

Original Research

Assessing for Gender Disparities in the Selection of Chief Residents of Emergency Medicine Residency Programs

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Abstract

Introduction

Although the number of women physicians has been increasing, there may be gender disparities in the assessment of female emergency medicine residents. This study sought to determine if female emergency medicine residents are less likely to become chief residents than males.

Methods

In July 2017, an anonymous survey was distributed to the program coordinators of all accredited emergency medicine residency programs in the United States. The survey requested the number of males and females in each graduating class from 2015 to 2017. The percentage of female residents who were chief residents was calculated and compared to that for males. Secondly, an analysis was performed to see if the region of the country or method of chief resident selection was associated with the chances of females becoming chief residents.

Results

Program coordinators from 57 residency programs responded to our survey (34% response rate). Of the 683 females in the three graduating classes, 182 (26.6%) were selected as chiefs. This percentage was very similar for males: 26.7% (311/1164). No differences in the female chief resident percentages were seen based upon the region of the country. Females were more likely to be chief residents in programs that selected chief residents by resident vote. No other factor relating to how chief residents are selected was found to have a statistically significant association with the percentage of female chief residents.

Conclusions

We found no evidence of a gender disparity with regards to the selection of chief residents for emergency medicine programs.

Keywords

internship; residency; medical education; sexism; emergency medicine; physicians; women; leadership; gender disparities; chief resident

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Introduction

Over the past century, there has been an increase in the number of women in medicine. In 1970, just 11% of medical school entrants were women,¹ but in 2017, females made up 34% of physicians in the United States.² This number will likely continue to increase as the number of females entering medical school in 2017 exceeded the number of men.³ As a specialty,

emergency medicine (EM) has traditionally attracted lower numbers of females than other specialties. A 2016 study reported that 27% of EM physicians were female and 37.4% of EM residents were women.⁴ In that study, 29% of the American Board of Emergency Medicine directors were women, a ratio that is consistent with the number of female physicians in practice.⁴

There are concerns about gender disparities within EM, which is a male-dominated specialty. In particular, a 2015 study reported significant gender disparities in rank and salary in full-time academic emergency medicine faculty.⁵ Also, Dayal, et al. found that female residents were consistently rated lower in Accreditation Council for Graduate Medical Education (ACGME) milestones when compared to their male cohorts.⁶ These results held constant for ratings by both male and female faculty, and they existed across every milestone. In another study, female residents received discordant feedback from attending physicians whereas their male counterparts received more consistent feedback from attending physicians regarding areas in need of improvement.⁷

Given the recent research noted above, one might worry that biases in the assessment of female residents may lead to fewer females in positions of leadership within residency programs. No studies to date have examined whether female residents are underrepresented in leadership positions in residency, namely chief resident positions. Thus, we performed a study to determine if females are less likely than males to become chief residents in emergency medicine residency programs.

Methods

Study Design

The data collected was from an anonymous survey of program coordinators from the 167 ACGME-accredited, EM residency programs at that time. The survey was sent by email to all 167 program coordinators in July 2017. A reminder survey was emailed one month later. This study was determined to be exempt by the medical school's institutional review board.

Study Setting and Population

A brief survey was distributed through the online survey instrument, Survey Monkey. A link to the survey was emailed to the EM residency program coordinators of the 167 ACGME-accredited residency programs in the United States. Program coordinators were first provided with a narrative informing them that the survey was anonymous, and that the study was about gender disparities. Further

participation was considered implied consent for the use of their data.

Survey

The survey was validated internally by a group of emergency physicians involved in graduate medical education. The survey queried how many males and females were in each graduating class in the past three years (2015, 2016, and 2017). The survey also contained a question regarding how many chief positions were available in 2015, 2016, and 2017. Follow-up questions examined how many males and females were selected for the chief resident positions. Finally, program coordinators were asked to provide information about methods by which chief residents were selected using a dropdown menu of choices including an "other" option that asked for further information. The region of the country, based on the Society for Academic Emergency Medicine designations, was also queried. To avoid very small cell sizes, some regions were combined: Great Lakes and Great Plains were combined to form Great Lakes; Northeast 1 and 2 were combined to form Northeast; Southcentral and Southwest were combined to form South; and Southeast 1 and 2 were combined to form Southeast.

Data Analysis

For each residency program, the number of female chiefs over the three years was divided by the number of female residents for the three years to produce a percentage of female chiefs for each residency.

Chi-squares and Fisher's Exact Tests were used to examine whether the percentage of females selected for chief positions differed from the percentage of females in the EM programs. The homogeneity of proportions test was used to examine whether the proportion of female chiefs varied significantly from program to program. Analysis of Variance (ANOVA) was used to explore whether categorical variables, such as the region of the country, differed in the average percentages of female chiefs for the residencies.

