
Does Mistreatment and Perceived Stress Impact Career Choice for LGBTQ+ US Medical Students?: An Analysis of AAMC Data

Elise Snyder, M.S.¹, John Hebb, M.D.¹, Xue Geng, M.S.², Michael Plankey, Ph.D.^{1a}

¹ Georgetown University School of Medicine, ² Biostatistics, Bioinformatics, and Biomathematics, Georgetown University

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Introduction

The impact of psychosocial stressors on specialty choice among sexual minority vs sexual majority medical students remains unclear. Past studies have suggested that sexual minority individuals are less likely to pursue specialties considered to have more intensive postgraduate training. We explored how sexual orientation, Perceived Stress Scale (PSS), and cumulative experience of mistreatment (ie, mistreatment experience variable [MEV]) during medical school influences specialty selection using longitudinal data from the Association of American Medical Colleges matriculation (2014) and graduation (2018) questionnaires.

Design, Setting, and Participants

A multinomial logistic regression model evaluated the association of sexual orientation, PSS, and MEV on specialty choice, adjusting for age, gender, race, US geographical region of medical school, and 2 interaction terms. Interactions between sexual orientation and PSS and MEV were not significant. The sample included 12 128 participants.

Results

Compared with heterosexual students, homosexual students were less likely to choose general surgery or surgical subspecialties ($P = .004$) and orthopedics ($P = .002$) over internal medicine. Homosexual students with a PSS score of 7 or greater were less likely to choose general surgery or surgical subspecialty ($P = .03$), orthopedics ($P = .02$), and emergency medicine ($P < .001$) than internal medicine. Additionally, homosexual students who reported an MEV score of 3 or greater were less likely to choose orthopedics ($P = .007$) over internal medicine.

Conclusions

These data suggest that stress and mistreatment during medical school significantly impact specialty choice, particularly for homosexual students. To correct these disparities and broaden LGBTQ+ representation across all specialties, institutions need to explore early career advising for students with greater perceived stress and increase efforts to eradicate mistreatment of sexual minority students during medical training.

^a Corresponding author:
Michael W. Plankey, PhD
Georgetown University Medical Center
Department of Medicine
3900 Reservoir Road NW
Medical Dental Building SW104
Washington, DC 20007
Phone: 202-784-2607
Email: mwp23@georgetown.edu

Introduction

Lesbian, gay, bisexual, and transgender (LGBTQ+) people are estimated to comprise between 3% and 4% of the US population.¹ The exact numbers of LGBTQ+ medical students and graduating physicians are unknown because they were not previously included in the demographic analysis of the Association of American Medical Colleges (AAMC). In 2018, the AAMC added sexual orientation and gender identity as an option for members to include in their demographic profiles, providing the first estimate of the numbers of LGBTQ+ medical students in the US. Of the 15 000 graduating physicians and students who responded to the AAMC survey, about 4% identify as LGBTQ+.² Prejudice against LGBTQ+ people persists in the medical community and may compound the negative health impacts of stigmatization in society.³ This prejudice also extends to LGBTQ+ people in medical school, thus affecting their experience of stress and mistreatment in medical school as well as which specialty they choose to pursue after graduation.

Minority stress theory is a widely studied phenomenon that suggests that sexual and racial and ethnic minority individuals are at greater risk for health problems than those in the majority. This difference is due to social stress related to prejudice. Any socially stigmatized minority group is subject to minority stress; however, concealment of sexual minority status and internalized homophobia are unique to the experience of sexual minority individuals.⁴ This supports the claim that concealment of one's sexuality leads to increased stress that affects the well-being of sexual minority individuals. Compared with heterosexual persons, sexual minority individuals smoke at higher rates, use drugs more often, and report increased anxiety.⁵ Sexual minority medical students face increasing challenges with regard to personal well-being, fear of discrimination, and harassment. The impact of this minority stress on career choices for medical students remains unclear. A study conducted by Sitkin et al⁶ suggests that sexual and gender minority (SGM) individuals are less likely to pursue specialties perceived as high stress, such as surgery and surgical subspecialties. In this survey-based study, "factors influencing specialty choice were used per the AAMC Graduation Questionnaire, with the addition of 'my race/ethnicity'; 'my gender'; and 'my sexual orientation or gender identity.'" The study concluded that SGM respondents rated their sexual orientation or gender identity as strongly influencing their specialty choice. It also surmised that there was no significant difference between SGM respondents and non-SGM respondents with regard to work-life balance and family expectations on specialty choice.⁶ The study demonstrated that factors influencing specialty choice differ between SGM and non-SGM individuals.

Other studies support the notion that SGM students have increased concern regarding specialty choice and career options. In a survey-based study by Mansh et al,⁷ respondents were asked about their sexual and gender identity,

whether or not they were “out,” and the reasons for not disclosing their identity. Of the 912 SGM students who responded, 269 reported concerns about their career options, including specialty choice, as a reason for concealment of sexual identity. These revelations are concerning because concealment of sexual identity increases minority stress.⁴ Additionally, these students reported fear of discrimination from both peers and faculty as a reason for concealment. While this is not a specific measure of harassment, it raises the question of whether these students reported this fear due to past experiences of harassment.⁷

These studies strongly support the notion that there is some difference in factors influencing specialty selection amongst sexual minority medical students vs their heterosexual peers; however, most of these studies were cross-sectional in their analysis. Given the addition of LGBTQ+ specific questions to the AAMC Graduation Questionnaire in 2018, the relationship of sexual minority status, perceived stress, and experience of mistreatment on career choice was analyzed in a longitudinal fashion from the same class of medical students at matriculation in 2014 and graduation in 2018.

