Implementation of a pilot medical student mentoring program for premedical students and its effects on premedical student attitudes

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ABSTRACT

As the medical school admissions process becomes increasingly competitive, there is an increased mental and emotional burden on undergraduate premedical students due to uncertainty about acceptance. Mentors in Medicine is a mentoring program between Texas Tech University Health Sciences Center and Texas Tech University students; the data demonstrate that this program can alleviate some negative emotional aspects faced by premedical students on their journey to medical school. The program interventions include establishing mentor-mentee relationships between medical students and premedical students, hosting various events to encourage dialogue, and promoting communication efforts from medical mentors. These interventions were found to significantly decrease feelings of anxiety or nervousness, as well as feelings of doubt or insecurity. These results may provide a framework for similar medical-premedical mentoring programs at other institutions.

KEYWORDS College students; medical education; medical students; mentoring; premedical education

The medical school admissions process is competitive, as evidenced by the 849,678 applications for 52,777 applicants in the 2018–2019 application cycle, of which only 21,622 matriculated, for a matriculation rate of 41%.¹ Furthermore, while the number of applicants has increased by 25% since 2009, the number of matriculants has only increased by 18% during the same time period.¹ The increasing competitiveness of the medical school application process has likely affected the landscape of premedical education and undergraduate premedical students themselves, as evidenced by a study revealing increased depression severity and degree of emotional exhaustion among premedical students compared with other students.² Similarly, another study found a higher rate of positive screening criteria suggestive of major depressive disorder in premedical students than in nonpremedical students, believed to be related to the unique challenges of the premedical curriculum.³ These changes in the selectivity of the medical school admissions process further complicate the

difficult task of mentoring students through a successful application cycle.

In the framework of mentoring, the benefits of the relationship are broadly categorized into vocational aspects and psychosocial aspects.⁴ While the vocational aspects are usually considered the primary goal of mentoring, one study found that mentees cited the psychosocial aspects as the most necessary.⁴ Thus, the Mentors in Medicine program was founded at Texas Tech University Health Sciences Center (TTUHSC) School of Medicine as a student organization in 2016 aiming to assist mentees on their journey to medical school through mentor advising and emotional support. Starting in 2018, the organization began collecting data from the mentees to improve the functions of the club so as to better serve the mentees—with events and communications serving as the “interventions” of the organization in this study. These data were analyzed to determine what benefit, if any, the organization offered for the mental and emotional well-being of the participating undergraduate students.

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METHODS

The TTUHSC Mentors in Medicine is a student organization that pairs medical student mentors with premedical student mentees to provide leadership opportunities to medical students in helping premedical students on their journey to medical school. The organization matched mentors and mentees, prioritizing juniors and seniors over sophomores and freshmen. From the initial pool of 216 applicants, 163 mentees were matched with mentors. Mentors were required to meet their mentee at least once per semester in person. Mentors were also required to reach out to their mentee at least twice per semester (via phone or email). To better facilitate communication, Mentors in Medicine hosted three club events: a mentor-mentee social (October 2018), a “bring your mentee to class” day (November 2018), and a campus tour and student panel (March 2019). These interventions aimed not only at promoting communication between mentor and mentee pairs, but also alleviating negative attitudes that were indicated on the initial survey in August 2018. The negative student attitudes targeted were those that were brainstormed by student leaders at the beginning of the academic year while reflecting on experiences from their journey to medical school: anxiety and nervousness, doubt and insecurity, uncertainty and disinterest, a feeling of being unconnected and distant, and poor outlook. Additionally, both mentors and mentees had to affirm compliance with Mentors in Medicine requirements at the end of each semester to stay in the organization. It was hoped that encouraging and facilitating mentor and mentee communication, as well as answering all questions regarding their journey to medical school, would alleviate the negative attitudes of premedical students regarding medical school.

Initial survey data were collected in August 2018 at the time of registration of all applicants. Initial survey data included gender and classification. Additionally, all 216 mentee candidates were asked to evaluate a series of statements to determine their current opinions regarding their journey to medical school. These questions had a rating scale of 1 to 5, with 1 being “I do not identify with this at all” and 5 being “I completely identify with this.” The questions were brainstormed by student leaders at the beginning of the academic year in an attempt to find the best ones to assess feelings of anxiety or nervousness, doubt or insecurity, and uncertainty or disinterest. A second survey conducted in March 2019 through Google Forms was sent out via email to all 163 undergraduate mentees to ask them about their experience in this organization and to rescore the same questions from the initial survey. Of the original 163 mentees who were asked to complete the second survey, data from the 96 responses were used to create a new set of data regarding any negative student attitudes about the journey to medical school after an academic year of involvement with Mentors in Medicine. This relatively low response rate is likely due to the poor timing of this survey (midterm examinations) and the inability to mandate a response from all

participating mentees. The results from these two surveys were tabulated and analyzed for significant differences through an unpaired *t* test, due to the unequal sample sizes.

