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# Promoting cultural competency and osteopathic medicine awareness among premedical students through a summer premedical rural enrichment program

<https://doi.org/10.1515/jom-2022-0002>

Received January 3, 2022; accepted May 16, 2022;

published online August 2, 2022

## Abstract

**Context:** Premedical preparatory programs at osteopathic medical schools that recruit students from medically underserved areas (MUAs) may promote interest in practicing osteopathic medicine in underserved or rural areas. In these programs, emphasis on cultural competency may increase diversity among medical school applicants and decrease healthcare disparities in the future.

**Objectives:** The goal of this study is to determine whether a summer premedical rural enrichment program (PREP) held at an osteopathic medical school located in a MUA will foster greater prioritization of cultural competency in medicine, enhance interest in practicing in rural or underserved areas, and increase familiarity with osteopathic medicine.

**Methods:** An eight-week summer PREP was hosted at the California Health Sciences University College of Osteopathic Medicine (CHSU-COM) in Clovis, California. Seventy-eight diverse participants were recruited from the Central Valley, an underserved region of California. Attendees were required to finish the formal application process and were recommended to have completed medical school prerequisite courses. The curriculum included Medical College Admission Test (MCAT) preparation through team-based learning sessions, introduction to the osteopathic medical school curriculum, osteopathic philosophy, and osteopathic manipulative medicine, as well as integrated anatomy and physiology sessions, medical school application workshops, mock interviews, simulation workshops, and sociology and cultural competency sessions. Data were collected via a voluntary and anonymous survey administered before and after the program with questions about familiarity with osteopathy, interest in practicing in underserved areas, medical school preparedness, and a post-course survey about cultural competency. The surveys had students rate statements on a Likert scale.

**Results:** Seventy-four of the 78 premedical students (95%) completed the pre- and postsurvey. There was a significant increase in agreement to statements evaluating medical school preparedness, osteopathic familiarity, and desire to practice medicine locally in the postprogram survey, compared to the preprogram survey. In the cultural competency postsurvey, 75.0% of the responses to questions that evaluated the positive effect of the course were “Agree” or “Strongly Agree.” Of the reported postcourse outcomes, the average MCAT score was  $504 \pm 6.2$  (38 students reported, 50.7%). Of the 27 participants who reported matriculation, 16 (59.2%) were admitted to osteopathic medical schools, 9 (33.3%) to allopathic medical schools, and 2 to other health programs.

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**Conclusions:** After completing the PREP program, premedical participants reported that they have better understanding of cultural competency and improvement in preparation for medical school, including familiarity with osteopathic medicine, and interest in serving MUAs. These findings indicate that similar programs may have a positive impact on MUAs. These programs may help create diverse and culturally competent osteopathic physicians.

**Keywords:** cultural competency; MCAT preparation; medically underserved areas; osteopathic awareness; pipeline programs; premedical rural enrichment.

Medical care is considerably influenced by cultural and linguistic diversity. A patient's cultural or ethnic background often directly contributes to the understanding and attitude toward disease and the medical care system [1–3]. Medicine is the convergence of science and humanity; therefore, medical providers must acquaint themselves with the impacts of culture in patient understanding and decision making; specifically within the context of the healthcare system, because ensuring high-quality healthcare and patient satisfaction is a critical component. Language barriers, communication styles, social hierarchies, inclusion of family members, and the value of religion and spirituality are a few examples of essential considerations when interacting with patients from a culturally competent perspective. Therefore, embedding cultural competency in medical education is important in preventing misunderstandings and avoiding inappropriate care.

The need for a systematic culturally competent patient care approach is particularly accented in medically underserved areas (MUAs) of the country. MUAs include those areas with primary care physician shortages, high infant mortality, and high poverty or elderly populations.

