

Gender Diversity in Anesthesiology Programs: The Role of Current Residents and Department Leadership in the 2014 Match Results

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Abstract

Background: Nearly half of graduates of American medical colleges are women, yet the percentage of women entering accredited anesthesiology programs remains less than 40%. There are obviously many factors that influence the choice of a residency training program, from geography to reputation to the atmosphere, composition and camaraderie of the department. We examined whether a greater number of current female residents, a female Chair, or a female Program Director were associated with a program matching a greater number of female candidates in the 2014 NRMP Match.

Methods: An electronic questionnaire was sent to all 132 ACGME-accredited anesthesiology programs immediately following the 2014 Match seeking information on the gender mix of their current residents, the gender of the Chair and Program Director, and the gender composition of their newly-matched candidates.

Results: The percentage of current female residents was significantly associated with the percentage of incoming female residents ($p = 0.013$). There was no association between the percentage of new female residents obtained in the Match and the presence of a female Chair or Program Director.

Conclusions: The results of the 2013 NRMP anesthesiology match indicate that programs with a higher proportion of female residents were able to sustain that diversity and successfully match a higher percentage of female candidates. No correlation was seen with Chair and Program Director gender, suggesting further work is needed to define the influence of female role models on female applicants' choice of anesthesiology residency programs.

Key words: Anesthesiology, Internship and Residency, Leadership, Gender Diversity

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Introduction

Data from the Association of American Medical Colleges indicate that in the 2013-2014 academic year 47.5% of medical school graduates were women¹. In that same period, however, women made up only 37.1% of residents in ACGME accredited anesthesiology programs.² The reasons for this under-representation are unknown and likely multifactorial, but create challenges for programs who view gender diversity as an important or desirable feature of their training environment. It has been demonstrated that across all specialties female students enter residency programs in their chosen specialty that have a higher proportion of female residents³. Similarly, women value perceived program diversity in surgical programs⁴ and internal medicine programs⁵. To the best of our knowledge, however, no one has looked specifically at the field of anesthesiology. We examined the results of the 2014 National Residency Matching Program (NRMP) match to explore whether anesthesiology programs with a female Chair, female Program Director, or higher proportion of female residents were more likely to match female applicants into their incoming class, with the hypothesis that each of the three factors would be associated with the recruitment of more female candidates as applicants sought out potential role models and colleagues.

Methods

The project was submitted to and received exemption from the University of Wisconsin Educational IRB.

An on-line questionnaire was created using the Qualtrics® tool and sent to the Program Coordinators of all 132 ACGME-accredited anesthesiology residency programs immediately following the 2014 Match. It was re-sent to non-responding programs one week later in an attempt to maximize response rate. Specifically, the questionnaire (Appendix 1) asked the gender of the current Chair and Program Director, the gender composition of the current residents, and the gender distribution of their newly matched residents. It also inquired as to whether or not the candidates actually met the Chair or Program Director as part of the interview process. We considered assessing the role of female faculty involvement in the interview process, but decided against it as we couldn't conceive of an accurate, straight-forward way for programs to quantify this involvement given the fact that the interview season often involves many different faculty over many interview days.

All data were analyzed using SAS 9.3 (SAS, Cary, NC). Associations between categorical variables were assessed using Pearson's chi-square test, and associations between continuous variables were assessed using simple linear regression. A two-tailed p-value < 0.05 was considered statistically significant. Multivariable models of a female applicant matching at a program were constructed using binary logistic regression, with p < 0.2 as a cut-off for including covariates significant at the bivariate level in the preliminary multivariable model. Variables were eliminated from the model in a bidirectional fashion with p < 0.05 as a final cutoff for inclusion.

Results

The completion rate for our questionnaire was 49% (65 of 132).

Characteristics of residency with complete data are given in Table 1. Sixty-five programs returned complete survey data, representing a total of 2940 current residents and 829 residents matching in the 2014 Match. Bivariate analyses are presented in Table 2. The gender of the Program Director and the gender of the Chair were not significantly associated with the proportion of incoming female residents. A simple linear regression model of the number of female applicants matching is presented in Table 3; since no variables other than the proportion of female residents were significant, a multivariable model was not pursued. At the bivariate level the proportion of female residents was significantly associated with the number of female incoming residents (slope 1.0, 95% CI 0.3, 1.6, $p = 0.003$).

Discussion

The finding that programs with a greater proportion of current female residents attracted more female residents in the match is consistent with previous studies in other specialties. Jagsi et al³ reviewed Association of American Medical Colleges (AAMC) data for 23,642 female medical school graduates from 2006-2008 and demonstrated that female students entered residency programs that had a significantly higher proportion of women residents. Similar to our study, there was no significant association with the presence of a female department Chair. Aagard et al⁵, in a survey of applicants to four internal medicine residency programs, found that women rated gender diversity of faculty and house staff as a more important factor than did men. In a twenty-year study of a non-university surgery program, Cole et al⁶ found that the number of female residents and attendings was rated significantly higher as a selection criteria by women than by men, although both groups rated those factors far lower than others such as variety and number of cases, friendly training environment, and resident camaraderie. Similar results were found at a university-based surgical training program by Mayer et al⁷ who demonstrated that women placed much greater importance on gender mix than did men in their selection of that particular residency program. Ku et al⁴, in a survey of 1,657 applicants to residency programs at Stanford University, found that women applicants were more likely than men to find gender diversity of faculty and residents to have a positive influence on their program ranking, and that that difference was more pronounced for surgical than for nonsurgical specialties (anesthesiology was in the nonsurgical group). Diversity within the department (gender and ethnic) was valued more highly by female than male applicants to radiology⁸ residencies, but again it was a relatively unimportant factor in the overall selection of a program.