RESULTS

The initial survey demographics included 88 male students and 128 female students, with 120 freshmen, 41 sophomores, 35 juniors, and 20 seniors (*n* = 216). The final survey demographics included 30 male students and 66 female students, with 30 freshmen, 27 sophomores, 23 juniors, and 16 seniors (*n* = 96). The organization was not yet able to collect information about specific medical school applications or whether the mentees had higher success rates in matching to medical school than premedical students not in the program.

Survey data were collected and tabulated for each of the five behavioral areas (*Table 1, Figure 1*). Significant improvement was seen in the first two questions related to the areas of anxiety and doubt, but significantly more uncertainty was seen with the third question (“I am not sure if medicine is the field for me”). Responses to the last two questions related to disconnection and outlook did not show a significant change.

DISCUSSION

Studies have found that mentoring increases student success or satisfaction in a wide variety of settings across multiple mentee populations.^{3–5} When high school students are mentored by undergraduate students to prepare for their General Certificate of Secondary Education (GCSE) examinations, mentoring leads not only to higher test scores but also significant improvement in student attitudes toward science.⁵ When undergraduate students are mentored by graduate students or professors, mentoring leads to higher grade-point averages, as well as increased perceived college satisfaction and emotional support.⁶ Workplace mentoring among colleagues leads to more job satisfaction and commitment to the organization.⁷ These studies demonstrate a consistent pattern in the value of mentoring, with each suggesting further study of the subject.^{3–5} However, no previous study examined a mentoring relationship between medical students and undergraduate premedical students and its effects on their attitudes toward medical school.

The TTUHSC Mentors in Medicine program demonstrated a significant improvement in two key premedical student attitudes: “anxiety and nervousness” and “doubt and insecurity,” possibly due to organizational interventions. Specifically, the aim of medical mentor and premedical mentee interactions was to change the perception that medical students are at a level of intelligence or diligence that is unattainable. The vocational aspects of mentoring include role modeling, educating, and providing exposure, but there is also a psychosocial component of this dynamic consisting of supporting, encouraging, and counseling.⁸ It is worth noting that when mentees were asked which component of the

Table 1. Surveyed attitudes and intervention

Survey question	Attitude tested	August 2018 data	Intervention	March 2018 data	P value
I am nervous or anxious about applying to medical school in the future.	Anxiety or nervousness	4.12	Mentor and mentee communication through scheduled meetups and electronic communications	3.85	<0.05
I am unsure if I will even be accepted to medical school despite all of my work.	Doubt or insecurity	3.72		3.41	<0.05
I am not sure if medicine is the field for me.	Uncertainty or disinterest	1.39	Mentor-mentee social in October 2018 and “Bring your mentee to class” day in November 2018	1.65	<0.05
Relative to my peers, I do not feel that I have much of a connection to the field of medicine despite my interest.	Unconnected or distant	1.93		1.91	>0.05
The route to medical school seems long and difficult and, at times, impossible.	Poor outlook	3.06	Campus tour and student panel in March 2019	3.26	>0.05

Figure 1. Differences in surveyed behavioral areas of undergraduate medical mentees from August 2018 (n=216) to March 2019 (n=96). Significant differences were demonstrated in “anxiety and nervousness,” “doubt and insecurity,” and “uncertainty and disinterest,” which are noted with an asterisk.

mentoring process was most needed, the study found that students cited the psychosocial aspect.⁸ In this case, the psychosocial aspects of Mentors in Medicine included planning social events, encouraging mentors to be supportive of their mentees, and requiring a minimum amount of communication between mentors and mentees.