The rapidly evolving need of a health system adequately serving diverse patient populations requires culturally competent and adaptable professionals who differ in gender, age, and ethnicity [4]. Furthermore, there is evidence that underrepresented minority physicians are more likely to practice medicine in disadvantaged communities when compared to their counterparts [5, 6]. This suggests that a focus on diversifying the physicians may result in tangible changes in retention rates of physicians in MUAs [7–10].

Studies show that the most substantial factors associated with physician retention in rural areas are the location of the medical school they attended, rural upbringing, and medical school curricula targeting the importance and unique needs of rural medicine [11–14]. Several studies suggest that implementing educational programs in premedical and high school populations that raise awareness about physician shortages in MUAs, and the resultant healthcare disparities, may alleviate the shortage [15–18].

Educating high school and premedical students from MUAs about osteopathic medicine and encouraging these students to apply to osteopathic medical schools in the region has been a focus for several Colleges of Osteopathic Medicine (COM). Several COMs have emphasized the benefits of mini-medical school programs for high school students [19] that may decrease the perceived barriers of pursuing medical careers and healthcare disparities among underrepresented minorities in the United States [20]. In a previous study, a comprehensive Medical College Admission Test (MCAT) preparatory program was offered to 116 rural premedical students in New Mexico, emphasizing the importance of osteopathic medicine as an important factor in creating physicians committed to serving in rural or MUAs [21]. Another study collected data on premedical students' attitudes toward primary care medicine [22]. However, few, if any, of these programs—even those that target MUAs—have emphasized the importance of cultural competency as one of the crucial factors in educating future physicians.

Cultural competency is particularly important in MUAs like the Central Valley of California, where patient demographics have disproportionate ethnic minorities [23]. Therefore, a comprehensive premedical rural enrichment program (PREP) project was designed to include MCAT preparation, awareness of osteopathic philosophy, and cultural competency for a diverse population of premedical students from the Central Valley region of California. We hypothesized that educating local premedical students on the importance of cultural competency and recognizing the urgent need for physicians serving their communities will inspire them to pursue medical careers in rural and underserved areas.

The purpose of this study was to gauge the attitudes of premedical students regarding their desire to pursue medicine, particularly osteopathic medicine, and to practice medicine in MUAs as culturally competent physicians.

## Methods

This survey-based study utilizes a nonexperimental design with a convenience sample of premedical participants who completed the 8 week summer PREP conducted at the California Health Sciences University (CHSU) COM in the summer of 2019. Successful graduation required at least 85% attendance. This study received approval from the institutional review board at Rocky Vista University (RVU IRB #2019-0037) before collecting data. Informed consent was taken via an electronic form before the program. Facilities, resources, and faculty time compensations were provided through support from the President's office and the Dean's office at the CHSU COM.

### Study population and diversity

The target population for PREP included premedical students from Central Valley, California. Recruitment for the program involved

**Table 1:** Demographic data of the PREP participants (n=78).

Self-reported ethnicities and genders of PREP students (n=78)	
Characteristic	n (%)
<b>Race/ethnicity</b>	
Asian	31 (39.7%)
Hispanic or Latino	30 (38.5%)
White	10 (12.8%)
Black	2 (2.6%)
Middle Eastern	1 (1.3%)
Prefer not to answer	4 (5.1%)
<b>Hometown</b>	
Within California Central Valley	74 (94.9%)
Outside of California Central Valley	4 (5.1%)
<b>Gender</b>	
Male	36 (46.2%)
Female	42 (53.8%)
<b>Financial status</b>	
Low-income family <sup>a</sup>	37 (47.4%)
First-generation college students	12 (15.4%)

<sup>a</sup>“Low-income” means an individual whose family’s taxable income for the preceding year did not exceed 150% of the poverty-level amount. PREP, premedical rural enrichment program.

outreach to local undergraduate institutes, premedical advisors, undergraduate science faculty, surrounding healthcare providers, and prehealth organizations in the Central Valley area of California. To be eligible for the program, premedical students were required to have a minimum GPA of 3.0 on a 4.0 scale and were strongly recommended to have completed all prerequisite medical school coursework. Seventy-four of the seventy-eight (94.9%) enrolled students were from the Central Valley. The program was open to all junior, senior, or graduated undergraduate premedical students, regardless of their major.