Methods

Data from the AAMC, including the class of 2018 information from the 2014 Matriculating Student Questionnaire (MSQ) and 2018 Graduation Questionnaire (GQ) was analyzed in this study.^{8,9}

The AAMC GQ is a survey that is administered annually to students graduating from all 140 accredited allopathic medical schools in the US. The AAMC GQ includes questions about student demographics, educational experience, finances, and career plans. The AAMC GQ contains items that assess negative behaviors by medical school faculty, nurses, residents and interns, institutional employees or staff, and other students. The questions address students’ experience of general negative behaviors and 3 types of discrimination related to gender, race and ethnicity, and sexual orientation.

Only students who completed both the 2014 matriculation and the 2018 graduation questionnaires were included so that respondents could be matched and analyzed in a longitudinal fashion. Students who identified as transgender or gender nonconfirming were not included because the numbers were too small. The total number of students in the analytic data set was 12,128.

Outcomes

Medical students’ specialty choice was obtained from the 2018 GQ and further grouped into 12 categories (below). Internal medicine and all subspecialties requiring an internal medicine preliminary year were grouped together. This was used as the comparison group because this is the most commonly selected specialty after graduation. Additionally, general surgery and surgical subspecialties were grouped together based on the similarity of practice.

Orthopedics was separated both due to the large number of students selecting this subspecialty, as well as commonly cited concerns with harassment in this subspecialty. Samora et al¹⁰ distributed a survey to a subset of members of the American Academy of Orthopedic Surgeons; 66% of the respondents reported discrimination, bullying, and harassment in the workplace.¹⁰

1. Surgery and subspecialty (neurological surgery, otolaryngology, or subspecialty, plastic surgery, general surgery, vascular surgery, thoracic surgery, urology);
2. Orthopedic surgery (orthopedic surgery or subspecialty);
3. Internal medicine (dermatology or subspecialty, medical genetics, internal medicine, neurology or subspecialty, ophthalmology, physical medicine and rehabilitation, internal medicine/pediatrics);
4. Pediatrics (child neurology, pediatrics);
5. Radiology (radiology or subspecialty, radiation oncology);
6. Family medicine (family practice or subspecialty, preventive medicine);
7. Emergency medicine (emergency medicine or subspecialty);
8. Anesthesiology (anesthesiology or subspecialty);
9. OB/GYN (obstetrics and gynecology);
10. Psychiatry (psychiatry or subspecialty);
11. Pathology (pathology or subspecialty);
12. Undecided/not practicing (I do not plan to practice medicine or undecided).

Predictors

Stress was measured by the shortened version of the Perceived Stress Scale (PSS) on the 2014 MSQ.^{11,12} The PSS uses multiple questions to generate a cumulative stress score. Lower scores correlate with lower perceived stress, whereas higher scores correlate with higher perceived stress. The PSS total score was classified into 5 categories to balance the distribution of the response across the categories: PSS total score of 0, 1 or 2, 3 or 4, 5 or 6, and greater than or equal to 7.

The amount of mistreatment students experienced during medical school was assessed in the 2018 GQ by 17 questions ranging from been publicly embarrassed to being subjected to negative or offensive behavior(s) based on personal beliefs or personal characteristics other than gender, race and ethnicity, or sexual orientation. Each question measured how frequently a

student had experienced a certain category of mistreatment. The responses to each mistreatment question were dichotomized into 2 levels: (1) experienced that mistreatment and assigned score 1 if a student selected “once,” “occasionally,” or “frequently” and (2) never experienced that mistreatment and assigned score 0 if a student selected answer “never.” The cumulative mistreatment experience variable (MEV) was created as the sum of 17 dichotomized answers of mistreatment questions and classified into 3 categories to balance the distribution of the response across the categories¹³: 0, 1 or 2, and greater than or equal to 3.

Covariates

Race and ethnicity (Asian, Black or African American, White, and other), sex (female and male), age at matriculation (<20 years old, 20-22 years, 23-25 years, 26-28 years, and >28 years), sexual orientation (bisexual, gay or lesbian, and heterosexual or straight), and medical school region (Midwest/Central, Northeast, Southern, and Western) were obtained from the 2014 MSQ. We did not use gender identity (transgender or gender nonconfirming) as a variable in this study. After reviewing the responses to the respective questionnaires, the number for those respondents was not large enough to be included in the analysis.

Descriptive statistics were generated for each variable including missing data. To determine whether the students’ sexual orientation, perceived stress, and mistreatment experience impacted choice of specialty, a multinomial logistic regression model was performed, adjusting for race and ethnicity, sex, age at matriculation, and medical school region. The interactions between PSS and sexual orientation, as well as MEV and sexual orientation, were added to the above model to test whether sexual orientation moderated the relationship between perceived stress and specialty choice, as well as moderated the relationship between mistreatment and specialty choice. The reference levels used for the multinomial logistic regression model were as follows: outcome = internal medicine; covariates = PSS score of 0, MEV score of 0, White race, female, aged 20 to 22 years old, heterosexual or straight, and Northeast region. All analyses were performed at a significance level of .05 using statistical software SAS version 9.4 (SAS Institute). The procedure used was PROC logistic.

Results

Baseline (2014) Characteristics

On the GQ, 3342 students (28.8%) chose internal medicine as their specialty choice; 1438 (12.4%), surgery and subspecialty; 1240 (10.7%), pediatrics; 1136 (9.8%), family medicine; 1110 (9.6%), emergency medicine; 793 (6.8%), OB/GYN; 626 (5.4%), radiology; 626 (5.4%), anesthesiology; 625 (5.4%), psychiatry; 493 (4.2%), orthopedic surgery; 133 (1.1%), pathology; and 50 (0.4%), undecided or not practicing ([Table 1](#)).

