

Improving the Adjustment of Educationally Disadvantaged Students to Medical School:

The Summer Enrichment Program

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Abstract

The Summer Enrichment Program (SEP) is a 6-week pre-matriculation program that targets students who may be at an educational disadvantage and/or may have difficulties adjusting to the rigors of medical school. The objective of the current study was to determine whether the SEP (a) eased the transition to the first year of medical school and (b) had an impact on academic performance during the first year of medical school. All students from groups underrepresented in medicine, who had been invited to participate in the SEP, and all Humanities and Medicine Program students who matriculated at Mount Sinai School of Medicine between 1999 and 2003 and were still matriculated during the 2003–2004 academic year were asked to respond to a survey distributed in the spring of 2004. In addition, student academic profiles were reviewed. Responses to the survey indicated that the SEP provided important emotional benefits for those students who chose to attend the program. Virtually all students who had attended had praise for the program and felt that it eased the transition to medical school, helped build confidence and facilitated social connections. In addition, those students from groups underrepresented in medicine who attended the SEP had less academic difficulty (fewer course failures) in their first year of medical school.

Key Words: Underrepresented students, educationally disadvantaged, pre-matriculation program, adjustment to medical school, first-year performance.

Background

OVER THE PAST QUARTER CENTURY, several medical schools have developed specialized pre-matriculation programs to improve the academic success of accepted minority students (1–4). In 1970, Mount Sinai School of Medicine (MSSM) developed a novel pre-matriculation Summer Enrichment Program (SEP) for students who are educationally disadvantaged and may have difficulty adjusting to the rigors of medical school. Although originally established for students from groups underrepresented in medicine (URM), the SEP now targets other students who may be at an educational disadvantage in their first year of medical school. In fact, in recent years a large percentage of students attending the SEP have been admitted to the medical school through a special early acceptance program—the Humanities and Medicine (H&M) Program—designed to attract non-

science majors to a career in medicine (5). H&M students have participated since 1991.

The SEP focuses on four first-year courses: molecules and cells (an integrated biochemistry, cell biology, and molecular biology course), gross anatomy, histology and physiology. The program does not have formal examinations and does not grade students' performance; however, students take weekly self-graded tests so that they can assess their academic progress. Because attending this summer program may be a financial burden for students who might otherwise seek employment, free housing and a stipend are provided. Participation is totally voluntary.

In the mornings, students attend didactic sessions on topics in biochemistry, taught by a senior faculty member. In the afternoons, they participate in laboratory sessions run by medical school teaching assistants who have already completed the first year curriculum. The laboratory component includes histology, physiology, and gross dissection of the back, thorax, abdomen, and pelvis. These sessions devote the largest blocks of time to first-semester courses (gross anatomy and molecules and cells, and gross anatomy), and a smaller amount of time to second-semester courses (histology and physiology).

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The purpose of the current study is (a) to determine whether those students participating in the SEP perform better academically in the first year of medical school or have an easier time adjusting to medical school than those who do not participate and (b) to assess the success of the program based on the results of a survey administered to students who have completed the SEP. Both quantitative and qualitative assessments will be presented.

Methods

All URM and H&M students enrolled in MSSM during the 2003–2004 academic year were included in this review. These students were divided into four groups: URM students who had attended the SEP program (n=17), URM students who had not attended the SEP program (n=25), H&M students who had attended the SEP program (n=40), and H&M students who had not attended the SEP program (n=16).

Survey Instrument

In the fall of 2003, a survey instrument was developed by the authors and reviewed by other members of the Institute for Medical Education both informally and as part of research presentation. Using this feedback, the final version was distributed in the spring of 2004. It evaluated: (a) the factors that led students to participate or not participate, (b) subjective factors relating to the transition into medical school, (c) overall ratings of the program and student perceptions of its success, and (d) the academic benefits the program had provided in terms of the four first-year courses discussed above. Finally, students were encouraged to provide written feedback on the program, commenting on their reasons for attending or not attending. Students who attended were also asked to comment on the strengths and weaknesses of the program.