To apply, students were required to complete an enrollment form with personal data including name, date of birth, sex, race/ethnicity, undergraduate information, first-generation student status, health-related and other work experiences, general financial status, and contact information (Table 1). Students were also required to write a one-page personal statement explaining why they wanted to become a physician. The application form also contained questions designed to gather participants’ interest in active learning, commitment to attendance, and willingness to share their standardized test scores and medical school matriculation information with the PREP course director. The course director (SK) screened the applications and selected the participants who met the program requirements.

## Program description

The 2019 summer PREP course was hosted at CHSU COM from June 8, 2019, to July 28, 2019. Workshops were conducted on weekends (Saturday and Sunday) from 8:00 am to 5:00 pm for 8 weeks. The primary objectives were to prepare the enrolled premedical students for the

MCAT, introduce osteopathy, expand cultural competency, and increase competitiveness when applying to medical schools.

Comprehensive review sessions of biology, chemistry, and physics, as well as anatomy and physiology, were emphasized. Topics related to verbal reasoning, critical analysis, scientific inquiry, statistical reasoning, public health, sociology, and behavioral sciences were also included. Interactive workshops aimed to strengthen medical school applications by guiding premedical students through the following activities: MCAT test-taking strategies, writing a personal statement, introducing osteopathic principles and practice, reviewing the medical school admissions process, performing mock interviews with medical school faculty, explaining the systems-based curriculum, and discussing the importance of physician shadowing and how to obtain health-related work experiences. The interactive sessions and workshops were facilitated by the CHSU COM faculty, staff, admissions team, and content experts from local universities.

The program also contained 8 h of sessions pertaining to cultural awareness and sensitivity through an invited speaker who covered a wide variety of topics, such as: formation of self-identity, social thinking and interactions, stereotypes, bias, prejudice, and discrimination, and understanding social structure, demographics of society, and social inequality. Cultural awareness and sensitivity were also integrated into all sessions through a team-based learning format. Students were required to work collaboratively with diverse peers as they learned and reviewed each topic. Team members from team-based learning groups were randomly changed each day to expose the students to more cultural diversity. Finally, this course was taught by faculty from diverse ethnic and cultural backgrounds.

## Survey description

Program participants received invitation for the surveys, with a cover page explaining how responses would be utilized and that enrollment in the study was voluntary and anonymous.

The study included a total of three surveys, including a “pre-course” survey and a “postcourse” survey with identical questions. The survey items were generated based on a recently published study [19]. The precourse survey was administered on the first day of the program, and the postcourse survey was administered on the last day of the program (Table 2). Both surveys consisted of seven questions distributed among three areas: medical school preparedness, osteopathic awareness, and serving the rural and underserved areas. Each question had the participants rating how much they agree or disagree with the survey item on a 5-point Likert scale. The survey questions (Appendices I and II) were graded on 5-point Likert scale, in which 1 indicated that the respondent “strongly disagree(d)” and 5 indicated the respondent “strongly agree(d)”.

The third survey, referred to as the “cultural competency survey,” was created specifically for this study. It was released on the last day of the program and kept open for 2 weeks to collect responses from the participants. Questions on this survey utilized the same format and included topics such as understanding the importance of diversity and cultural competency in medicine from both the provider’s and the patient’s point of view (Table 3).

## Data collection and analysis

Survey data were collected via Survey Monkey<sup>®</sup> to maintain complete anonymity of the respondents. Each participant was assigned a

**Table 2:** Survey response averages of participants before and after attending PREP (n=74). Detailed survey results were demonstrated in Appendix II.

