GENDER DIFFERENCES IN PERCEPTION OF BIAS AT TWO PRIVATE MEDICAL SCHOOLS

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ABSTRACT

BACKGROUND Male and female medical education faculty have differing perceptions of healthcare practices and workplace culture. Likewise, male and female medical students have differing perceptions of diversity and bias in their institutions. Increased understanding of such differences would provide greater insight into issues on which the sexes differ and provide needed information to aid school administrators in establishing the most equitable environment possible.
METHODS Over 541 students were surveyed in two private medical schools. Students marked level of agreement to thirty survey items which were assigned strengths to generate descriptive statistics. Item means and survey sums were analyzed to generate descriptive statistics and to compare results.
RESULTS Though there were no overall statistically significant differences between the sexes regarding perceptions of bias, on a number of items males were significantly less positive regarding admissions biases and females were more perceptive of biases in curriculum and teaching. Males were less positive regarding administrations promoting an atmosphere of discussing bias freely. At one institution the genders differed on 10 items, 4 regarding admissions (males being less positive), 5 in curriculum/teaching events (females less positive), and 2 items regarding grades and communication (males less positive). At the second institution, males were again less positive regarding admissions.
CONCLUSION Male medical students at both schools did not perceive that the admissions process was as bias-free as females, yet males appeared to be less sensitive toward bias in curriculum, teaching events, and evaluations and grades than female medical students.

Overview

What is already known on this subject

Medical faculty and students differ markedly in their opinions regarding healthcare-related practices and sociocultural issues such as faculty diversity and diversity training. Not as apparent regarding medical students are differences in perception of bias in admissions, curriculum and other issues.

What this study adds

Males and females differ with regard to perceptions of equitability of the admissions process as well as the amount and impact of biases on curriculum and teaching events. These findings support previous studies of such differences.

Suggestions for further research

Continued research of the impact of bias on medical training and its impact on medical education and beyond is needed.

INTRODUCTION

The number of women entering and graduating from our nation's medical schools has continued to climb for the last few decades. In 1994-1995, female students comprised 42.2% of the entering medical school classes in the United States, while in 2004-2005 females comprised 49.5% of first-year classes.[1] Likewise the percentage of women faculty in U.S. medical schools as of 2003-2004 has risen to 32%.[2] With increased numbers of female medical students graduating, research studies are beginning to focus upon the effects in healthcare provided by this changing physician population as well as attempting to determine if there are differences in practice and the effect(s) these differences may have on patient care. An early study by Bertakis et al[3] reported female physicians spent more time than male physicians with patients, performed more preventive services and communicated with their patients on a deeper level. The culmination of these differences was that patients of female physicians tended to be more satisfied regarding their visit than patients of male physicians. In a survey of medical faculty at a Midwestern university, Foster et al[4] found a number of gender-specific perceptual differences in healthcare climate, including the finding that females reported a greater number of instances of sexual harassment and workplace denigration as well as greater obstacles to academic and career success. These results were echoed by Saalwachter et al[5] in their study of surgeons and residents wherein significantly more women mentioned inferior and otherwise incomparable workplace treatment. Relevant to this study, women valued more highly than males issues such as faculty diversity.

Perceptual differences according to gender have been found in undergraduate medical education as well as assessment of medical students' perceptions has been the subject of several studies. Richardson et al[6] reported gender differences in perceiving bias and then extended within genders along racial/ethnic lines as women generally reported more issues of bias than men, though not men of color necessarily. Another study pointed to other differences between the genders in

seeking to assess medical students' perceptions of diversity in their classes, its impact on curriculum, and predictions of diversity in their future patient populations. One result was that female medical students tended to value diversity training more than their male colleagues.[7] Further, male medical students were more likely to devalue diversity issues in curriculum while female students were more likely to agree that discussing diversity and increasing diversity awareness were positive steps. Women were also more likely to have encountered "a lack of sensitivity" in regards to diversity. Crosson et al[8] reported medical student differences in perception as female students were more apt to understand the value of understanding the patient's perspective prior to and following intervention than their male colleagues.

In this study, I sough to determine the amount of bias perceived in curriculum and other areas of medical education by students at two private schools of medicine, one predominantly European American (Institution X) and the other predominantly African American (Institution Y). Since each student's perception of "bias" can range from fairly benign personal favoritism (for any number of innate reasons) to overt racism, each student was informed during pre-survey instructions to interpret bias individually according to his/her own construct. Previous studies have reported or implied a dissimilarity in the perception of bias according to gender; this study sought to determine if there were clear differences in perceptions.