The survey, which was distributed to students via email, used E*value, a web-based survey tool developed by Advanced Informatics (Minneapolis, MN). In the week before the program went on line, students received correspondence explaining the re-

search project. At this time, students were informed that participation was completely voluntary and that all answers would be anonymous. Students were given one month to complete the survey, and all answers were transferred to SPSS v12.0 (Chicago, IL) for data management and analysis.

Measures of Academic Performance

The students' academic files were accessed to determine their undergraduate grade-point averages (GPAs) and Medical College Admission Test (MCAT) scores, and to identify any academic difficulty they had during the first year of medical school, measured by failure rate in four first-year courses (molecules and cells, gross anatomy, histology and physiology). Mean undergraduate GPA and MCAT scores were compared using the t-test.

Results

A total of 92 students were surveyed. Students in all four years of the medical school were represented. Overall, 85.9% of students responded to the survey, with the response rate of the four groups nearly identical (Table 1).

Survey

Attendance Factors. For both URM and H&M students the reason most often cited as "very important" for attending the program (Table 2) was that students believed that attending the SEP would better prepare them for their upcoming medical school courses. The second most important attendance factor reported was that students hoped the program would help them develop confidence. Only a few students said they attended because they had no other summer plans.

Among students who did not attend the SEP, the reasons most often cited as "very important" were that they already had other plans and the fact that they felt confident about being able to make the transition to medical school.

TABLE 1
Comparison of Student Response Rate to Survey

	URM		H&M	
	Attendees	Non-attendees	Attendees	Non-attendees
Total number of students	15	23	39	15
Number of survey responses	14	18	33	14
Survey response rate	93.3%	78.3%	84.6%	93.3%

TABLE 2

Factors Influencing Students' Decision to Attend the SEP: Percent of Students Responding "Very Important" to the Survey Question "How Important Were the Following Factors in Your Decision to Attend the SEP?"

	URM (n=14)	H&M (n=33)
Thought it would help with coursework	71.4%	81.8%
Would give me confidence to handle transition to medical school	57.1%	75.8%
Stipend helped with expenses	57.1%	48.5%
Would allow me to settle in Aron Hall [dormitory] before med school started	42.9%	51.5%
Would enable me to make friends before med school started	21.4%	27.3%
Had nothing else to do	7.1%	6.1%

Number in parentheses is total number of responses analyzed.

Academic Preparation. In terms of academic preparation, students reported that the SEP program best prepared them for first semester courses (Figure). Approximately half of all participants reported that the SEP helped significantly with gross anatomy and molecules and cells, while between 38.3% and 48.9% reported that the SEP program was somewhat helpful in terms of preparing for these courses. A smaller number of students found that the SEP program helped significantly with coursework in the second semester (histology and physiology), while approximately half of respondents reported that the SEP helped somewhat with these courses.

Overall Rating. Of note is the fact that respondents overwhelmingly agreed that attendance in the SEP greatly improved their adjustment to medical school (Table 3). Virtually all students

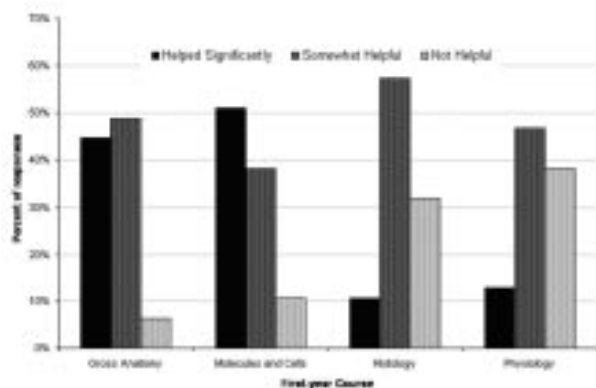


Figure Student Perceptions of Academic Benefit of SEP by Course. Responses to the question "Did attendance in the SEP help you with the following courses?" were analyzed for all students who attended the SEP (both URM and H&M).