Table 1. Overall demographic data from the 2014 matriculation questionnaire (MSQ) and 2018 graduation questionnaire (GQ).

Variable	Level Values	Overall n=12128	Missing (%)
Specialty Choice at GQ (%)	Surgery and subs	1438 (12.4)	516 (4.25)
	Orthopaedic	493 (4.2)	
	IM	3342 (28.8)	
	Pediatrics	1240 (10.7)	
	Radiology	626 (5.4)	
	Family medicine	1136 (9.8)	
	Emergency medicine	1110 (9.6)	
	Anaesthesiology	626 (5.4)	
	OB/GYN	793 (6.8)	
	Psychiatry	625 (5.4)	
	Pathology	133 (1.1)	
	Undecided/not practicing	50 (0.4)	
Total PSS Groups (%)	0	529 (4.8)	1124 (9.27)
	1 - 2	2484 (22.6)	
	3 - 4	3224 (29.3)	
	5 - 6	2823 (25.7)	
	>=7	1944 (17.7)	
Cumulative Mistreatment Experiment groups(%)	0	5197 (45)	576 (4.75)
	1 - 2	4084 (35.35)	
	>=3	2271 (19.65)	
Race/Ethnicity (%)	Black or African American or subcategory	757 (6.3)	48 (0.4)
	Asian or subcategory	2696 (22.3)	
	White only	7322 (60.6)	
	Other	1305 (10.8)	
MSQ Sex (%)	Female	6261 (51.6)	0 (0)
	Male	5867 (48.4)	
Age at MSQ (%)	Under 20	22 (0.2)	0 (0)
	20 - 22	4508 (37.2)	
	23 - 25	5532 (45.6)	
	26 - 28	1382 (11.4)	
	Over 28	684 (5.6)	
MSQ Sexual Orientation (%)	Bisexual	241 (2.2)	1131 (9.33)
	Gay or lesbian	340 (3.1)	
	Heterosexual or straight	10416 (94.7)	
MSQ Medical School Region (%)	Midwest/Central	3273 (27.0)	0 (0)
	Northeast	3355 (27.7)	
	Southern	4133 (34.1)	
	Western	1367 (11.3)	

A total of 529 students (4.8%) had a PSS score of 0, 2484 (22.6%) had a PSS score of 1 or 2, 3224 (29.3%) had a PSS score of 3 or 4, 2823 (25.7%) had a PSS score of 5 or 6, and 1944 (17.7%) had a PSS score of 7 or greater. For student-reported mistreatment experience, 5197 students (45%) had an MEV score of 0, 4084 (35.35%) had an MEV score of 1 or 2, and 2271 (19.65%) had an

MEV score of 3 or greater. Only 241 (2.2%) and 340 (3.1%) students identified as bisexual and homosexual, respectively, and 10416 (94.7%) identified as heterosexual.

There were 2696 (22.3%) Asian, 757 (6.3%) Black or African American, 7322 (60.6%) White participants, and 1305 (10.8%) identified being of other race or ethnicity. More than half of students were female (51.6%). In terms of age at matriculation, 0.2% of students were younger than 20 years old, 37.2% were 20 to 22 years old, 45.6% were 23 to 25 years old, 11.4% were 26 to 28 years old, and 5.6% were older than 28 years. The plurality of students (34.1%) were from the Southern US.

Multinomial Logistic Regression Results

[Table 2](#) displays the odds ratios and significance from the multinomial logistic regression model with nonstatistically significant interaction terms removed.

SURGERY AND SUBSPECIALTY

Homosexual students were less likely to choose general surgery and subspecialty over internal medicine compared with heterosexual students, with an odds ratio of 0.513 (95% CI, 0.325-0.808; $P = .004$). There was a similar association for bisexual students; however, unlike homosexual students, this was not statistically significant. Students with a PSS score of 7 or greater were also less likely to choose surgery and surgical subspecialty over internal medicine compared with students with a PSS score of 0 (odds ratio, 0.685 [95% CI, 0.488-0.96; $P = .03$]). MEV was negatively associated with surgery and surgical subspecialty but this was not statistically significant.

ORTHOPEDIC SURGERY

Compared with heterosexual students, sexual minority students were less likely to choose orthopedic surgery or subspecialty over internal medicine (odds ratio, 0.197 [95% CI, 0.072-0.542; $P = .002$] and 0.137 [95% CI, 0.019-0.992; $P = .049$] for homosexual and bisexual students, respectively). Students with a PSS score of 5 or 6 or with a PSS score of 7 or greater were also less likely to choose orthopedic surgery or subspecialty over internal medicine compared with students with a PSS score of 0 (odds ratio, 0.595 [95% CI, 0.381-0.929; $P = .02$] or 0.444 [95% CI, 0.271-0.727; $P = .001$]). Similarly, students with an MEV score of 3 or greater were less likely to choose orthopedic surgery or subspecialty over internal medicine compared with students with an MEV score of 0 (odds ratio, 0.608 [95% CI, 0.425-0.87]; $P = .007$).

PEDIATRICS

Sexual orientation and PSS were negatively associated with student's choice of pediatrics over internal medicine but this association was not statistically significant. Compared with students with an MEV score of 0, students with an MEV score of 1 or 2 were more likely to choose pediatrics over internal medicine (odds ratio, 1.174 [95% CI, 1.002-1.374]; $P = .047$).

