



Mobilizing Physician Assistants: Educational and Professional Outreach to Underserved Urban Communities

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There remains a dramatic underrepresentation of disadvantaged students entering physician assistant (PA) programs. To remediate this issue, healthcare professional schools have developed outreach programs to increase interest and enrollment of underrepresented minority (URM) students. There is limited research on the effectiveness of such programs in the PA education setting. We designed a program intended to stimulate URM high school students' interest in the PA profession and measure their knowledge and interest in applying to a PA program. In this pilot study, using a mixed-methods approach, we found the program increased knowledge about PA profession and education and interest in applying to PA school. However, quantitative results were not statistically significant. Findings suggest further research is needed to determine impact of outreach programs on PA schools. *J Allied Health* 2022; 51(3):e71–e75.

UNDERREPRESENTED MINORITY (URM) communities face challenges accessing healthcare due to shortages of physicians and healthcare workers,⁽¹⁾ which has been linked to a lack of diversity in medical professions in the United States (US).⁽²⁾ In the next four decades, underrepresented minorities are estimated to become a majority of the population, which may leave even more people without access to health care.⁽³⁾ While the population of URMs continues to grow, there remains a dramatic shortage of URM and socioeconomically disadvantaged persons entering healthcare professions.⁽⁴⁾

Several efforts have been launched to improve access to healthcare, both generally and specifically for underrepresented communities. The physician assistant (PA)

profession was developed to meet the gap in the health workforce with a focus on providing care in rural and medically underserved areas (MUAs).⁽⁵⁾ Additionally, pipeline programs have been developed to support underrepresented precollege students to prepare for pursuing a career in the health care field.^(6–9) These programs were designed to increase URM students' access to health professional schools through better academic preparation, financial, academic counseling, and social support.⁽¹⁰⁾ Studies have documented that students from underserved backgrounds show greater interest in serving underrepresented communities, suggesting that pipeline programs targeted toward URM students may be especially effective at increasing access to medical care for URM communities.^(7,11) Given these, pipeline programs aimed at bringing more people from URM backgrounds into the PA profession may increase healthcare access for URM communities.

Some outreach pipeline interventions in medicine and dentistry have been successful in increasing the URM students' enrollment.⁽¹¹⁾ Drawing on past literature, we developed a pilot precollege outreach program titled “*Mobilizing Physician Assistants: Educational and Professional Outreach to Underserved Urban Communities*” (MPA), exposing underrepresented high school students to topics and skills related to the PA profession. Although there are studies about precollege outreach programs in other healthcare professions, there is limited research on them in the PA field.

This pilot study aimed to address the following research question: *Does a PA outreach educational program of underrepresented high school students in an urban community increase their knowledge and interest in a career as a PA?*

Methods

Program Design

The present study evaluates the MPA program, which recruited underrepresented high school (HS) students in grades 10–12 from an urban high school in New Jersey for one academic year (2019–2020). A solicitation letter was sent to the school district's superintendent to recruit schools. A presentation for interested students was offered in the fall of 2019. Eligible candidates were

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TABLE 1. Pre-Program Survey Characteristics of High School Students Participating in the Mobilizing PA Program

Characteristics	No. of Students	%
Gender		
Male	6	25
Female	18	75
HS grade level		
10	7	29
11	11	46
12	6	25
Ethnicity		
Asian or Pacific Islanders	8	33
Black or African Americans	1	4
Caucasian (non-Hispanic)	4	17
Hispanic or Latino/a	11	46
Prior participation in the program (2019)		
Yes	11	46
No	13	54

selected if they expressed interest in health-care and self-identified as URMs* or economically/educationally disadvantaged. Twenty-five high school (HS) students were accepted into the program, and 24 HS students eventually enrolled, 11 of whom had participated in a similar program the previous year (2018–2019).

The program consisted of five meeting sessions throughout the 2019–2020 academic year. Each session consisted of hands-on clinical skills in small groups, developing a group poster presentation on a medical topic prevalent in their community, and professional development workshops. Additionally, PA students from a PA program were invited to volunteer as peer mentors in this MPA program. The clinical skills were taught by PA student mentors and focused on clinical practice, such as measuring blood pressure, applying ACE bandages, learning surgical knot-tying, and performing an eye and ear exam. Additional activities in each session included: an overview of the PA profession, academic requirements to become a PA, a presentation on academic and financial resources to assist students in attending a university, and a small group discussion by PA student mentors on their academic and clinical experiences. At the final session, HS students were provided a Certificate of Completion as a representation of their practical knowledge gained and as a resume-builder for both college applications and professional opportunities. The project was awarded grant funding by the nccPA (National Commission on Certification of Physician Assistants) Health Foundation *Be the Change Grant* in 2018. This study was declared exempt from formal ethical review by the Institutional Review Board at Seton Hall University. As the participants were minors, parental consent was obtained.