Survey item	Before (mean ± SE)	After (mean ± SE)	p- Value
<b>Medical school preparedness</b>			
1. I feel confident in my ability to perform well on the MCAT.	3.2 ± 0.1	4.1 ± 0.1	<0.01
2. I understand the workload and lifestyle of a medical student.	4.0 ± 0.1	4.5 ± 0.1	<0.01
<b>Osteopathic awareness</b>			
3. I am familiar with osteopathic medicine.	3.5 ± 0.1	4.4 ± 0.1	<0.01
4. I understand the difference between osteopathic (DO) and allopathic (MD) doctors.	3.7 ± 0.1	4.5 ± 0.1	<0.01
5. I intend to apply to osteopathic medical schools.	4.1 ± 0.1	4.5 ± 0.1	<0.02
<b>Serving underserved areas</b>			
6. After medical school, I plan to practice medicine in a rural or underserved community.	4.4 ± 0.1	4.6 ± 0.1	0.09
7. After medical school, I plan to practice medicine in the Central Valley of California.	4.4 ± 0.1	4.6 ± 0.1	<0.05

MCAT, medical college admission test; PREP, premedical rural enrichment program; SE, standard error.

random three-digit number when the survey was processed. Identifying information beyond participant identification numbers was kept confidential from all authors. The data were stored on an encrypted flash drive in a safely locked drawer.

The precourse and postcourse surveys were analyzed utilizing an unpaired t-test data analysis tool in Microsoft Excel. A p value less than 0.05 was considered statistically significant. Descriptive statistics (numbers and percentages) were utilized to analyze the variables, including the ethnicity and demographic data of each participant. Statistical analysis of the 7- and 12-item surveys was calculated as mean and standard error [SE], utilizing GraphPad Prism® software where appropriate. The data acquired from Survey Monkey® and the statistically calculated values followed the research methods reported in the recent literature [19].

### Response rate

Of the 75 students who successfully completed the PREP program, 74 (98.7%) completed the precourse and postcourse surveys. Thirty-seven of these students (50.0%) also chose to complete the post-program survey regarding cultural competence. Between August 2019 and December 2021, thirty-eight (50.7%) students self-reported MCAT scores. In addition, 27 students (36.0%) reported matriculation into osteopathic, allopathic, podiatric, or naturopathic medical schools.

**Table 3:** Self-reported MCAT scores and matriculation outcomes from PREP students.

<b>Self-reported MCAT scores range, n=38</b>	
MCAT score range	n (%)
<34th percentile (490–496)	3 (7.9%)
35–68th percentile (497–506)	24 (63.2%)
69–95th percentile (507–518)	11 (28.9%)
<b>Self-reported matriculation data, n=27</b>	
Matriculation data	n (%)
Osteopathic medical schools	16 (59.2%)
Allopathic medical schools	9 (33.3%)
Doctor of podiatric medicine	1 (3.7%)
Doctor of naturopathic medicine	1 (3.7%)

MCAT, medical college admission test; PREP, premedical rural enrichment program.

### Demographics

Students self-reported ethnicity and hometown information in their program application, as displayed in Table 1. Among the 78 applicants who were selected for the PREP, 31 (39.7%) identified as Asian, 30 (38.5%) identified as Hispanic or Latino, 10 (12.8%) identified as White, 2 (2.6%) identified as Black, 1 as Middle Eastern (1.3%) and 4 (5.1%) participants preferred not to answer. The program consisted of 36 (46.2%) male and 42 (53.8%) female participants. Thirty-seven (47.4%) students came from families with a low-income status and 12 (15.4%) were first-generation college students.

## Results

### Promoting osteopathic awareness, medical school preparedness, and practice in rural areas

Enhancing students' motivation and self-confidence was a crucial component to achieve the main goals of our study. Compared to 21 students (28.0%) who agreed and 6 (8.0%) who strongly agreed to the question if they feel confident to take the MCAT (question 1) before the camp, 43 (58.1%) agreed, and 18 (24.3%) strongly agreed after completing the camp successfully. The mean [SE] increased from 3.2 [0.1] to 4.1 [0.1] (p<0.01) on the Likert scale. Also, after the program, participants felt that they had a better understanding of the workload and lifestyle of a medical student, as the mean value of the answers increased from 4.0 [0.1] to 4.5 [0.1] (p<0.01).

