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Original Research

Gender Differences in Perception of Workplace Experience Among Anesthesiology Residents

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Introduction

Medical education is moving toward gender parity; however, many specialties remain predominantly male. Although half of all medical students are women, they represent a minority of residency applicants in fields such as anesthesiology, emergency medicine, neurology, radiology, and nearly all surgical specialties.[1]

In the field of anesthesiology in the United States, 23% of practicing physicians, 34% of residents, and 33% of residency applicants are female.[1,2] The existence of this gender gap is surprising to many who view anesthesiology as a *lifestyle* specialty with flexibility of work hours and type of practice.

A comparison can be made with general surgery, a similarly rigorous, operating room based specialty. In general surgery, the existence of the *old boys' club* stereotype has brought gender disparities to the forefront, and there have been a number of studies addressing these issues.[3-10] Although lifestyle and family preferences have been proposed as a reason for women to avoid careers in general surgery, women are less likely than men to cite these as deterrents.[10] Perceptions of gender-based discrimination seem to play a larger role than previously thought.[3] Related studies in anesthesiology have focused on workforce trends and the gender pay gap.[1,11]

Perceptions of gender-based discrimination may be affecting recruitment and retention of women in anesthesiology. We hypothesize that perceptions of the following variables differ between male and female anesthesiology residents: workplace discrimination, social support, locus of control, career satisfaction, and career barriers.

Methods

After exemption determination by the Icahn School of Medicine Institutional Review Board, a survey was administered online via REDCap (Vanderbilt University, Nashville, Tennessee to anesthesiology residents at the Icahn School of Medicine at Mount Sinai during the 2016-2017 academic year. Age, year of residency, and ethnicity were collected. The survey consisted of 30 questions adapted from existing validated tools used to measure attitudes and discrimination in the workplace, including the Perceived Discrimination Scale (questions 1 to 5), Organizational Commitment Scale (questions 6 to 10), Work Locus of Control Scale (questions 11 to 15), Social Support Scale (questions 16 to 20), and Career Barriers Inventory (questions 21 to 28; Appendix A).[7-11] These validated tools were chosen to assess a number of domains that might affect a person's perception of the workplace: environmental, structural, and motivational. Items from the Perceived Discrimination Scale were intended to assess environmental factors, such as workplace discrimination and gender biases. Questions from the Career Barriers Inventory and Social Support Scale targeted structural factors, such as mentoring and support systems in the workplace. The Work Locus of Control Scale and Organizational Commitment Scales evaluated participants' motivation and self-efficacy.

Twenty-eight of the questions in the survey were in Likert Scale format. Two questions were in a *yes/no* format. Responses were anonymous; they were collected and stored by REDCap. A total composite score consisting of the sum of all instrument responses was calculated for each respondent. Additionally, aggregate scores were determined for each individual tool. Lastly, responses were analyzed on a question-by-question basis. The Kruskal-Wallis H test of independent samples was performed independently on questions from each of the tools compiled to make up the survey. Individual questions were analyzed using Kruskal-Wallis H testing as an exploratory measure but not as a primary endpoint. The Spearman rank-order correlation was run to determine the relationship between participants' scores on questions from each individual tool.

Results

Of the 98 residents who received the survey via email, 83 residents completed it for an 85% response rate. Respondents consisted of 27 women (32.5%) and 56 men (67.5%; Figure 1, Table 1). All participants completed the survey. Power calculations determined that with a sampling ratio of 3:1, 1% error rate, and 80% power, a future study would require 559 respondents. Shapiro-Wilk test for normality showed that composite scores within the male and female groups were not normally distributed; thus, medians were used for comparison. There was no difference in median total composite score between male and female respondents (64 and 69, respectively; Mann-Whitney *U* test, $P = .703$).