Results

Program coordinators from 57 residency programs responded to our survey (34% response

Table 1. Average Percentage of Female Chiefs for Residencies in Each Region

Region	# of EM Programs	Mean (95% CI)
East Florida	13	36.4% (30.1% - 42.7%)
Mountain	14	35.0% (27.7% - 42.4%)
Pacific	8	41.4% (21.7% - 61.0%)
South	10	29.3% (21.2% - 37.5%)
Southeast	12	38.2% (30.7% - 45.7%)

rate). Of the 683 females in the three graduating classes, 182 (26.6%) were selected as chiefs. This is quite similar to the percentage of males in the same three classes selected as chiefs: 26.7% (311/1164). The odds of being a chief if one is female (0.363) did not differ significantly from the odds of being chief if one is male (0.364) (OR=0.996, ns). The average percentage of female chiefs for each residency was 35% (95% CI 0.322 - 0.396) ranging from 0.0 to 0.70. Despite the range, there was no statistical evidence for heterogeneity. That is, given the number of chiefs at each program, there was no evidence the percentage who were female differed significantly among the programs.

The average percentages of female chiefs for the residencies for each region are presented in **Table 1**. There was no statistically significant difference to suggest that any particular region of the country was any more likely to have female chief residents than another. Residency program coordinators reported a variety of methods used to select chief residents (**Table 2**). Of those, only one of the methods had an influence on the percentage of females chosen to be chief residents. Residencies where residents vote on chief residents had higher

percentages of female chiefs (38.0%) than residencies that did not use resident votes (27.2%, $P < .02$).

Discussion

This is the first study to examine the percentage of male and female residents selected for chief resident positions, and it yielded two particularly important findings. First, the percentage of female residents in EM selected as chief residents was similar to the percentage of male residents selected. Second, programs that used resident vote as a mechanism for chief resident selection chose a significantly higher percentage of female residents for chief resident positions.

The lack of a gender disparity with regards to chief resident selection seen in this study is consistent with prior data finding no discrepancy between the percentage of women serving on the American Board of Medical Specialties Board of Directors and women practicing EM.⁴ However, the data are inconsistent with a number of studies that have found women faculty at American medical schools are less likely to be full professors even

Table 2. Average (95% CI) Percentage of Female Chief Residents Selected by Method Used to Select Chief Residents

Selection Method	Yes	No	P-Value
Resident Vote	38.0% (34.0% - 42.0%)	27.2% (18.8% - 35.6%)	0.02
Faculty Vote	36.6% (32.7% - 40.6%)	28.3% (19.1% - 37.6%)	0.20
Interview	38.9% (30.6% - 47.1%)	34.3% (30.5% - 38.0%)	0.24
Nomination	41.9% (29.9% - 53.8%)	34.6% (30.8% - 38.4%)	0.13
Application	36.3% (30.0% - 42.6%)	35.6% (31.0% - 40.1%)	0.85

after adjusting for factors known to influence faculty rank.⁸⁻¹⁰ Given that our study assesses residents rather than faculty, it might be a signal that longtime gender biases are eroding, but other recent data suggest that trainees (in particular, surgical trainees) still feel that gender-based discrimination is common.¹¹

Our results are also promising in that they provide contradictory evidence to the idea promoted in a prior publication that women lack the confidence necessary to assume leadership positions and advance their careers.¹² While fewer females enter into EM residency programs than men, the current results suggest that once females enter EM residency programs, the odds of being selected chief resident are the same as those for men.

Another important finding of the current study is that using a resident vote as a mechanism for chief resident selection tends to significantly improve the proportion of female residents chosen. This has significant implications for residency programs' selection processes. While not examined in the current study, it may be hypothesized that using resident vote circumvents some of the implicit gender biases of attending physicians found in previous work.^{6,7} Organization systems can have significant impacts on women's ascension to leadership positions,¹³ and using a resident vote may be one organizational mechanism of reducing gender bias.

Limitations

This study had several limitations to consider. First, only 34% of program coordinators responded to the survey. There may be greater biases among programs whose coordinators did not respond as the narrative associated with the survey indicated that we were assessing for gender disparities. Additionally, this study only examined the impact of gender on chief resident selection. Gender is only one of a multitude of characteristics that might impact biases in selecting chief residents. This study did not examine other characteristics (such as test scores or milestone assessments) and their combined impact with gender on chief resident selection. Finally, this study assessed only EM residency programs, and so the results may not hold true for other specialties. EM is a relatively young specialty, and gender bias-

es may not be as ingrained in the culture as in some other specialties.

Conclusions

Our data suggests no significant disparities in the percentage of women and men selected for chief resident positions in EM. We also found an association between the use of resident vote as a mechanism for chief resident selection and the percentage of females selected as chief residents. These data are encouraging, suggesting that traditional gender disparities in medicine may be improving.

Conflicts of Interest

The authors declare they have no conflicts of interest.

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