Table 2. The association of perceived stress, mistreatment and sexual orientation with specialty choice in 2018 using Multivariate Multinomial Regression Models

Parameter	Parameter Level	Specialty Choice	Odds Ratio (95% CI)	p-value
PSS	1 - 2	1. Surgery and sub	0.943 (0.683, 1.301)	0.7208
	3 - 4		0.863 (0.628, 1.184)	0.3609
	5 - 6		0.816 (0.591, 1.126)	0.2164
	>=7		0.685 (0.488, 0.96)	0.0281
MEV	1 - 2		0.926 (0.797, 1.076)	0.3169
	MEV >=3		0.895 (0.739, 1.083)	0.2531
Race/Ethnicity	Asian		0.704 (0.595, 0.832)	<.0001
	Black		0.887 (0.661, 1.191)	0.426
	Other		0.879 (0.705, 1.096)	0.2526
Sex	Male		1.231 (1.074, 1.412)	0.0028
Age at MSQ	Under 20		0.36 (0.044, 2.948)	0.3408
	23 - 25		0.967 (0.836, 1.119)	0.6522
	26 - 28		1.043 (0.829, 1.313)	0.7167
	Over 28		0.663 (0.463, 0.949)	0.0248
MSQ Sexual Orientation	Bisexual		0.987 (0.621, 1.57)	0.9566
	Gay or lesbian		0.513 (0.325, 0.808)	0.004
MSQ Medical School Region	Midwest/ Central		0.927 (0.774, 1.111)	0.412
	Southern		1.018 (0.861, 1.204)	0.8346
	Western		0.993 (0.779, 1.267)	0.9565
PSS	1 - 2	2. Orthopaedic Surgery or sub	0.823 (0.534, 1.267)	0.3759
	3 - 4		0.73 (0.477, 1.119)	0.1489
	5 - 6		0.595 (0.381, 0.929)	0.0223
	>=7		0.444 (0.271, 0.727)	0.0012
MEV	1 - 2		0.836 (0.665, 1.052)	0.1265
	>=3		0.608 (0.425, 0.87)	0.0065
Race/Ethnicity	Asian		0.348 (0.253, 0.479)	<.0001
	Black		0.701 (0.426, 1.153)	0.1615
	Other		0.643 (0.449, 0.92)	0.0158
Sex	Male		3.856 (2.993, 4.967)	<.0001
Age at MSQ	Under 20		1.35 (0.155, 11.751)	0.7857
	23 - 25		0.929 (0.743, 1.162)	0.5204
	26 - 28		0.762 (0.527, 1.102)	0.1491
	Over 28		0.572 (0.33, 0.993)	0.0472
MSQ Sexual Orientation	Bisexual		0.137 (0.019, 0.992)	0.0491
	Gay or lesbian		0.197 (0.072, 0.542)	0.0016
MSQ Medical School Region	Midwest/ Central		0.821 (0.62, 1.087)	0.1689
	Southern		1.012 (0.784, 1.306)	0.9288
	Western		0.724 (0.47, 1.117)	0.1442
PSS	1 - 2	4. Pediatrics	0.887 (0.618, 1.271)	0.5131
	3 - 4		0.964 (0.678, 1.371)	0.8394
	5 - 6		0.961 (0.673, 1.372)	0.8259
	>=7		0.792 (0.546, 1.148)	0.2189
MEV	1 - 2		1.174 (1.002, 1.374)	0.0468
	>=3		0.954 (0.783, 1.163)	0.6427

Parameter	Parameter Level	Specialty Choice	Odds Ratio (95% CI)	P-value
Race/Ethnicity	Asian		0.563 (0.47, 0.674)	<.0001
	Black		0.77 (0.565, 1.049)	0.0972
	Other		0.824 (0.651, 1.041)	0.1046
Sex	Male		0.338 (0.289, 0.396)	<.0001
Age at MSQ	Under 20		0.67 (0.135, 3.322)	0.6242
	23- 25		0.862 (0.741, 1.003)	0.0552
	26 - 28		0.786 (0.607, 1.018)	0.0679
	Over 28		0.406 (0.256, 0.642)	0.0001
MSQ Sexual Orientation	Bisexual		0.727 (0.43, 1.228)	0.2331
	Gay or lesbian		0.784 (0.477, 1.287)	0.3354
MSQ Medical School Region	Midwest/ Central		1.161 (0.957, 1.409)	0.1288
	Southern		1.251 (1.043, 1.501)	0.0157
	Western		1.483 (1.156, 1.902)	0.0019
PSS	1 - 2	5. Radiology	1.099 (0.669, 1.807)	0.7087
	3 - 4		1.108 (0.68, 1.806)	0.6799
	5 - 6		1.322 (0.811, 2.156)	0.2628
	>=7		1.488 (0.905, 2.449)	0.1175
MEV	1 - 2		0.941 (0.766, 1.157)	0.5637
	>=3		0.943 (0.725, 1.226)	0.6594
Race/Ethnicity	Asian		0.909 (0.73, 1.133)	0.3974
	Black		0.812 (0.526, 1.252)	0.3458
	Other		0.765 (0.555, 1.054)	0.1012
Sex	Male		2.473 (2.021, 3.026)	<.0001
Age at MSQ	Under 20		0.841 (0.101, 6.99)	0.8728
	23 - 25		0.923 (0.754, 1.131)	0.4412
	26 - 28		0.977 (0.709, 1.347)	0.8876
	Over 28		1.338 (0.907, 1.974)	0.1427
MSQ Sexual Orientation	Bisexual		0.453 (0.18, 1.135)	0.091
	Gay or lesbian		0.81 (0.493, 1.329)	0.4038
MSQ Medical School Region	Midwest/ Central		1.03 (0.798, 1.328)	0.8224
	Southern		1.208 (0.958, 1.524)	0.1108
	Western		1.11 (0.795, 1.549)	0.5391
PSS	1 - 2	6. Family medicine	1.01 (0.693, 1.47)	0.9602
	3 - 4		1.12 (0.775, 1.618)	0.5465
	5 - 6		1.069 (0.736, 1.553)	0.7253
	>=7		0.906 (0.615, 1.336)	0.6195
MEV	1 - 2		1.145 (0.972, 1.349)	0.1051
	>=3		1.233 (1.014, 1.499)	0.0359
Race/Ethnicity	Asian		0.481 (0.394, 0.586)	<.0001
	Black		0.915 (0.679, 1.232)	0.5569
	Other		0.942 (0.75, 1.184)	0.61
Sex	Male		0.579 (0.498, 0.673)	<.0001
Age at MSQ	Under 20		1.472 (0.367, 5.902)	0.5851
	23 - 25		1.091 (0.926, 1.286)	0.2994
	26 - 28		1.547 (1.218, 1.966)	0.0003
	Over 28		2.292 (1.712, 3.068)	<.0001