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The Kruskal-Wallis H test of independent samples was performed independently on questions from each of the tools compiled to make up the survey. Using the Bonferroni correction to adjust for testing of multiple hypotheses, our *P* value for this part of the analysis is .0125 (a = desired alpha level, m = number of hypotheses; 0.05/4 = 0.0125). There was a statistically significant difference in the aggregate score of items representing the *Perceived Discrimination Scale*, with males having a median composite score of 6 and females having a median composite score of 11 ($P = .004$). Median scores of the other tools showed no statistically significant difference based on gender.

Individual questions were analyzed using Kruskal-Wallis H testing as an exploratory measure but not as a primary endpoint (Table 2).

Additional analysis by ethnicity did not reveal any statistically significant findings. As residents became more senior (comparing postgraduate year 1 to postgraduate year 4 residents), they were more likely to report that they had been treated unfairly at work because of their gender ($\chi^2 = 10.461$, $P = .015$) and witnessed inappropriate verbal exchanges ($\chi^2 = 11.446$, $P = .010$).

Chi-squared analysis showed that women were significantly more likely to have *observed* discrimination from patients ($P = .012$) and to have *experienced* discrimination from attendings ($P = .020$), residents ($P = .018$), and patients ($P = .001$).

The Spearman rank-order correlation was run to determine the relationship between participants' scores on questions from each individual tool. There were positive correlations between items relating to social support and organizational commitment (correlation coefficient [CC] 0.543, $P < 0.05$), work locus of control and social support (CC 0.415, $P < .05$), and work locus of control and organizational commitment (CC 0.525, $P < .05$). Negative correlations were seen between items related to organizational commitment and perceived discrimination (CC –0.328, $P < .05$).

Discussion

Clearly there is a gender gap in anesthesiology. As previously stated, only 23% of practicing physician anesthesiologists are women.[1] This gap extends to areas of compensation and type of practice.[2,11] In 2012, male anesthesiologists earned 29% more than their female counterparts.[2] Women were found to work 6 hours fewer per week and were 3 times as likely to work part time.[2] Adjusting for these differences in practice, men earned 11% more per hour than women of the same experience level.[2]

Studies describing the gender gap are important; however, we must also determine why this gap exists. Although lifestyle and family preferences have been put forth as reasons for women to avoid certain fields, women do not often cite these as deterrents.[3] In fact, females reported that they were more likely to be deterred from choosing surgery by perceptions of the *surgical personality* and the stereotype of surgery as an *old boys' club*.[3] Women are more likely to point to perceptions of gender-based discrimination as reasons to stay away from a field.[3,4,10] Additionally, women are more likely to cite the lack of female mentorship as a reason for not pursuing a specialty.[4] Similar forces may be at work in anesthesiology. Female respondents in our study reported a higher rate of discrimination at work. Furthermore, those who earned higher scores on items related to perceived discrimination were likely to report lower feelings of social support and organizational commitment. Tellingly, persons who did not feel socially supported at work were unlikely to report a strong commitment to the organization.

A survey of general surgeons using a modified Career Barriers Inventory, similar to the one used here, demonstrated that women perceived that they were treated differently based on their gender and that these negative attitudes represented a barrier to their career development in academic surgery.[8] Similarly in our study, female anesthesiology residents were more likely to feel that their gender is a limitation, that their achievements are underrecognized, and that their department fails to inspire the best in them. This demonstrates a possible linkage between gender-based discrimination in the workplace and low self-efficacy. Self-efficacy is necessary for improving achievement, developing self-regulated learning skills and motivation, and career advancement. It is also important for maintaining social and emotional wellbeing.

Our study was limited in terms of the small number of total participants, and an even smaller number of female participants. It only represents the experience of resident physicians in anesthesiology at 1 institution. In terms of survey design, no single validated survey was available for use. Although an attempt was made to use existing validated tools, they were adapted to be appropriate for the audience. Altering and combining these tools weakens their validity. Recall bias and inability to confirm the accuracy of perceptions of discrimination may be limitations as well.

Future directions for this research include surveying a larger population of anesthesiology residents across a number of institutions, as well as residents from other specialties. Exploring the role of female mentorship in anesthesiology is another important related area of inquiry.