Regarding osteopathic awareness questions, "I am familiar with osteopathic medicine" and "I understand the difference between osteopathic and allopathic doctors"

(questions 3 and 4, respectively) had a significant increase in the mean values of the Likert scale from 3.5 [0.1] to 4.4 [0.1] ( $p < 0.01$ ) and 3.7 [0.1] to 4.5 [0.1] ( $p < 0.01$ ), respectively. After the program, participants agreed or strongly agreed “I intend to apply to osteopathic medical schools” increased from mean [SE] of 4.1 [0.1] to 4.5 [0.1] ( $p < 0.02$ ) (Table 2).

Students’ interest in practicing medicine in underserved areas was evaluated through a broad question and a more focused Central Valley question. Interest in practicing medicine in a nonspecific rural or underserved community increased slightly from 4.4 [0.1] to 4.6 [0.1] ( $p = 0.09$ ). Interest in practicing specifically in the Central Valley of California, where this program was administered, increased from 4.4 [0.1] to 4.6 [0.1] ( $p < 0.05$ ) on the Likert scale.

### MCAT scores and matriculation

MCAT scores were self-reported after the program by 38 (50.7%) students (Table 3). Of these, 3 students (7.9%) scored below the 34th percentile, 24 (63.2%) scored between the 35th and 68th percentile, and 11 (28.9%) scored above the 68th percentile, with three of those students scoring above the 90th percentile. The average MCAT score was  $504 \pm 6.2$ .

Medical school matriculation was self-reported after the program by 27 (36.0%) students (Table 3). Sixteen of those 27 (59.2%) matriculated into osteopathic medical schools and nine (33.3%) into allopathic medical schools. In addition, one student was admitted to a Doctor of Podiatric Medicine program, and one was admitted to a Doctor of Naturopathic Medicine Program.

### Promoting cultural competency

In the cultural awareness survey (Table 4), participants strongly indicated that the learning environment was welcoming, inclusive, and diverse (question 1, mean [SE], 4.8 [0.1]). After finishing the program, students also felt that they were able to function and communicate effectively and respectfully with participants of varying beliefs, attitudes, and cultural backgrounds (question 2, mean [SE], 4.7 [0.1]).

More than half of the respondents reported that they needed to make an adjustment to their personal learning and communication styles to successfully work with peers from different backgrounds. Nine (24.3%) “Agreed” and 12 (32.4%) “Strongly Agreed” (question 3; mean [SE], 3.7

[0.2]). This aligned with the responses about diverse healthcare environments and patient populations in items 4 and 5: “I gained skills that will help me build strong relationships with diverse patient populations” to which 12 (32.4%) “Agreed” and 17 (46.0%) “Strongly agreed” (mean [SE], 4.1 [0.2]) and “the course inspired me to consider working in a diverse healthcare environment” to which 12 (32.4%) “Agreed” and 20 (54.1%) “Strongly Agreed” (mean [SE], 4.4 [0.1]). The mean values for all of the items assessing the positive shift toward culturally competent practice were above 4 on the 5-point Likert scale.

After completing eight-session hours on cultural competency, participants felt they were better able to understand the challenges faced by members of historically underrepresented populations (question 6; mean [SE], 4.4 [0.1]). Thirty-six (97.3%) of the students “Agree” or “Strongly Agree” that “Patients are more likely to communicate freely and honestly with a culturally competent physician,” and all respondents agreed or strongly agreed that “Patients feel culturally competent physicians provide better care by respecting the beliefs, customs, values, and traditions of the patient (questions 7 and 8, respectively). All participants (100.0%) “Agreed” or “Strongly Agreed” that the diversity of medical providers contributes to improving healthcare disparities (Table 4).