METHODS

Sample and Study Design

A descriptive/comparative research design was employed to measure student attitudes regarding perceptions of bias at their medical institutions were surveyed. A 30-item Likert scale survey instrument was developed based upon research questions framed by elements identified in a literature review and stemming from researcher experiences. The categories of the instrument were: *Admissions Process, Curriculum* (assigned or distributed teaching materials), *Didactic Lectures and*

Teaching Events, Evaluations and Grades, and *Interpersonal Relations*. There were six items per category for which respondents indicated level of agreement from *strongly agree* to *strongly disagree*. In addition, there was a section titled *Demographic Information* that requested respondents identify their gender, nationality, ethnicity, and length of time in the United States.

The survey contained no identifying participant information so there was minimal risk of loss of confidentiality. Since the survey was completely anonymous and voluntary, all three Institutional Review Board-granting institutions waived the necessity of signed consent from each student. Surveys were gathered in a drop box or by hand and contents of were not reviewed until after transport to a neutral location.

The Institutions

The subjects were the medical student populations at two private schools. A total of 541 students completed the survey fully, 327 students from Institution X and 214 from Institution Y. A small number (approximately 15) were returned blank. Four surveys were not used due to their being returned incomplete or containing errors which invalidated the survey. A demographic breakdown by gender is provided below.

Institution X is an established, nationally ranked, private medical school with a robust endowment and learning tradition, and has been historically dominated demographically by European-American males. In recent years the school has instituted significant efforts to diversify its student population, particularly with regards to increasing the enrollment of female students as well as underrepresented minority students. Consequently, for the first time the entering class of 2004 contained more women than men.

Institution Y is a historically Black medical school that has trained a significant percentage of African-American doctors in the United States and has a proud history with a distinguished list of alumni. Females have in recent years comprised the majority gender of its population.

At Institution X, 327 students completed surveys of which 153 were female (46.8% of the population group) and at Institution Y, 214 students completed the survey of which 111 were female (51.9% of the population group). Both percentages were representative of the total school population.

RESULTS

The research sought to gauge the amount of perceived bias within the population of surveyed students for individual items and the degree of agreement and disagreement to each item. In the table below, only groups that differed to a statistically significant level, as determined by an unpaired *t-test* ($\alpha = 0.05$), are listed and discussed in detail.

Analysis of Data

All participants who fully completed the survey were included in the results. Fifteen of the survey items were scored positively as: *strongly agree* = 5, *agree* = 4, *no opinion/neutral* = 3, *disagree* = 2, and *strongly disagree* = 1. Fifteen items were scored with negative polarity: *strongly agree* = 1, *agree* = 2, etc. The lower the mean, the more likely that student had perceived bias or held a negative opinion of that particular item, whereas the higher the mean, the opposite. Summing the 30 items provided a relative rating of satisfaction/dissatisfaction with the institution. For example, if a student marked all items such that each received the maximum of 5 points each, that is little or no negative perceptions reported, the survey summative score would be 150. Conversely, if marked such that each item was a score of 1, little or no positive perceptions, a summative score of 30 would result.

Cronbach's Alpha was used to validate the instrument. The results of the Cronbach's Alpha were that the positively scored items received a value of 0.72 and negatively scored items received a value of 0.79. A pilot study was completed with the fourth-year classes from each institution and results aggregated. The computational software used for statistical analyses in this study was

StatView for Windows, Version 5.0.1. The complete study may be accessed via Dissertation Abstracts.[9]

Limitations

One limitation was the differences in how each student perceived "bias." Students were not provided a formal definition of bias, but were instructed to use their personal understanding or impression of the term. In the context of this study, it is understood that some may question if bias truly existed or if students had mistakenly understood bias to exit when it did not. To the researcher, both situations would result in the student being affected the same, that is for that student, bias was perceived and consequently internalized. Given the subsequent survey results, students in the same lecture hall or attending the same educational event may or may not have perceived biases and these perceptions cut across gender lines. However, the interesting aspect of this issue was the amount of differences between students regarding the amount of bias perceived, thus the differences between genders as reflected by item means.

