Establishment and Retrospective Analysis of a Pilot Peer Mentorship Program

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ABSTRACT

Background: Studies suggest widespread advantages to peer mentoring programs; however, there is minimal data pertaining to medical students mentoring undergraduate students.

Objectives: To determine the feasibility and perceived effectiveness of a medical student-undergraduate student peer mentorship program.

Methods: A needs assessment guided the development of Pre-Med Pair Up, a program connecting medical student mentors from the Medical College of Wisconsin and other US medical schools to undergraduates at Marquette University and the University of Wisconsin-Oshkosh to provide peer mentorship, premedical resources, and global health information. After 6 months, surveys were distributed to 43 premedical and 26 medical students to evaluate the program. Descriptive statistics and Pearson correlations (*r*) were used to assess the relational strength between program components and student confidence and knowledge.

Results: Eleven undergraduate and 26 medical students completed surveys. Most undergraduates expressed increased confidence in abilities as premedical students associated with program involvement (18.2% great, 27.3% moderate, 45.5% minimal, 9.1% no improvement). Increased confidence was strongly correlated with knowledge of volunteer opportunities ($r = 0.887$, $P < 0.001$) and feelings of preparedness for the medical school application process ($r = 0.854$, $P = 0.001$) and curriculum ($r = 0.871$, $P < 0.001$).

Conclusion: While self-reported confidence improved and overall positive program outcomes were statistically significant, the number of participants was low and the number who completed mid-year surveys was even lower. Therefore, no conclusions about program effectiveness were made. Instead, a lessons-learned approach was used to discuss the pilot development, implementation, and suggestions for future program installment.

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INTRODUCTION

Data released by the Association of American Medical Colleges (AAMC) in 2015 reported that the number of students enrolling in US medical school programs increased 25% between 2002 and 2015. The number of first-time applicants increased by 4.8%, while total number of applicants increased 6.2% from the previous year.[1] This rise in application rates indicates an increasing interest in medicine and suggests that there are many individuals who could benefit from a mentorship program that facilitates partnerships with medical students.

Literature suggests widespread advantages of peer mentoring for both mentors and mentees,[2-5] including skill building, community engagement, knowledge acquisition, cultural competency, and feeling valued and supported.[6] The Medical Student Mentorship Program at John A. Burns School of Medicine in Hawaii has focused on fostering relationships between undergraduate students, medical students, and faculty to guide undergraduate premedical students through the medical school application process since 2002.[7]

More recently, the University of California Irvine School of Medicine created and publicized an innovative summer enrichment program to incorporate multiple levels of mentorship that, over its first 3 summers (2010-2012), involved 253 high school students, 48 undergraduate students, 12 medical students, and several faculty and additional staff, such as registered nurses.[8] All undergraduate and medical school students self-reported enhancement of teaching and leadership skills, self-confidence, and motivation toward careers in academic medicine.[8]

Figure 1. Program Logo

In the past decade, virtual programs have become more popular. Virtual programs involving telementoring offer the possibility for cost-effective, large-scale programs that are more widely available and accessible.[9] The Society for Academic Emergency Medicine sponsored a virtual advisor program to provide meaningful career guidance to national and international students either without access to emergency medicine providers at their home institution or who desired counsel in a specific area within the specialty.[10] In its pilot academic year 2001-2002, it facilitated mentorship pairs between 264 medical students and 121 emergency medicine faculty mentors.[10] Feedback about the program from participants was generally positive, and the virtual nature of the program allowed mentorship to be provided at a distance.[10]

Although there are many examples of mentorship programs in the medical field, very few published programs focus on pairing premedical students with medical students who attended the same undergraduate university. The purpose of this manuscript is to describe the development and evaluation of "Pre-Med Pair Up," a unique medical student-undergraduate student distance peer mentorship program that offers guidance for medical school preparation, enhances global health awareness, and identifies local health care outreach opportunities.

METHODS

Program Development

Three medical students at the Medical College of Wisconsin (MCW) developed Pre-Med Pair Up: A Medical Mentorship and Global Awareness Program (PMPU) in 2015 to facilitate mentorship between currently enrolled medical students and undergraduate premedical students. The program incorporated global health education, as this was of growing interest to many students, and it exposed students to opportunities in medicine and volunteerism. The 1-year pilot program was implemented in 2016, with intentions of renewing the program for additional years depending on outcomes.