Although this study only examined anesthesiology residents at 1 institution, it provides a framework for assessing and thinking about perceptions and assessment of gender-based discrimination in other areas of medicine. Despite their equal representation in medical schools, women remain a minority in many fields.[1] Progress is being made, but to continue attracting women to medicine and accommodate the slow but steady increase in their numbers, it is necessary to bring gender disparities to the forefront, understand different experiences in the workplace, and move to change cultures of discrimination.

References

1. American Association of Medical Colleges. Residency applicants by specialty and sex, 2016-2017. https://www.aamc.org/download/321558/data/factstablec1.pdf. Accessed November 1, 2017.
2. Baird M, Daugherty L, Kumar KB, Arifkhanova A. Regional and gender differences and trends in the anesthesiologist workforce. *Anesthesiology*. 2015;123(5):997-1012.
3. Bruce AN, Battista A, Plankey MW, et al. Perceptions of gender-based discrimination during surgical training and practice. *Med Educ Online*. 2015;20:25923.
4. Park J, Minor S, Taylor RA, et al. Why are women deterred from general surgery? *Am J Surg*. 2005;190:141-6.
5. Ahmadiyeh N, Cho NL, Kellogg KC, et al. Career satisfaction of women in surgery: perceptions, factors, and strategies. *J Am Coll Surg*. 2010;210:23-30.

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6. Witte FM, Stratton TD, Nora LM. Stories from the field: students' descriptions of gender discrimination and sexual harassment during medical school. *Acad Med*. 2006;81:648-54.
7. Jagusztyn, NE. Perceived Workplace Discrimination as a Mediator of the Relationship between Work Environment and Employee Outcomes: Does Minority Status Matter? In: Graduate Theses and Dissertations. Tampa, Florida, University of South Florida Scholar Commons. 2010.
8. Cochran A, Hauschild T, Elder WB, et al. Perceived gender-based barriers to careers in academic surgery. *Am J Surg*. 2013;206:263-8.
9. Carr PL, Ash AS, Friedman RH, et al. Faculty perceptions of gender discrimination and sexual harassment in academic medicine. *Ann Intern Med*. 2000;132:889-96.
10. Gargiulo DA, Hyman NH, Hebert JC. Women in surgery: do we really understand the deterrents? *Arch Surg*. 2006;141(4):405-8.
11. Schubert A, Eckhout GV, Ngo AL, et al. Status of the anesthesia workforce in 2011: evolution during the last decade and future outlook. *Anesth Analg*. 2012;115(2):407-27.
12. Swanson JL, Tokar DM. Development and initial validation of the Career Barriers Inventory. *J Vocat Behav*. 1991;39(3):344-61.
13. Williams DR, Yu Y, Jackson J, Anderson NB. Racial differences in physical and mental health: socio-economic status, stress, and discrimination. *J Health Psychol*. 1997;2(3):335–51.
14. Meyer JP, Allen NJ. A three-component conceptualization of organizational commitment. *Hum Resource Manag Rev*. 1991;1(1):61-89.
15. Krause, N. Negative interaction and satisfaction with social support among older adults. *J Gerontol B Psychol Sci Soc Sci*. 1995;50(2):59-73.
16. Spector, PE. Development of the work locus of control scale. *J Occup Organ Psychol*. 1988;61:335-40.

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Abstract

Background Medical education is moving toward gender parity; however, many fields, including anesthesiology, remain predominantly male. The gender gap in anesthesiology is poorly recognized, and little is known about why it exists. It is possible that perceived workplace discrimination may deter women from pursuing a career in anesthesiology. We administered a survey to examine whether gender differences affect the experience of anesthesiology residents in the workplace.

Methods This study consisted of an analysis of responses to a survey administered in 2017 via REDCap to residents at an American Council for Graduate Medical Education (ACGME) accredited anesthesiology training program. The survey contained 30 questions adapted from validated tools for measuring attitudes and discrimination in the workplace.

