

## Third-Year Medical Students' Self-perceived Knowledge About Health Disparities and Community Medicine

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### Abstract

**Introduction:** Medical providers' attitudes about caring for vulnerable populations have significant implications for persistent health disparities. Therefore, assessing medical students' self-perceived knowledge about community-based medicine and care for underserved populations can provide insights for improving health care delivery to achieve health equity. We evaluated third-year medical students' perceptions of their knowledge and attitudes about community medicine, and addressing health care needs of vulnerable populations.

**Methods:** From October 2, 2017 to July 12, 2019, third-year medical students at a private, urban medical school were asked to complete an assessment survey during their family medicine clerkship orientation. The anonymous survey assessed students' self-perceived knowledge and attitudes regarding community medicine and care of vulnerable populations. We examined differences in survey responses by student demographics.

**Results:** A total of 401 students participated in the survey; 50.5% of respondents agreed that they had knowledge to assess health literacy of the patient, while only 22.2% of students agreed that they had knowledge about how to identify a community and conduct a community health needs assessment. Additionally, students agreed with being most comfortable providing care to adolescents (73.0%) and the elderly (69.5%), and that they were least comfortable caring for incarcerated individuals (31.7%) and immigrants/refugees (44.1%).

**Conclusion:** Assessment of learners' self-perceived knowledge can help highlight areas for educational interventions. Our findings suggest the need for improving medical student knowledge in areas of community health and health care for specific vulnerable populations.

### Introduction

Medical providers' biases, stereotypes, and uncertainty in clinical decision making while caring for vulnerable populations are some of the many contributing factors to health disparities.<sup>1</sup> Early education to shape medical trainees' attitudes regarding underserved populations may inform their future practice. Despite limited literature

examining this relationship, studies have shown that attitudes and beliefs play a role in health care delivery. In one study, medical students' and residents' endorsements of false beliefs about race-based biological differences resulted in racially biased pain assessment and treatment recommendations.<sup>2</sup> Similarly, studies suggest that implicit bias among physicians can affect diabetes care,<sup>3</sup> cancer screening and treatment recommendations,<sup>4,5</sup> and renal transplantations<sup>6,7</sup> for patients of different demographic backgrounds.

Although many students enter medical school with a commitment to underserved communities, this tends to decline over time<sup>8-10</sup> and needs to be reinforced across training. Cross-cultural education on these topics might help medical students counteract the influence of biases that can impact downstream physician performance and health outcomes.<sup>11</sup> However, there is no consensus about the best way to deploy this type of training.<sup>12-14</sup> To inform the development of a health disparities curriculum, we surveyed third-year medical students' self-perceived knowledge about community-based medicine and care of vulnerable populations and determined how perceptions differed by demographics.

## Methods

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### ***Study Population***

Our study population consisted of third-year medical students (N=537) completing their family and community medicine clerkship at a private, urban medical school between October 2, 2017 and July 12, 2019. Of the 537 students who received the paper survey, 425 responded and 24 declined/did not respond about consent. The final sample consisted of 401 students (74.7% of those eligible) who fully completed the survey.

### ***Survey***

We developed an anonymous, paper-based, 28-item survey, informed by the literature,<sup>8,15</sup> to assess medical students' self-perceived knowledge about community-based medicine; attitudes about caring for vulnerable populations; and preferred learning method. Items consisted of categorical demographic variables (age, gender, race/ethnicity, size of community) and 5-point Likert scale rated items (1=strongly disagree to 5=strongly agree). This survey is part of a larger medical educational curriculum, teaching third-year family medicine clerkship students about health disparities in vulnerable populations. We administered the survey on the first day of students' family medicine clerkship orientation and reviewed the results periodically to develop modules on select vulnerable populations. The university's institutional review board determined this study was exempt.

### ***Analysis***

All data were inspected for their frequencies, normality, and homogeneity of variance. We completed descriptive analyses using IBM SPSS Statistics version 26 (Armonk NY: IBM Corporation). We examined demographic differences in attitudes and perceived knowledge using independent *t* tests for gender and race/ethnicity comparisons and one-way analyses of variance for age and community size comparisons. Data were treated as interval in effort not to condense Likert scale categories. For analytic purposes, we collapsed racial/ethnic categories into two groups: non-Hispanic White, and other, due to the small sample sizes in the other groups.