Marquette University and the University of Wisconsin-Oshkosh (UW-Oshkosh) were the 2 undergraduate institutions selected to participate in the pilot year of PMPU based on their affiliation with the medical students who founded the project. One student from each undergraduate institution was appointed as a campus representative. Communication between MCW and the 2 undergraduate institutions was maintained through these campus representatives during initial program development. The campus representatives informally gauged interest in development of a mentorship program by word-of-mouth at institutional premedical society and AAMC chapter meetings. Mentor interest was obtained by emailing enrolled medical students at MCW and other medical schools across the United States who graduated from Marquette University and UW-Oshkosh.

Once interest in mentorship was identified, formal program development began. A PMPU logo was created (Figure 1) and a program-specific email account was set up. An online application and needs assessment were both created using Google Forms. The application included a brief program summary, a section to provide name and contact information, and 2 additional sections—one specific to current medical students and one specific to undergraduate students. The section for current medical students requested undergraduate institution, medical college, anticipated MD or DO graduation year, and any additional program interests (eg, PhD, MS, JD, military, rural program). The section for undergraduates requested undergraduate institution, major and minor, anticipated undergraduate graduation date, interest in MD/DO/both, interest in additional programs (eg, PhD, MS, JD, military, rural program), and the following short-answer questions: "Why do you want to be a part of this program?", "What questions do you have for your future medical student mentor?" and "What resources would be of interest to you?" The 11-item needs assessment was created to identify resources that would be beneficial for undergraduate participants. A link to the application and corresponding needs assessment was emailed to 59 undergraduate students at Marquette University and UW-Oshkosh and 34 current medical students at 9 medical schools across the US who indicated interest in the program. The application and needs assessment were available to both groups for 21 days. Descriptive statistics were used to compile and analyze the needs assessment data, which were then utilized to create program content.

Program Implementation

Program founders read all needs assessments and used them to match students. Forty-three undergraduate mentees and 26 medical student mentors were joined in pairs or triplets to form mentorship groups based on similarities in application responses. Highest priority for matching criteria was undergraduate institution attended, followed by additional program interests, such as dual degree. Participants were encouraged to communicate regularly through face-to-face meetings, email, or phone. Resources, guided by the needs assessment, were provided to participants. These resources are detailed in the Results section.

Program Assessment

Six months following program implementation, an evaluation was conducted to investigate the effectiveness of PMPU. A 12-item medical student survey and 17-item undergraduate student survey were created and distributed. Both surveys assessed several components:

- Report of frequency and method of communication with mentee/mentor
- Perceived value of monthly e-newsletter
- Self-reported knowledge of global health issues
- Perceived strengths and weaknesses of program

Additionally, the undergraduate survey assessed perceived benefit of resources, confidence, and understanding of and preparedness for medical school and the application process, while the medical student survey assessed student perceived confidence as a mentor. The retrospective survey was approved by the MCW Institutional Review Board.

Surveys were available through SurveyGizmo (now Alchemer, www.alchemer.com) to participants for 14 days. A link to the survey was emailed to all enrolled students: 26 medical students and 43 undergraduate students. Participants were informed that the survey was optional and results would be used to evaluate and improve the program. Surveys were anonymous and no incentive was offered for completion. A statistician calculated descriptive statistics and Pearson correlations (r) to assess the relational strength between program components and student confidence and knowledge. Analysis was generated by IBM SPSS 24.0.