No correlation was seen between the presence of a female Chair or Program Director and the gender composition of the newly matched residents. Most or nearly all of the applicants met the Program Director (64/65, 98%) and the Chair (53/65, 81%), so applicants were aware of the gender of the program leadership. This finding is interesting, as one might hypothesize that women applicants might be attracted to programs with strong female role models, and there is evidence that female medical students desire access to female mentors, although this is of less importance than a strong mentoring relationship.⁹

The number of departments with female departmental Chairs was small. Therefore, the difference in female PGY1 match rates between programs with female and male Chairs (43% and 36% respectively) may have been significant with a larger total population of residents. A power calculation indicates that approximately three times the number of residents would have been needed to detect a statistically significant difference of the magnitude we saw in our 2014 data.

Unlike previous work based on surveys of applicants and current or former residents this survey looked at the actual results of the NRMP Match. A program-level factor may therefore come into play, as any positive or negative biases that a program may have regarding resident gender may be reflected in their rank list and will influence the observed results. In addition, the actual result of the Match may or may not accurately reflect the candidate's preferred training program as only 51% of candidates matched into their first choice.¹⁰

One is compelled to ask, of course, whether or not gender diversity actually matters in a residency training program, and the authors do not mean to imply that it does or that it should automatically be a priority for every Residency Selection Committee. As noted above work in several other specialties has demonstrated that gender diversity, while a factor, played a relatively minor role in candidates' selection of a program. We are aware of no evidence that residency training in anesthesiology is improved in the presence of a gender diverse residency group. That said, there are certainly those who have strong personal feelings about the issue, and the case for diversity in medicine as a whole has been elegantly communicated by others^{11,12}. Perhaps if the ACGME Milestone project evolves to the point where aggregate resident Milestone data truly and comprehensively reflects the quality of training provided by a program we will have a way to compare programs of differing composition and begin to explore the contribution of factors such as diversity.

We have demonstrated that in US anesthesiology residency programs responding to our survey the percentage of current female residents is associated linearly with female residency candidates matching in the 2014 NRMP match. We failed, however, to show a correlation between Chair and Program Director gender and the recruitment of incoming female residents despite the hypothesis that this may play a role as candidates identify potential role models. What might be the implications of these findings for a residency program that sees this as important and wishes to become more gender diverse? One could be disheartened and conclude that only those that already have female residents will successfully recruit female residents, but this need not be the only conclusion. The correlation we demonstrated may be due to the absolute number of female residents in the program, but it may just as likely be due to the role that those residents played in the recruiting process. This deserves further study. For example, educators might set out to better understand how maximizing opportunities for candidates to interact with female residents already within the program might help programs increase gender diversity. Likewise, the absence of a correlation between the presence of female role models and matching female applicants suggests further work is needed to define the contribution of potential role models in applicants' choice of a residency training program.

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Table 1: Characteristics of residency programs with complete survey response (N = 65)

	<i>n (%)</i>
Department Chair	
<i>Male</i>	58 (89)
<i>Female</i>	7 (11)
Program Director	
<i>Male</i>	47 (72)
<i>Female</i>	18 (28)
All Current Residents (PGY2 or higher)	
<i>Male</i>	1863 (63)
<i>Female</i>	1077 (37)
Incoming Residents (PGY1)	
<i>Male</i>	522 (63)
<i>Female</i>	307 (37)
Program Size	
<i>All Current Residents†</i>	45 ± 23
<i>Incoming Residents†</i>	13 ± 7
Geographical Distribution of Programs	
<i>Midwest</i>	22 (34)
<i>Northeast</i>	20 (31)
<i>South</i>	13 (20)
<i>West</i>	10 (15)
† <i>mean ± SD</i>	

Table 2: Bivariate Analyses of Matched PGY-1 Residents Among Programs with Complete Survey Data (N = 829)

Variable	Female PGY-1 Residents Matching in 2014 <i>n (%)</i>	p
Department Chair		
<i>Male</i>	265 (36)	0.522*
<i>Female</i>	42 (43)	
Program Director		
<i>Male</i>	157 (30)	0.466*
<i>Female</i>	85 (28)	

*Pearson's χ^2 Test

Table 3: Linear Regression Model of Number of Female Residents Matching in US Anesthesiology Programs with Complete Data

Variable	Slope (95% CI)	p
Female residents matching per 10% point increase in proportion of current female residents	1.0 (0.3 - 1.6)	0.003†

Appendix 1

Your current Department Chair is

- Male
- Female
-

Your current Program Director is

- Male
- Female

What proportion of this year's applicants met (via interview or group presentation) the Chair?

- Nearly All
- Most
- About Half
- Less Than Half
- None

What proportion of this year's applicants met (via interview or group presentation) the Program Director?

- Nearly All
- Most
- About Half
- Less Than Half
- None

What is the gender distribution of your current residents (total of all years, including PGY1 where applicable)? Please provide absolute number, not percentage.

_____ Male
_____ Female

What is the gender distribution of your 2014 NRMP Match results (all Matched candidates, including categorical, advanced and Physician only where applicable)? Please provide absolute number, not percentage.

_____ Male
_____ Female