The Mentors in Medicine program demonstrated a significant worsening in a key premedical student attitude: “uncertainty or disinterest,” meaning that students were generally more uncertain about medicine as their future career path by the end of the year. This worsening may not necessarily be a negative outcome since it is common for premedical students to change their mind about their pursuit of medicine as they progress in their undergraduate education. This view not only is supported by numerous articles that

attempt to explain the high attrition rate of premedical students,⁹ but also partially explains the decreasing rate of response in the second survey, particularly among freshmen, who had a 25% response rate in the second survey. It is possible that the organization was able to help them come to that realization sooner than they would have otherwise, which therefore might be considered a positive outcome. Regardless, the significant worsening in uncertainty or disinterest toward medical school is an area of future study, as many factors affect this feeling—such as acquiring significant student loans, personal problems or family issues, discovering a new potential career path, or changing majors. Finally, the Mentors in Medicine program did not demonstrate a significant difference in feelings of being “unconnected and distant” or having a “poor outlook.”

The mentoring model of the TTUHSC Mentors in Medicine program can be further improved to benefit undergraduate premedical student mentees. One recommendation to improve the feeling of being unconnected is to create shadowing opportunities for undergraduate premedical students, which would also increase mentee exposure. Another recommendation is to improve the feeling of poor outlook by encouraging medical student mentors to be truthful about the length and difficulties of the journey to become a physician, but to also emphasize the positive aspects and encourage students that the journey is worth it. While the demonstrated changes are statistically significant, it is certainly appropriate to question whether the changes are educationally significant; however, mentorship is just one of many possible interventions that could improve the well-being of premedical students. This study not only provides a framework for similar interventions, but also serves as a call to action in the area of premedical student wellness. If numerous interventions target premedical student wellness, it is quite likely that larger changes could be made in these surveyed areas.

The study has limitations, especially since only 96 of the 163 mentees elected to respond to the second survey, which may indicate a lack of engagement with the organization. Potential future directions for this type of research would be to increase the number of undergraduate premedical participants and to increase the percentage of mentees who elect to respond for a more accurate evaluation of student well-being. Further studies may seek to expand the emotional categories to include other determinants of mental health and well-being. Given that this is a pilot program, the project will be continued to determine if the early promising data can be confirmed with larger sample sizes and improved surveys.

Overall, the mentoring relationship is shared between two individuals to assist with both vocational and psychosocial aspects, for the mentor and mentee alike. While there may be a need for mentoring to improve well-being among the premedical student population, it is also worth noting that mentoring may be an excellent way to connect those who otherwise may not have had the opportunity to meet. Mentoring has been demonstrated to have numerous positive effects on the lives of those impacted, and the TTUHSC Mentors in Medicine program may provide a basic framework for other institutions interesting in implementing a mentoring program.

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1. Association of American Medical Colleges. U.S. medical school applications and matriculants by school, state of legal residence, and sex. In: *AAMA Data Reports—Medical Education Facts*. Chicago, IL: AAMC; 2019. <https://www.aamc.org/data-reports/students-residents/report/facts>.
2. Fang DZ, Young CB, Golshan S, et al. Burnout in premedical undergraduate students. *Acad Psychiatry*. 2012;36(2):103–116. doi:10.1007/BF03339773.
3. Fang DZ, Young CB, Golshan S, et al. Depression in premedical undergraduates: a cross-sectional survey. *Prim Care Companion J Clin Psychiatry*. 2010;12(6):pii: PCC.10m00958. doi:10.4088/PCC.10m00958blu.
4. Girves JE, Zepeda Y, Gwathmey JK. Mentoring in a post-affirmative action world. *J Social Issues*. 2005;61(3):449–479. doi:10.1111/j.1540-4560.2005.00416.x.
5. Sharpe R, Abrahams I, Fotou N. Does paired mentoring work? A study of the effectiveness and affective value of academically asymmetrical peer mentoring in supporting disadvantaged students in school science. *Res Sci Tech Educ*. 2018;36(2):205–225. doi:10.1080/02635143.2017.1355783.
6. Crisp G, Cruz I. Mentoring college students: a critical review of the literature between 1990 and 2007. *Res High Educ*. 2009; 50(6): 525–545. doi:10.1007/s11162-009-9130-2.
7. Baranik L, Roling EA, Eby LT. Why does mentoring work? The role of perceived organizational support. *J Vocat Behav*. 2010;76(3): 366–373. doi:10.1016/j.jvb.2009.07.004.
8. Schockett MR, Haring-Hidore M. Factor analytic support for psychosocial and vocational mentoring functions. *Psychol Rep*. 1985;57(2): 627–630. doi:10.2466/pr0.1985.57.2.627.
9. Lin KY, Parnami S, Fuhrel-Forbis A, et al. The undergraduate premedical experience in the United States: a critical review. *Int J Med Educ*. 2013;4:26–37. doi:10.5116/ijme.5103.a8d3.