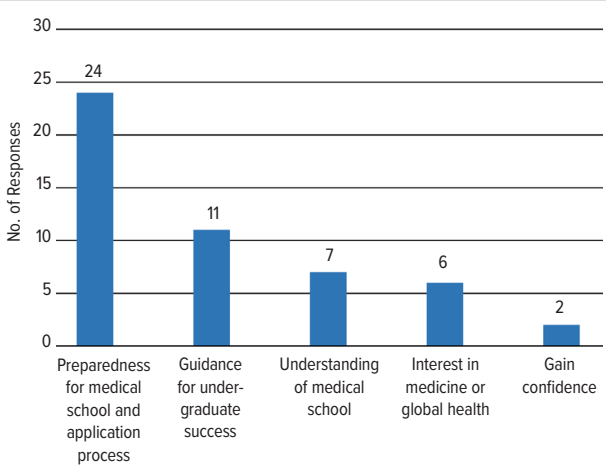
RESULTS

Program Development

Forty-three undergraduate students and 26 medical students completed the enrollment application and accompanying needs assessment. Undergraduate students cited several reasons for joining PMPU, including wanting to understand and feel prepared for medical school, seeking guidance for success in undergraduate courses, and having a general interest in medicine or global health (Figure 2). They identified the following resources as having the most potential to be helpful: a month by month checklist (n = 35), volunteer resource guide (n = 34), and advice pertaining to the Medical College Admission Test (MCAT), personal statement writing, and interviewing (n = 35). Data collected from the needs assessment guided PMPU content, which included:

- Month-by-month checklist of activities recommended for premedical undergraduate students specific to year in school, eg, when to take the MCAT, ask for letters of recommendation, etc.
- Volunteer resource guides specific to location of undergraduate institution.
- Monthly e-newsletter: global health article, "Words of Wisdom" section, and "Pre-Med Prep" section with tips for the premedical process.

Figure 2. Premedical Student Reasons for Joining Pre-Med Pair Up (N = 43, multiple responses allowed)



- Dedicated webpage, including featured program information and resources readily available (http://www.mcw.edu/MedicalSchool/PMPU-Mentorship-Program.htm).

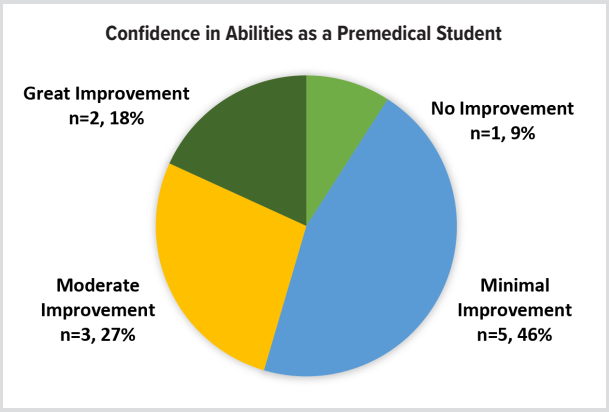
Program Implementation

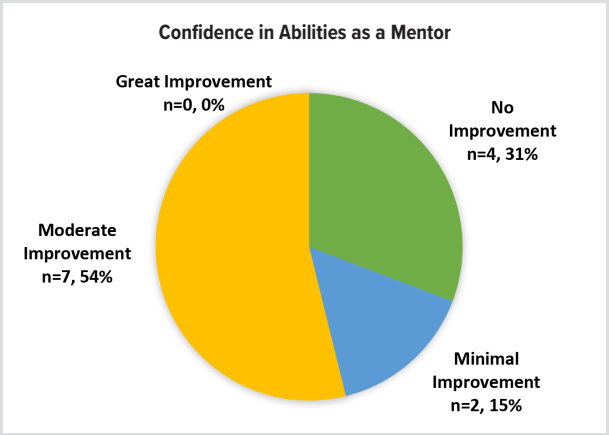
Peer mentorship pairs and triplets were assigned as described above. The time commitment for program facilitators varied throughout the school year. Monitoring participant interest, establishing program curriculum, and pairing mentors with mentees required the most time—about 15 to 30 hours weekly divided among program leaders. Undergraduate campus representatives assisted with curriculum specific to their location. After the initial program startup phase, the time requirement was limited to creating monthly communication—approximately 1 to 10 hours per week divided among program leaders.