Parameter	Parameter Level	Specialty Choice	Odds Ratio (95% CI)	p-value
MSQ Sexual Orientation	Bisexual		1.348 (0.872, 2.084)	0.1792
	Gay or lesbian		0.695 (0.435, 1.111)	0.1285
MSQ Medical School Region	Midwest/Central		1.991 (1.628, 2.435)	<.0001
	Southern		1.529 (1.252, 1.867)	<.0001
	Western		2.118 (1.646, 2.725)	<.0001
PSS	1 - 2	7. Emergency Medicine or sub	0.679 (0.489, 0.942)	0.0205
	3 - 4		0.595 (0.43, 0.821)	0.0016
	5 - 6		0.63 (0.454, 0.873)	0.0056
	>=7		0.527 (0.373, 0.746)	0.0003
MEV	1 - 2		1.076 (0.91, 1.271)	0.3918
	>=3		1.213 (0.99, 1.487)	0.0622
Race/Ethnicity	Asian		0.501 (0.409, 0.614)	<.0001
	Black		0.881 (0.644, 1.205)	0.4292
	Other		0.827 (0.65, 1.052)	0.1222
Sex	Male		1.428 (1.226, 1.663)	<.0001
Age at MSQ	Under 20		0.635 (0.077, 5.26)	0.6738
	23 - 25		1.314 (1.108, 1.557)	0.0017
	26 - 28		1.601 (1.252, 2.049)	0.0002
	Over 28		2.115 (1.563, 2.861)	<.0001
MSQ Sexual Orientation	Bisexual		1.271 (0.795, 2.031)	0.3162
	Gay or lesbian		1.02 (0.696, 1.494)	0.9203
MSQ Medical School Region	Midwest/Central		1.294 (1.063, 1.575)	0.0102
	Southern		1.059 (0.874, 1.283)	0.5588
	Western		1.236 (0.952, 1.605)	0.1118
PSS	1 - 2	8. Anesthesiology or sub	0.845 (0.535, 1.336)	0.4721
	3 - 4		0.938 (0.601, 1.465)	0.7797
	5 - 6		0.988 (0.63, 1.549)	0.9581
	>=7		0.909 (0.569, 1.451)	0.689
MEV	1 - 2		0.909 (0.737, 1.12)	0.3695
	>=3		1.007 (0.777, 1.306)	0.9558
Race/Ethnicity	Asian		0.899 (0.718, 1.125)	0.3532
	Black		1.16 (0.787, 1.71)	0.4522
	Other		0.856 (0.623, 1.175)	0.3352
Sex	Male		2.035 (1.67, 2.48)	<.0001
Age at MSQ	Under 20		<0.001 (<0.001, >999.999)	0.9221
	23 - 25		0.786 (0.64, 0.966)	0.0217
	26 - 28		0.93 (0.675, 1.28)	0.6565
	Over 28		1.501 (1.039, 2.17)	0.0307
MSQ Sexual Orientation	Bisexual		0.176 (0.043, 0.724)	0.0161
	Gay or lesbian		0.857 (0.522, 1.408)	0.5434
MSQ Medical School Region	Midwest/Central		1.179 (0.925, 1.504)	0.184
	Southern		0.913 (0.719, 1.161)	0.4595
	Western		1.126 (0.811, 1.564)	0.4776
PSS	1 - 2	9. OB/GYN	1.179 (0.736, 1.89)	0.4935