Students' self-perceived comfort addressing health disparities in all eight vulnerable populations (eg, adolescents, elderly, LGBT, etc) was also assessed. We looked at the variety of vulnerable populations whom students rated as being comfortable addressing health disparities (identified from responses rated as "agree" and "strongly agree").

## Results

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Of the final sample (N=401), respondents were predominantly non-Hispanic White (66.8%), female (53.6%), between the ages of 24-26 years old (61.0%), and from suburban backgrounds (Table 1).

### **Perceived Knowledge and Attitudes**

Almost all respondents (99.0%) believed that doctors are subject to prejudices; however, 93.6% of respondents still agreed/strongly agreed that they could demonstrate empathy toward the concerns of patients from underserved populations. For the highest self-perceived areas of knowledge, 50.5% of respondents agreed/strongly agreed that they had knowledge to assess health literacy of the patient, and 49.5% of respondents agreed/strongly agreed that they knew how to understand and incorporate a patient's cultural traditions into his/her care. Their greatest self-perceived knowledge deficits were how to identify a community and conduct a community health needs assessment (22.2% of students agreed/strongly agreed that they had this knowledge) followed by the delivery of health care in communities and the role of community agencies (41.1% agreed/strongly agreed that they had this knowledge; Table 2).

Students perceived themselves to be most confident addressing health concerns for adolescents (73.0% agreed/strongly agreed) and the elderly (69.5% agreed/strongly agreed), and least comfortable for incarcerated individuals (31.7% agreed/strongly agreed) and immigrants/refugees (44.1% agreed/strongly agreed; Table 2). Patient panels (49.0%) and standardized patients (22.0%) were the preferred learning methods about care for vulnerable populations (Figure 1).

### **Demographics and Attitudes**

After adjusting the threshold for significance to adjust for multiple comparisons within each subscale (.05/8=.006), there were no gender, age, or community size differences on any items or for the variety of populations with whom they felt comfortable addressing health disparities. The attitudes and knowledge levels reported by students also did not significantly differ by race/ethnicity (Table 3). However, non-Hispanic Whites reported significantly more confidence in addressing health concerns for patients who are LGBT ( $P=.001$ ), homeless ( $P<.001$ ), veterans ( $P<.001$ ), and patients who are mentally ill or those with substance use issues ( $P<.001$ ) than students from other race/ethnicities. Non-Hispanic White students also reported feeling comfortable working with a greater variety of vulnerable populations compared to other students, ( $P<.001$ ).

## Discussion

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An assessment of medical students' educational needs is a key component for the development of an adaptive curriculum, providing important first steps to inform more effective educational interventions in the future.<sup>16,17</sup> Encouragingly, students in the present study reported feeling highly prepared to be conscientious and empathetic clinicians, though they did note deficits in their skills to evaluate the needs of their communities. In the present study, students reported greater comfort treating certain vulnerable populations, which may reflect groups whom they have been the most exposed to, or have learned the most about in their preclinical education, such as adolescent and elderly populations. Previous studies also noted that community-based clinical experiences with vulnerable populations improved health professional students' comfort level and future willingness to care for underserved populations.<sup>18,19</sup> Thus, learning environments that provide opportunities for student exposure to underserved populations might also help to strengthen medical students' attitudes and commitment to these groups.<sup>19-21</sup> Cumulatively, these findings suggest that potentially effective educational strategies could entail a combination of didactic training and hands-on opportunities to interact

with a range of vulnerable populations.