Combined Data Set

When examining the combined data set, that is, the entire population of 541 surveys segmented by gender, there was no statistically significant difference (SSD) between genders regarding perceptions of bias (female mean = 104.2; male mean = 104.3; $p = .95$). If comparing responses via an unpaired *t-test* (*alpha* < .05), there were a number of items with SSDs. For example, in Section I, *Admissions Process*, females were more positive regarding the admissions process than males on five of six items (four to a statistically significant level), the exception being males' belief that a "color-blind" admissions process was more advantageous to them ($p = .03$). Of statistical significance, females were much more positive on items 2, *Gender/race/ethnicity was not an issue during the admissions process* ($p = .03$) and 6. *The admissions process was free of biases* ($p = .0001$).

In Sections II, *Curriculum*, III. *Didactic Lectures/Teaching Events,* and IV. *Evaluations and Grades*, only 3 of 18 items resulted in the two genders disagreeing to a statistically significant level. On these three items, 9. *Bias awareness should be more emphasized in our curriculum*, 12. *The issue of faculty diversity or lack thereof is* ***not*** *a major concern to me*, and 14. *If/when bias is perceived, it is personally distracting to me*, females rated each item significantly lower regarding bias, indicating they were much more sensitive to issues of bias or more perceiving of the existence of bias than were male medical students. On 8 of the 12 items in Sections II and III, females were less positive than males regarding the existence of bias (and the culture/policies of the medical school). Interestingly, in Section IV, males were less positive than females on five of the six items pertaining to evaluations and grades, though no differences were statistically significant. Yet this indicates that, in the same vein as admissions, males may perceive more systemic biases in the assessment process than females.

In Section V. *Interpersonal Relations*, there was one item of statistically significant difference, 25. *Students at this institution are encouraged to talk freely about bias* ($p = .01$), with female medical students agreeing with this item at a much higher rate, meaning that male students did not perceive as open an environment to discuss bias issues. However, on four of the remaining five items on the survey, males were more positive than females over a range of issues, though not on the final item regarding overall bias in each institution. Overall, there were 16 items on which item means differed by less than or equal to .11.

Institution X Differences

Within Institution X, the overall means were quite close (female mean = 105.0; male mean = 105.8; $p = .64$). When segmenting the data by institution to examine perceptions, other differences emerged. Item analysis via an unpaired *t-test* resulted in 10 items having SSDs, 4 of which were ranked higher by females and 6 by males. In Section I*, Admissions Process*, males and females

differed significantly on four of the six items in this section. The following items resulted in *p* scores of less than 0.05: 2. (*p* = .04), 3. (*p* = .004), 4. (*p* = .017), and 6. (*p* = .002). Females agreed more strongly than males on all items except no. 4 ("*Color blind" admissions*) indicating that males did not perceive the admissions process to be as bias-free as females did, or perhaps males discerned a different message regarding support or sensitivity to bias-related issues.

In Section II, males and females differed to a statistically significant level on four of the six items: 8. *Curriculum contains biased materials (p* = .03), 9. *More emphasis on bias awareness (p* = .0005), 10. *Biased curriculum encountered (p* = .004), and 12. *Faculty diversity not a concern* (*p* =.01). Contrary to the first section, male mean scores were higher on 5 of the 6 items, the only exception being item 11. *Confidence in school administration,* which females rated higher, however, the difference was not statistically significant (*p* = .43). Therefore, the implication was that males did not perceive bias to be as much an issue as the females, a result supporting earlier research studies.

There was only one item in Section III, *Didactic Lectures/Teaching Events,* upon which the two genders disagreed to a statistically significant level, item 14, which stated *If/when bias is perceived, it is personally distracting to me.* In this negatively scored item, female medical students reported a higher level of agreement, meaning they were affected much more so than male medical students by perceive bias manifested by the female mean item score of 2.68 compared to the male mean of 3.04 (*p* = .0002). Females scored lower on four of six items in this section, indicating they were once again more sensitive to issues of bias than males.

In Section IV, *Evaluations and Grades*, no items resulted in statistically significant differences in mean scores. Females, however, had higher mean scores than males on all six items, indicating that females felt more positive, albeit not to a statistically significant level, than males.

In the final portion of the survey, Section V, *Interpersonal Relations*, there was only one statistically significant difference, item 25. *Students encouraged to talk freely* (p = .01), on which females agreed more strongly than males that they were encouraged to talk freely about bias though males rated 4 of 5 remaining items higher, but none significantly so and several virtually the same. Overall, females were more positive toward issues of bias on 16 of the 30 items, however, 11 of these were Sections I and IV.