TABLE 3

Factors Helping Transition to Medical School: Percent of Students Responding "Agree Strongly" or "Agree Somewhat" to One or More of the Factors Listed in the Survey Statement, "The SEP Helped My Transition into Medical School in the Following Ways."

	URM (n=14)	H&M (n=33)
Thought it would help with coursework	71.4%	81.8%
Gaining the needed confidence	85.7%	97.0%
Made the overall transition easier	100%	97.0%
Making friends	100%	93.9%

Number in parentheses is total number of responses analyzed.

who participated in the SEP reported that the program (a) eased their transition to medical school, (b) helped them build confidence, and (c) helped them establish friendships.

Both the written responses and the survey responses indicated that students had a very positive overall experience. Specifically, 85.7% of URM attendees and 87.8% of H&M attendees reported that their expectations of the program were either fully met or mostly met. All URM attendees and 93.9% of H&M attendees felt that they made the right decision by attending. In a similar vein, approximately nine out of ten attendees said they would recommend or highly recommend the program to other students.

Written Feedback

The written feedback was strongly positive, in terms of the major features of the program and why students chose to attend. Virtually all students had praise for the program. Students frequently remarked that the program was a significant confidence booster and improved their adjustment to medical school. In the words of one H&M attendee: "I felt much more confident and enthusiastic about going to medical school. I was able to make the shift in my studying from a humanities mindset to a more scientific mindset.... [The course director] really helped to calm my fears and remind me why I wanted to go to medical school in the first place." Many students also mentioned that the program helped prepare them academically for the challenges of medical school. One URM attendee wrote: "SEP helped me to gain a realistic expectation of what the first year of medical school had in store." Another URM student stated that the SEP was a "great opportunity to get pointers on what materials to use and how to approach the coursework."

Several students thought the real benefit of the program was not so much in providing academic preparation as it was in helping them “emotionally and psychologically feel ready for the experience [of medical school].” Similarly, a number of students described the advantages in forming early friendships for their socialization into medical school. It is also worth noting that even though the course director’s name was not mentioned in the survey instrument, twelve attendees specifically mentioned his teaching and mentorship as one of the key benefits of the program. One H&M attendee wrote that the course director was the “key to the SEP program. He not only made it educational but also made sure that every student was well-adjusted to our new environment.”

Very few negative or critical comments were returned. Three students suggested that some sort of formal academic enrichment program be offered during the pre-clinical years, and perhaps even between the first and second years, as well. Several non-attendees mentioned the fact that they wanted to take advantage of their last “free” summer before medical school began and also to avoid burnout. This sentiment was well summed up by one non-attendee, who wrote with a certain economy: “1st year is long enough.”

First-Year Academic Performance

Among the Humanities and Medicine students, only one student had academic difficulty in year 1, as determined by failure in one or more of the four courses introduced during the SEP (gross anatomy, molecules and cells, histology, physiology). This student had attended the SEP. Because of the small sample number, we could not derive any significant correlation between the failure rate and attendance in the SEP for the H&M students. And the undergraduate GPA of H&M students who chose to attend the SEP did not differ significantly ($p > 0.5$) from the undergraduate GPA of H&M students who chose not to attend the SEP.

Among the URM students, 2 out of 15 (13.3%) students who attended the SEP had course failures in one or more of the four first-year courses mentioned above, while 6 out of 23 (26.1%) students who did not attend the SEP had failures in these courses. While these are striking results, the numbers are too small to allow meaningful statistical analysis by the chi-square method. And the mean undergraduate GPAs and MCAT scores of URM students who chose to attend the SEP (3.11 ± 0.24 ; 27.7 ± 2.2) were not significantly different ($p > 0.1$ for GPA; $p > 0.2$ for MCAT) from the scores of those who chose not to attend the SEP ($3.25 \pm$

0.24 ; 27.1 ± 2.0). Thus, failure in first-year courses among these students is unlikely to be correlated with difference in undergraduate GPA or MCAT scores, but may be correlated with attendance in the SEP. Future analyses will have to use a larger sample number to verify this conclusion.