Results Of the 98 residents who received the survey, 83 (33% female) completed it. Power calculations determined that with a sampling ratio of 3:1, 1% error rate, and 80% power, a future study would require 559 respondents. There was no difference in total composite score between male and female respondents; however, when considering only those items used to assess perceived discrimination, women scored higher. Analysis of individual items revealed that women were significantly more likely to feel that their gender put them at a disadvantage in the workplace, and to note sexist behavior at work. Female residents were significantly more likely to have experienced discrimination from patients, attending physicians, and residents.

Conclusion Our study revealed that female anesthesiology residents perceive more gender-based discrimination at work. Perceptions of workplace discrimination may contribute to the persistence of gender gaps in different areas of medicine.

Keywords: Anesthesia, sexism, education

Figures

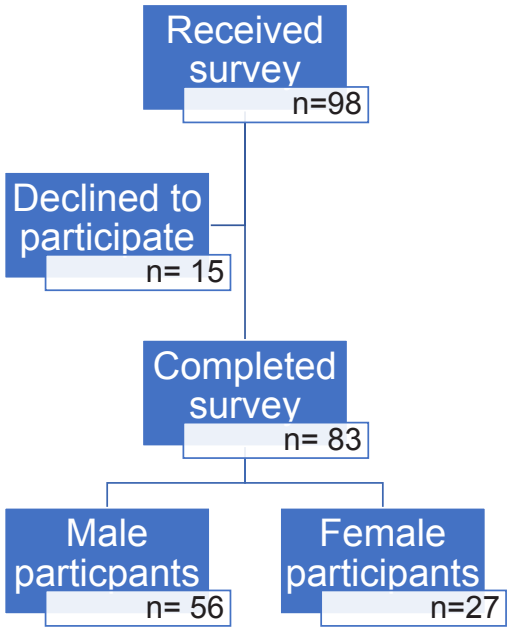

Figure 1. Flowchart of survey participation

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Tables

Table 1. Demographics. Key: PGY – Post-Graduate Year

Demographic Information		Female	Male	Total
	Total Number	27	56	83
Level of Training				
	PGY1	6	16	22
	PGY2	8	17	25
	PGY3	5	10	15
	PGY4	8	13	21
Age				
	<25	1		1
	25–30	14	48	62
	31–35	10	8	18
	36–40	1		1
	41–45	1		1
Ethnicity				
	White	15	26	41
	African American	0	2	2
	Hispanic/Latino	2	1	3
	Asian	7	21	28
	Native American/Pacific Islander			0
	Combination	3	12	9

Table 2. Kruskal-Wallis H Test by Gender for Items From Each Validated Tool

Validated Tool	Question	Median Score Female	Median Score Male	Chi-Squared	*P*-value
Perceived Discrimination Scale	I have been treated unfairly at work because of my gender	2	1	20.423	0.000
	The people I work with sometimes make sexist statements and/or decisions	3	2	9.569	0.002
	I feel that some of the policies and practices of this organization are sexist	2	1	7.720	0.005
	At work, I sometimes feel that my gender is a limitation	3	1	41.081	0.000
	At work, I do not get enough recognition because of my gender	1	1	20.826	0.000
Career Barriers Inventory	I have experienced sexual harassment	1	0	19.494	0.000

Appendix

Workplace Experience Survey

What is your current level of training?

a. PGY1
b. PGY2
c. PGY3
d. PGY4

What is your age?

a. <25
b. 25-30
c. 31-35
d. 36-40
e. 41-45
f. >45

What is your gender?

a. Female
b. Male

What is your ethnicity?

a. White
b. African America
c. Hispanic/Latino
d. Asian
e. Native American/Pacific Islander
f. Combination

How strongly do you agree with the following statements, on a scale of 0 to 5:

1. I have been treated unfairly at work because of my gender.
2. The people I work with sometimes make sexist statements and/or decisions.
3. I feel that some of the policies and practices of this organization are sexist.
4. At work, I sometimes feel that my gender is a limitation.
5. At work, I do not get enough recognition because of my gender.