There were few demographic differences in how prepared students felt to be effective clinicians and advocates generally. However, there were some notable self-reported differences in comfort while working with vulnerable populations, though the effect sizes were all small (Cohen's  $d < .5$ ). Although there is limited research exploring students' preparedness to care for different vulnerable populations, similar to our findings, some existing literature suggests that non-Hispanic Whites perceive themselves more prepared to address the health needs of vulnerable populations, such as those who identify as LGBT.<sup>22,23</sup> In one study, non-Hispanic Whites reported higher comfort levels with LGBT health compared to respondents in the Asian race/ethnicity group,<sup>22</sup> and in another study, non-Hispanic white respondents reported more agreement with the statement "I am able to empathize with the life experience of an LGBT patient" compared to all other respondents.<sup>23</sup> It is unclear whether the differences in confidence levels reported by these students reflect a response bias or true differences, and these potential biases should be explored in future studies. Formal training might help all students to feel prepared to address the health needs of vulnerable populations and encourage students to increase their exposure to these populations. We plan to explore this in the future as we develop our curriculum. Assessment tools, such as observed structured clinical examinations or direct observation checklists, could help to evaluate whether the students are able to implement this training in practice.

Our study has limitations. First, we treated Likert-scale data as interval. While this could limit the ability to interpret our findings,<sup>24</sup> this approach allows for a more nuanced understanding of students' self-perceptions and attitudes. Second, our study is limited to surveying students at one point during their family medicine clerkship and it is not possible to evaluate whether our findings could be contingent upon the timing of students' clerkship assignments, as clerkship order is randomly assigned by the university. Additionally, all students participate in a longitudinal health systems science course including population health and community medicine during their first and second years, and it is possible that this curriculum has influenced students' comfort levels with vulnerable populations. Third, the majority of our sample was non-Hispanic White between the ages of 24-26 years, which limited demographic comparisons and conclusions. Fourth, we surveyed medical students at a single institution, thus limiting generalizability. Furthermore, we cannot exclude response biases due to the self-reported nature of the survey. Despite maintaining survey anonymity to mitigate the impact of a social desirability bias, it may still be present in the responses.

Although education alone cannot eliminate health care disparities, teaching institutions should develop adaptive, cross-cultural education on a broad array of vulnerable populations and convey useful strategies that may help medical students address disparities in their future careers. To do this effectively, medical education must adapt to students' ever-changing knowledge base while understanding students' prior exposures and backgrounds in relation to underserved populations. Continuous assessments of educational needs may help to inform disparities curriculum development and drive a more tailored approach to address knowledge gaps among students. Cross-cultural education and training for medical students are critical first steps for developing effective physician advocates for underserved patient populations and helping to eliminate health disparities.

## Tables and Figures

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**Table 1: Respondent Demographics**

Demographics	n (%)
Age, years (n=392)	
21-23	46 (11.7)
24-26	239 (61.0)
≥27	107 (27.3)
Race/ethnicity (n=380)	
Hispanic/Latino/Spanish, non-White	13 (3.4)
Non-Hispanic White	254 (66.8)
Asian	78 (20.5)
Black or African American	9 (2.4)
Native American	0 (0.0)
Multiracial	12 (3.2)
Other	14 (3.7)
Gender (n=392)	
Male	182 (46.4)
Female	210 (53.6)
Community size (n=390)	
Major metropolitan area (>1 million people)	63 (16.2)
Metropolitan area (500,001-1,000,000 people)	35 (9.0)
City (100,001-500,000 people)	39 (10.0)
Small city (50,001-100,000 people)	74 (19.0)
Town (2,500-50,000 people)	161 (41.3)
Rural area (<2,500 people)	18 (4.6)

Initially, the survey design used binary options for gender. However, after 2 years, the survey was adapted to include additional gender identity options. The sample size (n) for each question is different than the total analytic sample (N=401) because respondents were not required to answer all questions.