Program Assessment

The 6-month program evaluation survey had 11 undergraduate respondents (25.6%) and 13 medical student respondents (50.0%). Most undergraduate students reported communication with their mentors 3 to 4 times (36.4%) or greater than 6 times (36.4%) over 6 months. Most medical student respondents reported communication with their mentees 2 to 3 times (92.3%) over 6 months. The majority of both undergraduate students (n = 8, 72.7%) and medical students (n = 12, 92.3%) reported email as a method of communication with their mentor. Students were able to choose all methods of communication that applied. Less than half of the respondents reported reading the e-newsletter each month (45.5% undergraduate students and 23.1% medical students, respectively). However, more than half of the undergraduates self-reported improvement in knowledge of global health issues after reading the monthly e-newsletters (9.1% great improvement, 36.4% moderate improvement, 9.1% minimal improvement). Fewer than half (46.2%) of medical students

Figure 3. Mid-year survey responses





Reported confidence in abilities as a premedical student (n = 11) and as a mentor (n = 13) after completion of the program.

acknowledged improvement in global health knowledge after receiving monthly e-newsletters.

Undergraduate student responses indicated that most students felt that their confidence in abilities as a premedical student improved with program involvement (18.2% great improvement, 27.3% moderate improvement, 45.5% minimal improvement, 9.1% no improvement) (Figure 3). This confidence was strongly correlated between students' knowledge of volunteer opportunities ($r = 0.887$, $P < 0.001$) and feelings of preparedness for the medical school application process ($r = 0.854$, $P = 0.001$) and medical school curriculum ($r = 0.871$, $P < 0.001$). In terms of the resources and advice offered, undergraduate students indicated varying degrees of improvement in their knowledge of global health issues, volunteer opportunities, and understanding and preparedness for medical school and the application process (Table).

More than half of medical student respondents reported their confidence in their abilities as a mentor improved following program involvement (54% moderate improvement, 15% minimal improvement, 31% no improvement) (Figure 3). Medical students' confidence in abilities as a mentor was correlated with their feelings of success as a mentor ($r = 1.0$, $P < 0.001$).

DISCUSSION

PMPU provided undergraduate students the opportunity to seek advice regarding specific undergraduate coursework and schedule, MCAT preparation, medical school application process, and medical school curriculum and structure. Most undergraduate students reported at least minimal improvement in confidence in their abilities as a premedical student after program involvement. This confidence correlated with their knowledge of volunteer opportunities and feeling of preparedness for the application process and medical school curriculum.

The program aimed to facilitate the medical student role as mentor, providing an opportunity for professional development. More than half of the medical students self-reported moderate improvement in confidence in their abilities as mentors. Learning and honing mentoring skills will be beneficial throughout their training and future careers, potentially affecting many future medical trainees.

The strengths of this program include the number of resources it provides to premedical students and its facilitation of mentorship relationships between premedical students seeking advice and medical students who have recently and successfully completed both prerequisites at the same undergraduate institution and the medical school application process. As interest in medicine continues to grow and the number of medical school applicants increases, this type of program may be in high demand and particularly helpful for undergraduate students.

Lessons Learned

There were many lessons learned from this pilot study which, if applied, would help enhance the program and allow for more rigorous study of its success. Participants were very excited about the idea of a program that matched premedical students with current medical students from the same undergraduate institutions. The program goal and incorporation of global health was appreciated from a subjective perspective; however, after analyzing surveys, it was apparent that there may be better ways to accomplish program goals. The program was implemented primarily as a distance mentoring program that relied heavily on communicating information via the monthly e-newsletter and posting it on the website. Unfortunately, most participants reported that they did not read the e-newsletters. It is possible that different methods of presenting information, such as virtual meetings or recorded webinars, would be more appealing to participants.

The PMPU website was a central location for housing information, however, it was not promoted as much as it could have been. The website consisted of a program introduction and drop-down menus with carefully organized information. It could be organized so it is more reader-friendly and conveys answers to frequently asked questions in a similar fashion to the Medical Student Mentorship Program organized by students at the University of Hawaii.[7] This website is very inclusive of topics of interest for

medical students and is easy to navigate. However, it should be noted that a question-and-answer format is at risk for misinformation and requires meticulous efforts to ensure the information is accurate and up-to-date.

Due to the low reported use of the e-newsletter, challenges of maintaining a website, and overall program goals of personal mentorship, the main focus going forward should be interactions between program participants. This may include direct guidance for undergraduate students to explore and prepare for medical school. Activities to incorporate could include meet-and-greet sessions, shadowing days, and mock interview workshops. Some of these experiences could be provided virtually due to the distance mentoring nature of the program.