Overall, all 12 items in Table 4 have an average mean value of 4.5. Participants felt that creating a diverse team-based learning environment might help to achieve better cultural competency (question 11). Notably, 34 (91.9%) of the participants either “Agreed” or “Strongly Agreed” to the question “Implementing team learning activities in the medical school curriculum helps build collaboration, trust, and cultural awareness among peers” (question 12; mean [SE], 4.7 [0.1]).

## Discussion

The San Joaquin Valley, which comprises the majority of the California Central Valley, has over 70 ethnicities and 105 languages spoken [24]. In areas like the culturally diverse and medically underserved Central Valley, cultural competency is an indispensable tool for healthcare providers, including osteopathic physicians. An in-depth understanding of how different beliefs, attitudes, languages, values, and behaviors can affect healthcare has been found to assist physicians to deliver effective care to patients with diverse cultural backgrounds [25]. Therefore, increasing diversity and cultural competency among medical school

**Table 4:** Cultural competency postsurvey responses of premedical participants (n=37).

Survey item	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	mean ± SEM
<b>Course cultural competence efforts</b>						
Compared to how I felt before the program:						
1. The learning environment was welcoming, inclusive, and diverse.	0 (0.0%)	0 (0.0%)	1 (2.7%)	7 (18.9%)	29 (78.4%)	4.8 ± 0.1
2. I was able to function and communicate effectively and respectfully with participants of varying beliefs, behaviors, and cultural backgrounds.	0 (0.0%)	0 (0.0%)	0 (0.0%)	12 (32.4%)	25 (67.6%)	4.7 ± 0.1
3. I found that I needed to make an adjustment to my personal learning and communication styles in order to successfully work with peers from a different background.	2 (5.4%)	5 (13.5%)	9 (24.3%)	9 (24.3%)	12 (32.4%)	3.7 ± 0.2
4. I gained skills that will help me build strong relationships with diverse patient populations.	1 (2.7%)	3 (8.1%)	4 (10.8%)	12 (32.4%)	17 (46.0%)	4.1 ± 0.2
5. The course inspired me to consider working within a diverse healthcare environment.	0 (0.0%)	1 (2.7%)	4 (10.8%)	12 (32.4%)	20 (54.1%)	4.4 ± 0.1
<b>Culturally competent practice</b>						
Compared to how I felt before the program:						
6. I understand the challenges faced by members of historically underrepresented populations.	0 (0.0%)	1 (2.7%)	4 (10.81%)	10 (27.0%)	22 (59.5%)	4.4 ± 0.1
7. Patients are more likely to communicate freely and honestly with a culturally competent physician.	0 (0.0%)	1 (2.7%)	0 (0.0%)	11 (29.7%)	25 (67.6%)	4.6 ± 0.1
8. Patients feel culturally competent physicians provide better care by respecting the beliefs, customs, values, and traditions of the patient.	0 (0.0%)	0 (0.0%)	0 (0.0%)	11 (30.6%)	25 (69.4%)	4.7 ± 0.1
9. The diversity of medical providers contributes to improving healthcare disparities.	0 (0.0%)	0 (0.0%)	0 (0.0%)	8 (21.6%)	29 (78.4%)	4.8 ± 0.1
10. Culturally competent physicians establish better rapport with patients.	0 (0.0%)	1 (2.7%)	0 (0.0%)	8 (21.6%)	28 (75.7%)	4.7 ± 0.1
<b>Cultural competence in medical school curricula</b>						
Compared to how I felt before the program:						
11. Medical schools that emphasize diversity, inclusion, and promote cultural sensitivity are more likely to create culturally competent physicians.	0 (0.0%)	0 (0.0%)	1 (2.7%)	8 (21.6%)	28 (75.7%)	4.7 ± 0.1
12. Implementing team learning activities in the medical school curriculum helps build collaboration, trust, and cultural awareness among peers.	0 (0.0%)	0 (0.0%)	3 (8.1%)	12 (32.4%)	22 (59.5%)	4.5 ± 0.1