Parameter	Parameter Level	Specialty Choice	Odds Ratio (95% CI)	P-value
MEV	2 - 4		1.247 (0.785, 1.982)	0.3497
	5 - 6		1.194 (0.747, 1.909)	0.4576
	>=7		0.934 (0.574, 1.518)	0.7821
	1 - 2		1.257 (1.034, 1.528)	0.0215
Race/Ethnicity	>=3		1.311 (1.047, 1.641)	0.0182
	Asian		0.499 (0.398, 0.626)	<.0001
	Black		1.199 (0.879, 1.634)	0.2516
Sex	Other		0.726 (0.543, 0.972)	0.0316
	Male		0.142 (0.112, 0.18)	<.0001
Age at MSQ	Under 20		0.513 (0.061, 4.329)	0.5399
	23 - 25		0.909 (0.756, 1.092)	0.3084
	26 - 28		1.032 (0.771, 1.382)	0.8336
	Over 28		0.494 (0.29, 0.84)	0.0093
MSQ Sexual Orientation	Bisexual		1.297 (0.788, 2.135)	0.3061
	Gay or lesbian		2.075 (1.305, 3.3)	0.002
MSQ Medical School Region	Midwest/ Central		0.993 (0.783, 1.259)	0.9549
	Southern		1.406 (1.136, 1.74)	0.0017
	Western		1.384 (1.027, 1.866)	0.033
PSS	1 - 2	10. Psychiatry or sub	1.212 (0.7, 2.098)	0.4916
	3 - 4		1.32 (0.77, 2.261)	0.3128
	5 - 6		1.538 (0.897, 2.636)	0.1178
	>=7		1.56 (0.901, 2.701)	0.1123
MEV	1 - 2		1.444 (1.166, 1.787)	0.0008
	>=3		1.582 (1.235, 2.027)	0.0003
Race/Ethnicity	Asian		0.793 (0.63, 0.997)	0.047
	Black		0.616 (0.394, 0.963)	0.0335
	Other		0.989 (0.737, 1.325)	0.9385
Sex	Male		0.809 (0.669, 0.979)	0.0292
Age at MSQ	Under 20		0.965 (0.117, 7.946)	0.9736
	23- 25		1.157 (0.933, 1.434)	0.1838
	26 - 28		1.82 (1.352, 2.451)	<.0001
	Over 28		2.553 (1.782, 3.657)	<.0001
MSQ Sexual Orientation	Bisexual		1.845 (1.127, 3.019)	0.0148
	Gay or lesbian		1.944 (1.301, 2.905)	0.0012
MSQ Medical School Region	Midwest/ Central		1.23 (0.958, 1.58)	0.105
	Southern		1.235 (0.974, 1.565)	0.0813
	Western		1.112 (0.8, 1.546)	0.527
PSS	1 - 2	11. Pathology or sub	2.838 (0.666, 12.089)	0.1584
	3 - 4		2.394 (0.563, 10.182)	0.2372
	5 - 6		3.572 (0.847, 15.063)	0.083
	>=7		3.315 (0.771, 14.253)	0.1073
MEV	1 - 2		0.796 (0.527, 1.204)	0.2801
	>=3		0.688 (0.405, 1.168)	0.166
Race/Ethnicity	Asian		0.708 (0.441, 1.136)	0.1527
	Black		0.493 (0.177, 1.371)	0.1753
	Other		1.138 (0.661, 1.96)	0.6416

Parameter	Parameter Level	Specialty Choice	Odds Ratio (95% CI)	P-value
Sex	Male		0.837 (0.575, 1.219)	0.353
Age at MSQ	Under 20		<0.001 (<0.001, >999.999)	0.9659
	23 Through 25		1.207 (0.773, 1.884)	0.4076
	26 - 28		2.23 (1.262, 3.942)	0.0058
	Over 28		3.425 (1.79, 6.552)	0.0002
MSQ Sexual Orientation	Bisexual		1.945 (0.761, 4.97)	0.1645
	Gay or lesbian		1.198 (0.471, 3.046)	0.7042
MSQ Medical School Region	Midwest/Central		1.2 (0.717, 2.008)	0.4885
	Southern		1.228 (0.756, 1.994)	0.4064
	Western		1.626 (0.897, 2.948)	0.1092
PSS	1 - 2	12. Undecided/not practicing	0.807 (0.171, 3.803)	0.7864
	3 - 4		0.97 (0.216, 4.353)	0.9686
	5 - 6		1.201 (0.27, 5.345)	0.8104
	>=7		0.526 (0.099, 2.782)	0.4496
MEV	1 - 2		2.1 (1.067, 4.135)	0.0318
	>=3		1.495 (0.629, 3.551)	0.3625
Race/Ethnicity	Asian		0.862 (0.42, 1.768)	0.6854
	Black		1.26 (0.433, 3.669)	0.6713
	Other		0.581 (0.175, 1.929)	0.375
Sex	Male		1.005 (0.552, 1.83)	0.9873
Age at MSQ	Under 20		<0.001 (<0.001, >999.999)	0.9778
	23 - 25		1.787 (0.87, 3.67)	0.1141
	26 - 28		1.603 (0.546, 4.709)	0.3909
	Over 28		3.402 (1.142, 10.133)	0.0279
MSQ Sexual Orientation	Bisexual		0.881 (0.119, 6.545)	0.9012
	Gay or lesbian		0.548 (0.073, 4.094)	0.558
MSQ Medical School Region	Midwest/Central		0.537 (0.251, 1.148)	0.1085
	Southern		0.441 (0.206, 0.942)	0.0345
	Western		0.501 (0.17, 1.475)	0.2098

Specialty choice at 2018 MSQ used as outcome. The classified PSS total score and classified MEV were used as independent variables while adjusting for race and ethnicity, gender, age at matriculation, sexual orientation, and medical school region. The interactions between PSS and sexual orientation, as well as MEV and sexual orientation were added to the above model to test whether sexual orientation moderated the relationship between perceived stress and specialty choice, as well as moderated the relationship between mistreatment and specialty choice.

The reference levels used for the multinomial logistic regression model were as follows: outcome = Internal medicine. Covariates = PSS score was 0, MEV was 0, White race, female, 20 through 22 years old, heterosexual or straight, and Northeast region.