The academic performance of a third group of URM students, those who were not deemed educationally disadvantaged and therefore were not invited to attend the SEP or who were accepted late in the admissions process and therefore were could not attend the SEP, was also analyzed. It is interesting to note that among these students, all of whom were in the late acceptance category, 3 out of 32 (9.4%) had course failures in their first year.

Discussion

Improving the academic success of educationally disadvantaged students is an important challenge that medical schools must address. One method beginning to gain popularity employs pre-matriculation programs, such as the one described in this study. According to a table published in *Academic Medicine*, 67 of 127 medical schools offer such a program (3). However, little research has been published on the topic, and considering the significant differences in these programs and in medical school curricula in general, it is essential that individual programs be evaluated for the impact they have on participants’ academic success.

This study shows that for URM students, the failure rate in one of the four major first-year courses was twice as high for those students not attending the SEP as for those attending the SEP. Attending the SEP thus not only helped these students adjust to their first year of medical school, as judged from the survey responses, but it also led to better academic performance in the first year.

The main limitations of the study were the small size of the study population (convenience sample) and the subjective nature of the survey, even though that is an appropriate method for assessing the impact of the program.

Despite some of the shortcomings that limited the present study, the results obtained appear consistent with previously reported studies, which demonstrated the positive effect such programs have on the first-year academic performance of educationally disadvantaged students. For example, a study published by Ugbole and colleagues documented a 6-week pre-matriculation program at Boston University School of Medicine (1). Much like the SEP, the Boston University program was voluntary and focused on biochemistry and gross anatomy. Participants in this program had lower

failure rates in several first-year courses, and survey results indicated that students had a positive experience with the program. Similar findings were reported for the first year of a new pre-matriculation program at the University of South Florida College of Medicine (4). A study from the Medical College of Georgia examined a pre-matriculation program at that campus designed to provide early academic support to academically disadvantaged students (2). Although the program at the Medical College of Georgia was not able to document any statistically significant difference between the academic performance of attendees and that of non-attendees, more than 90% of attendees reported that the program played an important role in their adjustment to medical school.

Based on the findings of the current study and previous research, it seems that pre-matriculation programs play an important role in improving the academic success of certain educationally disadvantaged students. At Mount Sinai, attendance factors demonstrated that it is the academic component of SEP that attracts participants, but that the benefits extend beyond this realm. Specifically, data from this project indicate that students perceived the program as having a very positive impact on their overall transition to medical school. Key reasons for the SEP's success appear to be (a) the academic preparation it provides for specific courses, (b) the confidence and study skills that it helps the attendees develop, and (c) the important early peer and faculty relationships it cultivates.

Another notable finding from the current study is that first-year course failures among URM students not invited to attend the SEP were limited to those students who were accepted late in the admissions cycle and therefore did not have an opportunity to attend the SEP. It may therefore be worth-

while to consider targeting the admission of educationally disadvantaged students to an earlier point in the admissions cycle. Based on student feedback, it may also be worth considering some type of formal enrichment experience during the school year to complement the materials and study skills introduced over the summer. This approach may be of benefit to both attendees and non-attendees.

Indeed, it is a testament to the success of the SEP that it has been able to achieve its goals while remaining totally voluntary, encompassing a broad range of students from different backgrounds, and allowing participants to monitor their own progress in a non-threatening, grade-free environment. Because producing the SEP requires significant resources and faculty teaching time, maintaining the program is a challenge to the institution. However, considering the positive impact that programs such as the SEP have consistently demonstrated, it is imperative that medical schools continue to invest in this type of initiative, which empowers students to succeed.

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