Institution Y Differences

For Institution Y data an unpaired *t-test* was used again to determine if there were SSDs between genders (female mean = 103.3; male mean = 101.6; p = .35), thus indicating there was no major difference in perceptions. When examining results by item, only 2 of 30 items were found to have SSDs between the genders (as opposed to 10 such differences at Institution X). Both of the items were in the first section regarding the admissions process and both items were rated more highly by females: 5. *Admitted solely on qualifications (p* = .02) and 6. *Admissions process was free of biases (p* = .03). Therefore, males appeared to be more discerning of the existence of bias in Institution Y's admissions process than females.

Females also gave higher ratings to four of the six items in Section II. *Curriculum*, but males ranked four of the six higher in Section III. *Lectures/Teaching Events*, but again, none were statistically significantly so. Females ranked four of six items higher in Section IV. *Evaluations/Grades* and in Section V. *Interpersonal Relations.* Overall, females were more positive about issues relating to bias at Institution Y on 18 of the 30 items. Of interest was the small range of difference for item means as 25 of 30 items differed by .12 or less.

Table 1 Individual item results of unpaired t-tests (α = 0.05)

Both Schools		Institution X		Institution Y	
Females (N=264)	Males (N=277)	Females (N=153)	Males (N=174)	Females (N=111)	Males (N=103)

	Mean	Mean	*p**	Mean	Mean	*p**	Mean	Mean	*p**
Section I. Admissions Process									
1. Interviews/contacts were bias free	3.74	3.72	.87	3.88	3.87	.94	3.54	3.47	.68
2. Gender/race/ethnicity not an issue	3.53	3.28	.03*	3.49	3.20	.04*	3.58	3.42	.34
3. Understanding of administration support	3.62	3.48	.12	3.89	3.56	.004*	3.26	3.34	.57
4. "Color blind" admissions an advantage	3.36	3.56	.03*	3.66	3.95	.02*	2.96	2.97	.92
5. Admitted solely on qualifications	3.89	3.76	.15	3.99	3.98	.88	3.74	3.38	.02*
6. Admissions process free of biases	3.19	2.79	.0001*	3.07	2.66	.002*	3.36	3.02	.03*
Section II. Curriculum (Materials)									
7. Multicultural perspectives included	3.76	3.78	.79	3.52	3.55	.74	4.10	4.17	.60
8. Curriculum contains biased materials	3.08	3.17	.29	3.03	3.27	.03*	3.15	2.99	.30
9. More emphasis on bias awareness	2.65	2.91	.003*	2.63	3.03	.001*	2.67	2.71	.78
10. Biased curriculum encountered	3.17	3.34	.07	3.09	3.44	.004*	3.27	3.18	.49
11. Confidence in school admin.	3.43	3.32	.29	3.54	3.45	.43	3.27	3.32	.29
12. Faculty diversity not a concern	2.97	3.19	.05*	2.85	3.28	.002*	3.16	3.04	.55
Section III. Lectures/Teaching Events									
13. Bias encountered in lectures/ events	3.04	3.11	.49	3.03	3.14	.37	3.06	3.04	.93
14. Bias is personally distracting	2.68	3.04	.0002*	2.57	3.09	<.0001*	2.85	2.97	.42
15. Bias discussed with faculty/ lecturer	3.72	3.77	.60	3.69	3.71	.86	3.70	3.79	.28
16. Bias identified to faculty/ administration	3.81	3.79	.82	3.75	3.76	.86	3.76	3.87	.19
17. Comfortable discussing bias	3.31	3.30	.93	3.35	3.25	.44	3.30	3.32	.86
18. Race in vignettes scrutinized more	3.01	2.92	.35	2.95	2.91	.68	2.93	2.98	.33
Section IV. Evaluations and Grades									
19. Bias affects subsequent performance	3.75	3.78	.73	3.73	3.83	.26	3.79	3.69	.40
20. I must worker harder for my grade	3.87	3.82	.63	4.06	4.03	.79	3.61	3.48	.43
21. Students earn grades regardless	4.17	4.09	.34	4.27	4.16	.28	4.04	3.98	.69
22. I have received the grades I earned	4.25	4.17	.29	4.35	4.21	.27	4.10	4.09	.92
23. Grades based on race/ethnicity	4.46	4.34	.09	4.54	4.34	.22	4.34	4.34	.97
24. Grades based on gender	4.34	4.29	.52	4.39	4.26	.39	4.28	4.35	.56
Section V. Interpersonal Relations									
25. Students encouraged to talk freely	3.57	3.35	.01*	3.60	3.32	.01*	3.44	3.41	.32
26. Friends of multiple cultures/ ethnicities	4.24	4.26	.75	4.31	4.33	.87	4.13	4.15	.90
27. Biased comments heard from students	2.67	2.69	.87	2.60	2.67	.61	2.76	2.73	.88
28. Medical students are less biased	2.73	2.85	.13	2.88	2.96	.10	2.66	2.67	.96
29. Society ignores issue of racism/ bias	2.95	3.12	.13	3.15	3.37	.09	2.69	2.69	.99
30. Bias exists in this institution	3.34	3.22	.23	3.29	3.21	.51	3.39	3.24	.35