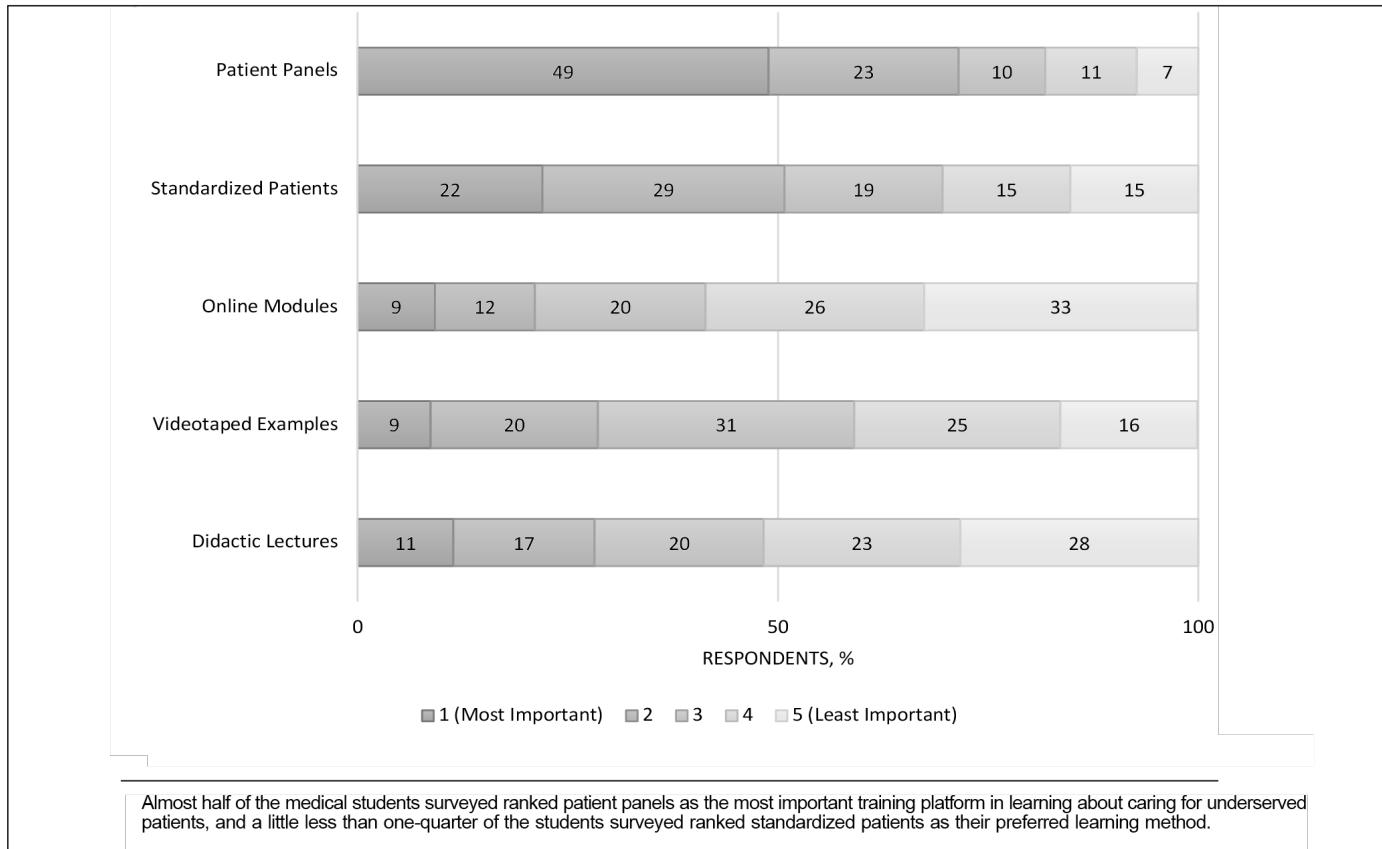
**Table 2: Self-perceived Knowledge and Attitudes regarding Community Medicine Practices and Care of Vulnerable Populations**