SEM, standard error of the mean.

applicants may decrease some barriers to pursuing careers in medicine and lead to a decrease in healthcare disparities. There are many programs conducted at osteopathic schools to motivate high school students [19, 26, 27] and undergraduate students [21] toward rural practice, [26, 28] osteopathic medicine, [16, 17, 29] and primary care [18, 22]. However, this PREP program appears to further build on the premedical students' interest in osteopathic medicine in rural settings by incorporating course-specific emphasis on cultural competency.

This study featured a survey that assessed the degree of students' familiarity and appraisal of cultural competency in medicine (Table 4). The results were promising.

Questions 6 to 12 assessing culturally competent practice and cultural competence in medical school curricula had a mean response of at least 4 out of 5 (Table 4), indicating that most PREP students appreciate cultural competency and recognize its significance in healthcare.

The only item in Table 4, with a mean value below 4, was Question 3, "I found that I needed to make an adjustment to my personal learning and communication styles in order to successfully work with peers from a different background," which had a mean value of  $3.7 \pm 0.2$ . Having more than half of the participants report that they found a need to adjust their interaction style suggests that the program introduced novel knowledge about cultural

competency and successfully emphasized its importance. The relatively high number of people who did not agree with this statement was not completely unexpected and likely stems from the perception that prior understanding of cultural competency and “common sense” would be sufficient in a diverse environment, a common confounding factor to this topic. The PREP students came from a wide variety of ethnic, cultural, linguistic, geographical, and financial backgrounds (Table 1), and it is not unexpected that some of them were already relatively aware of cultural diversity. However, throughout the course, it was emphasized that cultural competency knowledge and implementation should not only be intuitive but also be actively sought, studied, and applied.

The survey clearly shows that students reported a significant understanding of the importance of cultural competency in practicing medicine and further developed this understanding throughout the PREP course. This directly relates to questions 6 and 7 from the precourse and postcourse surveys (Table 2). Although a statistically significant increase in the drive to practice in the Central Valley of California was noted ( $p < 0.05$ ), the increased interest in practicing in rural or underserved areas was not statistically significant ( $p = 0.9$ ). These findings can be explained by the fact that students entered the course with a strong interest in serving rural or underserved areas. The increased interest in practicing in the Central Valley further emphasizes the role of local upbringing and the positive effect of local medical education toward improving a region's physician shortage.

The remainder of the precourse and postcourse survey questions focused on knowledge of and interest in osteopathic medicine and medical school and MCAT preparedness (Table 2). Results showed increased familiarity with osteopathic medicine (question 3) and heightened interest in applying to osteopathic medical schools (question 5). In terms of medical school preparedness, past evidence has shown the effectiveness of MCAT preparatory courses [19]. While similar, the current project goes further by incorporating the cultural competency aspect and collecting more robust data utilizing precourse and postcourse surveys.

Comparing precourse and postcourse survey responses, an overall increase in medical school preparedness was identified through increased confidence in performing well on the MCAT and better understanding the workload of a medical student (questions 1 and 2). These positive results support programs that strengthen future medical school applicants from MUAs and educate about osteopathic medical schools. In addition, 37 (47.4%) of PREP students came from low-income families (Table 1) and may have had difficulty affording commercially available MCAT

preparatory courses. To further validate our goals, we encouraged students to report their MCAT scores and acceptance to medical schools. The average MCAT score of the reporting students was 504, which is slightly higher than the mean of all MCAT test-takers [22]; however, due to a low response on reported scores, it is difficult to draw conclusions. The acceptance rate of the self-reported students also seemed satisfactory, with 27 (36.0%) students reporting acceptance to doctoral programs.