RADIOLOGY

Sexual orientation and MEV were negatively associated with students' choice of radiology over internal medicine, and PSS was positively associated; however, neither sexual orientation, MEV, nor PSS showed statistical significance.

FAMILY MEDICINE

The association of sexual orientation and PSS with students' choice of family medicine over internal medicine did not show statistical significance. Compared with students with an MEV score of 0, students with an MEV score of 3 or greater were more likely to choose family medicine over internal medicine (odds ratio, 1.233 [95% CI, 1.014-1.499]; $P = .04$).

EMERGENCY MEDICINE

Sexual orientation and MEV were positively associated with students' choice of emergency medicine over internal medicine but this association was not statistically significant. Compared with students with a PSS score of 0, students with a PSS scores of 1 or 2, 3 or 4, 5 or 6, or 7 or greater were all less likely to choose emergency medicine over internal medicine (odds ratio, 0.679 [95% CI, 0.489-0.942; $P = .02$], 0.595 [95% CI, 0.43-0.821; $P = .002$], 0.63 [95% CI, 0.454-0.873; $P = .006$], or 0.527 [95% CI, 0.373-0.746; $P < .001$], respectively).

ANESTHESIOLOGY

Compared with heterosexual students, bisexual students were less likely to choose anesthesiology over internal medicine (odds ratio, 0.176 [95% CI, 0.043-0.724]; $P = .02$). The direction of the association of homosexual students was in the same direction as bisexual students but this association was not statistically significant. PSS scores of 1 or greater and MEV scores of 1 or 2 negatively associated with students' choice of anesthesiology over internal medicine, while an MEV score of 3 or greater was positively associated, but none of these associations showed statistical significance.

OB/GYN

Compared with heterosexual students, homosexual students were more likely to choose OB/GYN over internal medicine (odds ratio, 2.075 [95% CI, 1.305-3.3]; $P = .002$). The direction of the association of bisexual students was in the same direction as homosexual students but was not statistically significant. Similarly, compared with students with MEV scores of 0, students with MEV scores of 1 or 2 or MEV score of 3 or greater were more likely to choose OB/GYN over internal medicine (odds ratio, 1.257 [95% CI, 1.034-1.528; $P = .02$] and 1.311 [95% CI, 1.047-1.641 $P = .02$], respectively). A PSS score of 1 to 6 was positively associated with students' choice of OB/GYN over internal medicine, while a PSS score of 7 or greater was negatively associated, but PSS did not show statistical significance.

PSYCHIATRY

Compared with heterosexual students, sexual minority students were more likely to choose psychiatry over internal medicine (odds ratio, 1.845 [95% CI, 1.127-3.019; $P = .02$] and 1.944 [95% CI, 1.301-2.905; $P = .001$] for bisexual and homosexual students, respectively). Similarly, compared with students with an MEV score of 0, students with an MEV score of 1 or 2 or MEV score of 3 or greater were more likely to choose psychiatry over internal medicine (odds

ratio, 1.444 [95% CI, 1.166-1.787; $P < .001$] and 1.582 [95% CI, 1.235-2.027; $P < .001$], respectively). PSS was positively associated with students' choice of psychiatry over internal medicine but this association was not statistically significant.

PATHOLOGY

Sexual orientation and PSS were positively associated with students' choice of pathology over internal medicine, and MEV was negatively associated; however, neither sexual orientation, PSS, nor MEV showed statistical significance.

FINDINGS OF RACE AND ETHNICITY, SEX, AGE, AND MEDICAL SCHOOL REGION

Compared with White students, Asian students were significantly less likely to choose surgery and subspecialty, orthopedic surgery, pediatrics, family medicine, emergency medicine, OB/GYN, and psychiatry over internal medicine. Black or African American students were significantly less likely to choose psychiatry, and students of other races and ethnicities were significantly less likely to choose orthopedic surgery and OB/GYN.

Male students were significantly positively associated with surgery and subspecialty, orthopedic surgery, radiology, emergency medicine, and anesthesiology, while significantly negatively associated with pediatrics, family medicine, OB/GYN, and psychiatry.

Compared with students aged 20 to 22 years, elder age at matriculation was significantly positively associated with family medicine, emergency medicine, psychiatry, and pathology, while significantly negatively associated with surgery and subspecialty, orthopedic surgery, pediatrics, and OB/GYN. Students aged 23 to 25 years were significantly less likely to choose anesthesiology over internal medicine, while students aged older than 28 years were significantly more likely to choose anesthesiology over internal medicine compared with students aged 20 to 22 years at matriculation.

Compared with students from Northeast medical schools, students from the Midwest/Central region were significantly more likely to choose family medicine and emergency medicine, and students from Southern or Western regions were significantly more likely to choose pediatrics, family medicine, and OB/GYN.

Discussion

Compared with heterosexual students, sexual minority medical students were less likely to choose careers in general surgery or surgical subspecialties and orthopedics compared with internal medicine. Sexual minority students with a PSS score greater than 7 were less likely to choose general surgery or surgical subspecialties and orthopedics as well as internal medicine, and sexual minority students who reported MEV scores of 3 or greater were less likely to choose

orthopedics over internal medicine. Additionally, sexual minority medical students were more likely to choose psychiatry and OB/GYN over internal medicine. Regardless of sexual orientation, students with a PSS score greater than 7 were less likely to choose emergency medicine.