Item	Strongly Disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly Agree n (%)
<b>Attitudes</b>					
Doctors, like all individuals, have prejudices	3 (0.9)	0 (0.0)	2 (0.6)	177 (50.4)	169 (48.1)
I can demonstrate empathy towards the multiple difficulties faced by patients from underserved populations	1 (0.3)	1 (0.3)	20 (5.8)	240 (69.8)	82 (23.8)
<b>I am knowledgeable about the following:</b>					
The delivery of health care in the community and the role of community agencies	3 (0.8)	80 (20.7)	145 (37.5)	143 (37.0)	16 (4.1)
Health policy and the role of the physician advocate	4 (1.0)	78 (20.2)	130 (33.7)	156 (40.4)	18 (4.7)
How to identify a community and conduct a needs assessment of that community	26 (6.7)	144 (37.3)	130 (33.7)	75 (19.4)	11 (2.8)
How to understand and incorporate a patient's cultural traditions into his/her care	3 (0.8)	48 (12.5)	143 (37.2)	175 (45.6)	15 (3.9)
How to assess health literacy of the patient	0 (0.0)	71 (18.5)	119 (31.0)	166 (43.2)	28 (7.3)
<b>I am comfortable addressing health issues in the following groups:</b>					
Adolescents	4 (1.0)	31 (8.0)	70 (18.0)	221 (56.8)	63 (16.2)
Elderly	4 (1.0)	24 (6.2)	91 (23.3)	228 (58.5)	43 (11.0)
Immigrants/refugee	10 (2.6)	74 (19.1)	133 (34.3)	145 (37.4)	26 (6.7)
Lesbian, gay, bisexual, transgender	10 (2.6)	57 (14.7)	120 (30.9)	165 (42.5)	36 (9.3)
Homeless	10 (2.6)	70 (17.9)	113 (29.0)	169 (43.3)	28 (7.2)
Incarcerated individuals	20 (5.1)	116 (29.8)	130 (33.4)	108 (27.8)	15 (3.9)
Mentally ill or those with substance abuse	2 (0.5)	39 (10.0)	108 (27.6)	193 (49.4)	49 (12.5)
Veterans	12 (3.1)	62 (15.9)	130 (33.4)	160 (41.1)	25 (6.4)

Responses were measured on a 5-point Likert scale ranging from 1, "strongly disagree," to 5, "strongly agree." All items were treated independently and not as a summary score.

The number of respondents ranged from 344 to 391 across items.

**Figure 1: Preferred Learning Method Regarding Care of Vulnerable Populations**



**Table 3: One-Way ANOVA Race/Ethnicity Comparisons of Self-perceived Knowledge and Attitudes Regarding Community Medicine Practices and Care of Vulnerable Populations**

	Non-Hispanic White	Other <sup>a</sup>	t	P	Cohen's d
	Mean (SD)	Mean (SD)			
<b>Attitudes</b>					
Doctors, like all individuals, have prejudices	4.45 (0.57)	4.46 (0.68)	-0.195	.845	.02
I can demonstrate empathy towards the multiple difficulties faced by patients from underserved populations	4.19 (0.50)	4.12 (0.64)	1.185	.237	.12
<b>I am knowledgeable about the following:</b>					
The delivery of health care in the community and the role of community agencies	3.23 (0.86)	3.23 (0.83)	-0.062	.950	.00
Health policy and the role of the physician advocate	3.23 (0.86)	3.34 (0.89)	-1.190	.235	.13
How to identify a community and conduct a needs assessment of that community	2.73 (0.91)	2.79 (0.99)	-0.623	.534	.06
How to understand and incorporate a patient's cultural traditions into his/her care	3.34 (0.76)	3.46 (0.83)	-1.348	.179	.15
How to assess health literacy of the patient	3.45 (0.84)	3.27 (0.91)	1.964	.050	.21
<b>I am comfortable addressing health issues in the following groups:</b>					
Adolescents	3.87 (0.83)	3.64 (0.87)	2.498	.013	.27
Elderly	3.78 (0.80)	3.58 (0.73)	2.252	.025	.26
Immigrants/refugees	3.23 (0.91)	3.30 (0.98)	-0.685	.494	.07
Lesbian, gay, bisexual, transgender	3.52 (0.88)	3.18 (1.01)	3.421	.001	.36
Homeless	3.46 (0.94)	3.10 (0.92)	3.589	<.001	.39
Incarcerated individuals	3.03 (0.97)	2.77 (0.94)	2.502	.013	.27
Mentally ill or those with substance abuse	3.77 (0.80)	3.40 (0.85)	4.066	<.001	.45
Veterans	3.44 (0.89)	3.05 (0.94)	3.838	<.001	.43

Abbreviations: ANOVA, analysis of variance; SD, standard deviation.

Measured on a Likert scale: 1, strongly disagree; 2, disagree; 3, neutral; 4, agree; 5, strongly agree.

<sup>a</sup> For analytic purposes, race/ethnic categories were collapsed into two groups. All respondents who identified as a race/ethnicity other than non-Hispanic Whites were considered as "other."

The degrees of freedom for analyses ranged from 341 to 378 across comparisons due to missing data.

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