How strongly do you agree with the following statements, on a scale of 0 to 5:

6. I am willing to put a great deal of effort beyond that normally expected in order to help this organization be successful.
7. I talk up this organization to my friends as a great organization to work for.
8. This organization really inspires the very best in me in the way of job performance.

Appendix *continued*

9. I really care about the fate of this organization
10. For me, this is the best of all possible organizations for which to work.

How strongly do you agree with the following statements, on a scale of 0 to 5:

11. A job is what you make of it
12. On most jobs, people can pretty much accomplish whatever they set out to accomplish.
13. If employees are unhappy with a decision made by their boss, they should do something about it.
14. Making money or getting a promotion are primarily matters of good luck.
15. People who perform their jobs well generally get rewarded for it.

How strongly do you agree with the following statements, on a scale of 0 to 5:

16. The people I work with go out of the way to do things to make my work life easier for me.
17. It is easy to talk to my coworkers and/or supervisor.
18. My coworkers and/or supervisor can be relied on when things get tough at work.
19. I have access to a mentor at my workplace.
20. I have access to informal social networks at my workplace.

How frequently have you experienced one of the following (never, rarely, annually, monthly, weekly)?

21. Inappropriate firing from position
22. Barriers to hire for applied positions
23. Bias against pregnancy
24. Sexual harassment
25. Disparities in salaries or benefits
26. Barriers to promotion or job progression
27. Lack of respect from medical team
28. Inappropriate verbal exchanges

29. Indicate whether you have OBSERVED discrimination from one of the following (yes or no):
    - Administrator
    - Attending
    - Clerical staff
    - Resident
    - Medical student
    - Nursing staff
    - Patient

Appendix *continued*

30. Indicate whether you have EXPERIENCED discrimination from one of the following (yes or no):
    - Administrator
    - Attending
    - Clerical staff
    - Resident
    - Medical student
    - Nursing staff
    - Patient

Appendix *continued*

Validated Tool	Question	Median Score Female	Median Score Male	P value
Perceived Discrimination Scale	I have been treated unfairly at work because of my gender	2	1	0.000
	The people I work with sometimes make sexist statements and/or decisions.	3	2	0.002
	I feel that some of the policies and practices of this organization are sexist.	2	1	0.005
	At work, I sometimes feel that my gender is a limitation.	3	1	0.000
	At work, I do not get enough recognition because of my gender.	1	1	0.000
Workplace Investment Score	I am willing to put a great deal of effort beyond that normally expected in order to help this organization be successful.	3	3	0.887
	I talk up this organization to my friends as a great organization to work for.	4	4	0.058
	This organization really inspires the very best in me in the way of job performance.	4	4	0.817
	I really care about the fate of this organization	4	4	0.100
	For me, this is the best of all possible organizations for which to work.	4	4	0.765
Locus of Control Scale	A job is what you make of it.	4	4	0.936
	On most jobs, people can pretty much accomplish whatever they set out to accomplish.	4	4	0.586
	If employees are unhappy with a decision made by their boss, they should do something about it.	4	4	0.056
	Making money or getting a promotion are primarily matters of good luck.	5	5	0.565
	People who perform their jobs well generally get rewarded for it.	4	4	0.883
Social Support Scale	The people I work with go out of the way to do things to make my work life easier for me.	4	4	0.399
	It is easy to talk to my coworkers and/or supervisor.	4	3	0.455
	My coworkers and/or supervisor can be relied on when things get tough at work.	4	4	0.339
	I have access to a mentor at my workplace.	2	2	0.527
	I have access to informal social networks at my workplace.	3	4	0.104
Career Barriers Inventory	I have experienced the following never, rarely, annually, monthly, weekly: Inappropriate firing from position	0	0	0.480
	Barriers to hire for applied positions	0	0	0.941
	Bias against pregnancy	0	0	0.019
	Sexual harassment	1	0	0.000
	Disparities in salaries or benefits	0	0	0.064
	Barriers to promotion or job progression	0	0	0.160
	Lack of respect from medical team	2	1	0.125
	Inappropriate verbal exchanges	2	1	0.084