* p -value <.05 denoting a statistically significant difference

DISCUSSION

The purpose of this study was to assess if males and females differed significantly in perceptions of bias in their medical education institution. When examining the pooled population,

there were overall no statistically significant differences between the sexes regarding their perceptions of bias. However, item analysis using an unpaired *t-test* resulted in seven items of statistically significant difference. Four of the items indicated males were more aware of bias in admissions and communications and the other three that females were more aware of biases in curriculum and teaching.

When segmenting by institution and then by item and analyzing each. At Institution X there were 10 items of statistically significant difference. Of interest, however, was the pattern of difference. There were four items in Section I, *Admissions Process*, which resulted in significant differences, with males being more sensitive to bias than females. There were five items in Sections II, *Curriculum*, and III, *Didactic Lectures/Teaching Events*, upon which the two genders disagreed significantly. On all five of these items, females gave lower scores regarding bias, indicating they were more sensitive to issues of bias in these two sections than males. The final item which resulted in a significant difference, item 25, males were less positive regarding the institution encouraging communication about bias, echoing the analysis results of the total data set.

At Institution Y, the historically more diverse institution of the two, impact of gender was more subtle as only 2 of 30 items were found to have statistically significant differences between the genders. However, both of these items were in the first section regarding the admissions process and both were rated more highly by females. Therefore, like males at Institution X, males at Institution Y were more sensitive toward bias in this section of the survey.

The results of this study point to the fact that there are definitely differences in perception between the genders: males more perceiving of bias during admissions and females thereafter, with a few exceptions. Furthermore, overall the most populace gender was also the most positive, which may point to the influence of institutional culture on student perceptions. At both schools, administrators can improve communications to ensure both sexes discern an equitable environment

beginning with recruitment through the undergraduate years. Thereafter, curriculum committees should review curriculum to expunge it of overtly biased materials. Avenues should be created that would allow students to provide instant feedback should biased comments or opinions be stated during lectures and teaching events. This may include broadening bias awareness and diversity training to faculty lecturers and preceptors. Sometimes bias is perceived by only a small minority of students, however, administrators must be prepared to address that eventuality. However, open communication and feedback from students should be an integral part of the process.

REFERENCES

1. Barzansky B, Etzel SI. Educational Programs in US Medical Schools, 2004-2005. *JAMA* 2005;**294**:1068-74.
2. Barzansky B, Etzel SI. In reply: trends in women among medical school faculty. *JAMA* 2004;**292(24):**2972.
3. Bertakis KD, Helms LJ, Callahan EJ, Azari R, Robbins JA. The influence of gender on physician practice style. *Med Care* 1995;**33**:307-16.
4. Foster SW, McMurray JE, Linzer M, Leavitt JW, Rosenberg M, Carnes M. Results of a gender-climate and work-environment survey at a midwestern academic health center. *Acad Med* 2000;**75(6):**653-60.
5. Saalwachter AR, Freischlag JA, Sawyer RG, Sanfey HA. The training needs and priorities of male and female surgeons and their trainees. *J Am Coll Surg* 2005;**201**:199-205.
6. Richardson DA, Becker M, Frank RR, Sokol RJ. Assessing medical students' perceptions of mistreatment in their second and third years. *Acad Med* 1997;**72**:729-30.
7. Elam CL, Johnson MM, Wiggs JS, Messmer JM, Brown PI, Hinkley R. Diversity in medical school: perceptions of first-year students at southeastern U.S. medical schools. *Acad Med* 2001;**76(1):**60-5.

8. Crosson JC, Deng W, Brazeau C, Boyd L, Soto-Green M. Evaluating the effect of cultural competency training on medical student attitudes. *Fam Med* 2004;**36(3):**199-203.

9. Bills JB. Perceptions of bias in medical school curriculum. *Diss Abs Int* 2006;AAT 3187587.