Table. Premedical Student Mid-Year Survey Responses, N=11

Program Goal	No Improvement n (%)	Minimal Improvement n (%)	Moderate Improvement n (%)	Great Improvement n (%)
Knowledge of volunteer opportunities	3 (27.3%)	2 (18.2%)	4 (36.4%)	2 (18.2%)
Understanding of and preparation for medical school	2 (18.2%)	4 (36.4%)	1 (9.1%)	4 (36.4%)
Medical school application process	3 (27.3%)	3 (27.3%)	2 (18.2%)	3 (27.3%)
Knowledge of current national and global health issues	5 (45.5%)	1 (9.1%)	4 (36.4%)	1 (9.1%)
MCAT preparation	3 (27.3 (%)	4 (36.4%)	1 (9.1%)	3 (27.3%)
Resources	**Not Useful n (%)**	**Minimally Useful n (%)**	**Moderately Useful n (%)**	**Very Useful n (%)**
List of volunteer opportunities	4 (36.4%)	2 (18.2%)	3 (27.3%)	2 (18.2%)
Month-by-month checklists	5 (45.5%)	1 (9.1%)	1 (9.1%)	4 (36.4%)

Abbreviation: MCAT, Medical College Admission Test.

To more rigorously evaluate the program, carefully created pre/post surveys could be implemented for new participants. These surveys could include items such as confidence scales for mentor and mentee, as well as objective, knowledge-based questions pertaining to the medical school application process for undergraduate students and questions pertaining to global health for both undergraduates and medical students. Surveys could be identified using a numerical system to maintain anonymity but ensure that pre/post participation answers could be compared and reasons for poor response rates could be investigated. The timeline for program participation also could be tracked through the survey. Pre/post survey answer comparisons could be further correlated with mentor/mentee characteristics, mode of mentor/mentee communication, number of interactions/mentor involvement, and duration of participation. Long-term studies could measure behavior change and impact on high stakes outcomes. For example, behavior change could be measured by medical student self-report of later involvement in mentorship programs or receipt of mentor awards. Impact could be measured by comparing undergraduate student PMPU program participant acceptance into medical school versus nonparticipants.

Limitations

Given this was a pilot study, there are multiple limitations that provide ideas for future research. First, this study was restricted to a single mentorship program. Thus, data collected cannot yet be generalized to peer mentorship programs involving other institutions. Small sample size limits statistical power and the interpretation of analytical results. Due to the nature of the pilot program, the sample size was small at the program's initiation (n = 43 undergraduates, n = 26 medical students). Even fewer participants completed mid-year surveys (n = 11 undergraduates, n = 13 medical students). It is unknown whether the remaining students dropped out of the program or continued but declined to complete the mid-year survey. That information would be helpful to determine the usefulness and success of the pilot program. The study did not collect follow-up data to learn if undergraduates were accepted into medical school or medical students became successful mentors in residency. Finally, this study did not account for all potential confounding variables; thus, it cannot be concluded that the program alone influenced premedical student understanding and preparedness for medical school or medical student feeling of success as a mentor.

Program Update

PMPU was continued at MCW during the 2017-2018 academic year. Already-established peer mentorship pairs were encouraged to remain in contact. The medical student founders and the undergraduate campus representatives passed their responsibilities to new student leaders. The program expanded to include additional undergraduate campuses, based on the new leaders' pre-existing relationships at undergraduate institutions. All prior leaders were available by email, phone, or in person to facilitate a smooth transition.

CONCLUSION

The many lessons learned through this pilot study could be used to improve the resources of the distance mentoring program PMPU, promote its long-term sustainability, and lead to future more rigorous studies to better determine its objective effect. While this study showed some promising self-reported improvement in confidence of undergraduate premedical student abilities and medical student mentor abilities, it has the potential to make an impact

on undergraduate students as they navigate the process of medical school admission and medical students as they develop mentorship skills that can be used throughout their careers.

Acknowledgements: The authors thank the Medical College of Wisconsin Admissions Office for their valuable input in starting this program, MCW Communications Specialist Jennifer Brooks for website and email design and maintenance, and the undergraduate campus representatives for their assistance with implementing the peer mentorship program.

Funding/Support: None declared.

Financial Disclosures: None declared.

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