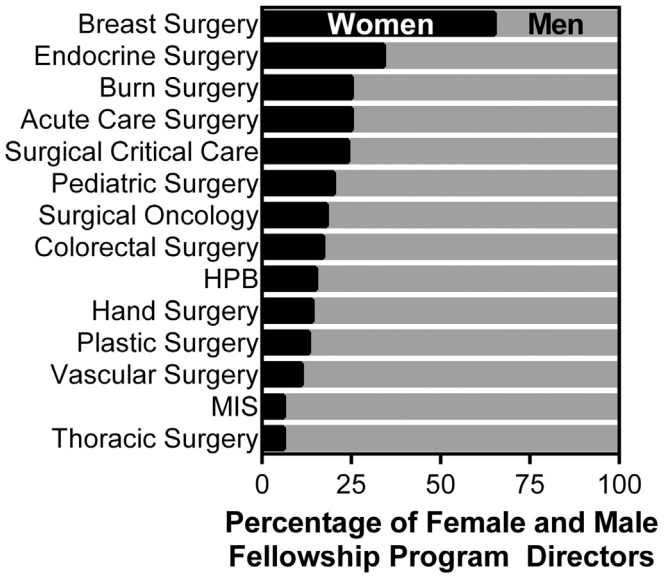

Fig 1. Percentage of female program directors stratified by surgery fellowship subspecialty.

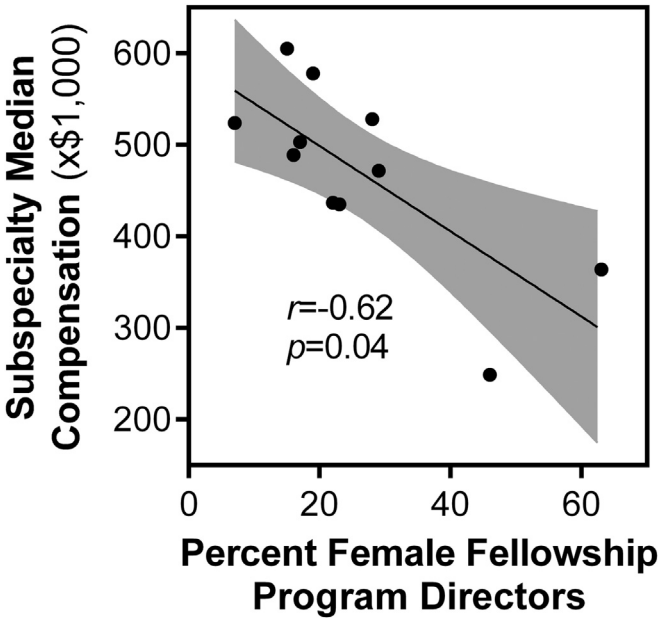

Fig 2. Correlation between surgical subspecialty compensation and the percentage of female program directors in each subspecialty. Correlation was assessed by Pearson *r*. The shaded region represents a 95% confidence interval.

subconscious beliefs held by both women and men regarding gender roles, may also contribute to stereotype threat or the feeling of not belonging among women leaders in academic medicine. Fortunately, evidence suggests that implicit biases are malleable and can be corrected when individuals are made aware of these biases.[2] Other strategies to mitigate implicit bias include exposure to counter-stereotypes, building strong mentor–mentee relationships centered on common interests and career trajectories rather than demographics, and focusing on merit for promotion and tenure.[12]

The following 3 major factors may contribute to the gender gap in the leadership of academic medicine: traditional gender roles, manifestations of sexism in the medical environment, and lack of effective mentors.[11] Gender schema affect expectations of men and women, the evaluations of their work, and their performance as professionals. Implicit ideas about men and women as a whole can condition reactions to men and women as individuals. By recognizing how these perceptions are affected by nonconscious beliefs, individuals can then be evaluated more accurately.

Among the highest paid subspecialties, such as hand surgery, pediatric surgery, and thoracic surgery, <20% of all fellowship program directors are women. In contrast, among the lowest paying subspecialties, such as breast surgery and endocrine surgery, female fellowship program directors comprise 63% and 46% of the workforce, respectively. Our findings are consistent with previous work identifying a negative correlation between the percentage of women in a subspecialty and the mean salary for those subspecialties ($r = -0.74$).[3] In 2 recent studies investigating factors contributing to gender salary gaps, after adjusting for potentially confounding variables such as rank, age, choice of subspecialty, NIH funding, and research productivity, approximately 40% of the pay gap remains unexplained.[13,14] A recent study that surveyed residency program directors in Internal Medicine found that after controlling for academic rank, a career in general internal medicine, and age of program director, the distribution of salary remained different by gender.[15]

Our study has several limitations. There is no formal dataset containing verified information about demographic and academic rank for surgery fellowship program directors. Therefore, individual program websites were queried, and as authors, we were reliant on each website providing current and accurate information. The determination of gender was based on first names and photographs. Although our interpretation of the sex of the program director based on a photograph may be incorrect, professional photographs represent the gender with which an individual identifies. Using a single observer to collect gender data may have increased the likelihood of unrecognized systematic methodologic errors, but also decreased heterogeneity in the practices of data collection, a common problem among databases and registries.[16] In addition, missing information about academic rank was excluded without imputation, introducing the possibility that the analysis is not representative of the entire study population of fellowship program directors. Because 24% of the fellowship program directors with missing academic rank were women and their subspecialty distribution was similar to that of the primary analysis, it seems unlikely that their exclusion compromised the integrity of the primary analysis. Furthermore, because there are few resources documenting compensation data among surgeons, the median compensation data may not be indicative of the fellowship program directors in this study. This study was not designed to assess reasons for salary disparities or adjust for variables that may contribute to these disparities. A survey of the surgery fellowship program directors identified in the current study using methods described previously,[15] may help to further elucidate reasons for salary discrepancies.

Women are underrepresented among surgery fellowship program directors, especially in high-income specialties. In addition, female fellowship program directors had lesser academic ranks than male program directors. It remains unclear whether female surgeons achieve program director appointments at lesser academic ranks or if promotion among fellowship program directors is influenced by gender. Despite ongoing efforts to identify and address contributing factors, disparities persist. More work must be done to increase gender equality in surgery, beginning with disseminating evidence and raising awareness, with the ultimate goal of merit-based selection and promotion.

Disclosure

The authors have no relevant conflicts of interest.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at https://doi.org/10.1016/j.surg.2019.05.017.

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