The Central Valley is the largest center of California's agricultural production but also has the poorest healthcare outcomes. The vision of CHSU COM is to recruit a diverse student body from the area in order to enhance local physician populations, which should improve the healthcare outcomes of the medically underserved. The PREP program provided a platform for premedical students from the Central Valley to experience the local osteopathic medical school. These outreach programs have a three-fold benefit (1): furthering the medical school application preparedness (2); augmenting the perspectives toward cultural competency; and (3) enhancing awareness of practicing osteopathic medicine in the rural communities. The finding that 11 (14.7%) students matriculated at CHSU COM validated these efforts.

## Limitations

A limitation to this study is that the self-reported surveys are naturally subjective and can introduce implicit biases or skewed results. Recognizing the importance of cultural awareness is not the same as functionally and effectively practicing it. Also, a standardized approach to quantify cultural competency has not been developed. Another potential limitation is the relatively low response rate of the participants who completed the postprogram survey regarding cultural competence (50.0%). The low response rate introduces the possibility that only those students who had the most positive opinion on cultural competency actually responded. A larger survey of premedical students in the area may provide more information about preprogram cultural competency.

Another limitation of this study is the limited ability to collect data on MCAT scores and matriculation into doctoral programs. Out of 75 students, 38 (50.7%) students shared their MCAT outcomes, and 27 (36.0%) shared their acceptance data. Participants who did not score well on the MCAT and who did not matriculate into medical schools may be less inclined to share their information. However, we were reluctant to assume that none of the non-respondents has not matriculated.

A future consideration would be assessing the long-term effects regarding this PREP summer course and especially the implications of promoting cultural competence and matriculation into osteopathic schools. This could potentially be done by following the educational and career outcomes of the participants involved by regularly disbursing surveys for data collection.

## Conclusions

The results of this study imply that the summer PREP improved the understanding of the importance of cultural competency in osteopathic medicine in premedical students, especially as it relates to MUAs. The data also support the hypothesis that providing a college preparedness course may improve the understanding of osteopathic medicine and promote interest in practicing medicine in rural or underserved areas, including the Central Valley of California. Furthermore, the original purpose of the program was upheld; students who completed PREP felt more prepared for the MCAT and medical school.

Ultimately, programs that emphasize the importance of cultural competency when preparing premedical students for osteopathic medical school can enhance the skill set of students to become more effective physicians, especially in rural or underserved areas with diverse populations. These findings indicate that hosting premedical programs similar to PREP at osteopathic medical schools across the country can have a positive impact on the participants and thus in the MUAs and/or diverse areas where these students may eventually practice osteopathic medicine.

**Acknowledgments:** The authors thank California Health Sciences University (CHSU) Office of the President and CHSU COM Office of the Dean for providing funding, and CHSU COM's biomedical and clinical faculty for providing instruction to the participants. The authors also thank the Academic Affairs and Assessment, Osteopathic Principles and Practices, Osteopathic Clinical Education and Simulations, Student Affairs and Admissions, Marketing and Communications, and Human Resources.

**Research funding:** Funding for this study was provided by CHSU Office of the President. Faculty protected time, compensation, and material support were provided by Office of the Dean, CHSU College of Osteopathic Medicine.

**Author contributions:** S.K., K.S.L., M.Q., and B.B.B. provided substantial contributions to conception and design, acquisition of data, or analysis and interpretation

of data; M.Q., V.S, W.D.K., R.A.L., and T.F.N authors drafted the article or revised it critically for important intellectual content; J.W.G. gave final approval of the version of the article to be published; and all authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

**Competing interests:** None reported.

**Informed consent:** All participants in this study provided written informed consent prior to participation.

**Ethical approval:** Prior to collecting data, this study received approval from the institutional review board at Rocky Vista University (RVU IRB #2019-0037).

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**Supplementary Material:** The online version of this article offers supplementary material (<https://doi.org/10.1515/jom-2022-0002>).