Previous studies have suggested that sexual minority identity is a factor in selecting a specialty^{6,7}; however, to our knowledge, there are no previous studies that examined the relationship between career choice, sexual minority identity, perceived stress, and mistreatment. Higher levels of perceived stress and mistreatment among sexual minority students significantly impact career choice; thus, it is clear that the phenomenon of minority stress theory impacts sexual minority medical students and influences their career choices. The unique challenges sexual minority medical students face with regard to personal well-being, fear of discrimination, and harassment shape perceptions of the professional environment and decisions these students make with regard to their careers. Additionally, self-reported PSS was higher amongst sexual minority medical students at baseline compared with their heterosexual peers. It stands to reason that increased reported mistreatment throughout medical school would only increase the perceived stress level of these students. It is reasonable to assume that an individual already under a significant level of self-perceived stress would be less likely to pursue training in fields known to have high levels of stress and burnout.

No single factor determines a medical student's choice of specialty. Career choice is an interplay among students' interest in the subject matter of each specialty and perceived lifestyle for physicians in the field. Estimates of the burnout rate among surgeons are between 30% and 38%. Notably, younger surgeons are more susceptible to burnout.¹⁴ Our finding that students with higher levels of perceived stress would be less likely to choose general surgery and surgical subspecialties compared with internal medicine supports the notion that there is widespread belief among medical students that surgery is a high-stress field of practice. For sexual minority students, there is a higher level of baseline stress that is compounded by increased incidence of mistreatment during medical school; thus, sexual minority students may be further deterred from choosing a career in a specialty generally perceived as high stress such as surgery.^{15,16}

Another factor known to contribute to stress in medical school is mistreatment. It has been previously established that among reported instances of mistreatment in medical school, sexual minority students face a disproportionate burden of mistreatment compared with their heterosexual peers.¹⁶ Additionally, prior studies have established that reported mistreatment during medical school significantly impacts student career choices with regard to careers in academic vs nonacademic medicine.¹⁵ While this study did not specifically look at career choice with regard to specialty, it stands to reason that if mistreatment significantly impacts one aspect of career choice it is likely

to impact other aspects as well. Our finding that MEV significantly impacts specialty choice supports the previously established notion that student mistreatment has significant impacts on career choice.

One major limitation of this study is the nature of the AAMC questionnaire. The survey is self-reported and anonymous. In surveying LGBTQ+ populations, there is often underreporting even on anonymous surveys due to the perceived social stigma; therefore, this sample may underestimate the total number of sexual minority medical students.¹⁷ Additionally, medical students underreport mistreatment on surveys for several reasons including fear of reprisal and perception that harassment is part of the medical culture.¹⁸ For this reason, this study may also underestimate the incidence of mistreatment among medical students. Notably, gender nonconforming and transgender students were not included in this analysis because the number of respondents who selected gender nonconforming was low compared with the general population. However, previous studies demonstrated that transgender and gender nonconforming physicians and students are exposed to a significant amount of mistreatment and stress during training; thus, further research is needed to explore whether the experience of these students with regard to career choice relates to their sexual minority peers.^{19,20}

Conclusions

In the past several decades, there has been rapid progress with regard to societal perception of the LGBTQ+ community. While society is rapidly progressing, there is still widespread discrimination within medical education. A 2017 survey of medical students found that most medical students, both heterosexual and sexual minority students, still perceive LGBTQ+ discrimination during medical school and perceive a suboptimal learning environment for LGBTQ+ students.²¹ While many of the factors relating to perceived stress among sexual minority students are societal as explained by minority stress theory, the issue of mistreatment during medical school is one that is easily addressed at the medical school institutional level. Sexual minority medical students experience a disproportionate level of mistreatment, likely due to both conscious and subconscious homophobia and bias. One way to address this is through cultural sensitivity training with professors, preceptors, and medical students. Prior studies have shown that cultural sensitivity training has a demonstrable effect on health care provider attitudes and patient outcomes.²² Wide implementation of cultural sensitivity programs with modules targeting LGBTQ+ issues could reduce reported incidences of mistreatment, thus reducing stress perceived by sexual minority students.

When picking a specialty, medical students rely heavily on the advice of their advisors and mentors. Prior research has shown that underrepresented minority medical students cited different needs from their advisors than majority students; however, the advisors themselves did not acknowledge this difference. For example, underrepresented minority medical students expressed

fear and stress around sharing vulnerability with their advisors at much higher levels than majority students, but 68% of coaches expressed that minority students would not have different needs than majority students.²³ This potential difference in advising could further complicate the issue of career choice for sexual minority students and increase their perceived stress.

Another way to address differences in experiences of heterosexual students compared with their sexual minority peers is expanding and adapting preexisting frameworks proposed for advancing antiracist initiatives in medical school toward initiatives for LGBTQ+ students. For example, there is the 4-step framework proposed by Solomon et al²⁴ of See, Name, Understand, Act, in which we can see from the results of this study that there are differences in medical school experience for LGBTQ+ students, we name that this is a result of years of bias and homophobia in society, but we must continue to do the work to understand and act.

While there is a breadth of literature highlighting the prevalence of mistreatment and discrimination experienced by LGBTQ+ medical students, there is little research on the demonstrable effects of different strategies to eradicate these disparities. One strategy could be to analyze the effect of implementing programs used for racially and ethnically underrepresented students to LGBTQ+ medical students. For example, the STRIVE program developed by Northwestern University started in 2016 connects URM medical students to URM residents. This program was highly valued by both the participating residents and students.²⁵ Implementing and evaluating the effect of similar mentorship programs for LGBTQ+ medical students could serve to improve the medical school experience and positively improve equity in career choice for LGBTQ+ medical students.

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Author Contributions

The authors contributed equally to this study.

Conflicts of Interest

These authors reported no conflicts of interest.

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