* URM high school students were identified as Black or African American, Asian or Pacific Islander, and Hispanic or Latinx.

Survey Instrument

We used pre-and post-survey instruments to capture participants' experiences and knowledge about the PA profession and to evaluate the program's effectiveness. The survey included items on: demographics (current school grade, gender, and race/ethnicity), interest in healthcare professions (Likert scale 1–5, 1—not at all interested to 5—extremely interested), and intent to apply to PA school (Likert scale 1–5, 1 = not at all interested to 5 = extremely interested). The surveys also included open-ended questions for feedback and knowledge gained. Instruments were piloted the year before (2018–2019) with a similar group of participants to check for content validity. The pre-program survey was administered on paper in person before the start of the first session. The post-program survey was conducted electronically a few weeks after the last (fifth) session. The surveys were anonymous and confidential.

Data Analysis

This study used a mixed-methods approach that draws on quantitative and qualitative data collected from student surveys. Quantitative analyses examined changes in students' interest in applying to PA school using a simple *t*-test using STATA 16 statistical software. Qualitative analyses examined student responses to the open-ended survey question, “*What did you learn from this program?*” The responses were guided by specific questions on the open-ended survey. Qualitative data were analyzed using a deductive coding scheme in Dedoose software in which words and themes from each student's response that most appropriately aligned with the research question were highlighted. Categories were developed to group repetitive words and themes, such as “knowledge of PA role” and “PA clinical skills” for each response. Each student response was reread, and codes were reapplied that aligned with previous responses. This process was repeated until all data was coded.

Results

Demographic characteristics of HS students who participated in the MPA program are shown in Table 1. HS student surveys were anonymous, meaning that responses to pre-and post-surveys could not be linked. Therefore in analyses, we treat responses as independent. The pre-program survey response rate was 100%, and the post-program survey response was 79%. Of the participating HS students, 75% identified as females, 46% were 11th graders, 46% identified as Hispanic or Latinx, and 54% were new to the MPA program.

Furthermore, to evaluate whether the MPA program increased participating HS students' knowledge of, and interest in, the PA profession, we draw on Kolb's experi-

TABLE 2. *t*-Test Results Comparing Pre- and Post-program of HS Students' Interest in Applying to PA School

	No.	Mean	SD	SE	Significance
Completed the pre-program survey	24	4.1	0.85	0.17	$p < 0.05$
Completed the post-program survey	19	3.5	1.12	0.25	$p < 0.05$

Note: No. = HS students who completed the survey. Students interested to apply to a PA school ranges from 1 (not interested) to 5 (extremely interested).

ential learning theory (ELT).⁽¹²⁾ Kolb's ELT posits that experiential learning operates through four stages: active learning through concrete experiences, reflective observation, abstract conceptualization, and active experimentation.⁽¹²⁾ Kolb defines concrete experiences as a new encountered experience or a reinterpretation of an existing experience, while reflective observation of a new experience explores unveiling inconsistencies between involvement and gained knowledge from an activity.⁽¹²⁾ Abstract conceptualization is the participant learning from their experience and active experimentation where the student applies an idea to their environment.⁽¹²⁾ Two themes, concrete experiences, and abstract conceptualization, align with the structure of the MPA program by emphasizing hands-on and practical experiences related to the PA profession. This framework has been used to understand learning experiences in other healthcare fields. For example, Fewster-Thuente drew on Kolb's ELT in a mixed-methods empirical qualitative study and found that students from eight professional healthcare programs, including medicine, pharmacy, and PA, learned in stages and learned most when working with each other.⁽¹³⁾

Data Analysis

Our qualitative data suggest that students learned through concrete experiences by interacting with PAs and PA students while practicing clinical skills performed on the job. For instance, one student reflected on the program, saying, "I learned what it meant to be a PA. I also got a look into the life of a PA and some of the skills required to get the job done. . . ." Across responses, the most prevalent themes were "Knowledge of PA role," which was evident in 16 out of 17 student responses, and "PA clinical skills," which was present in 10 out of 17 student responses. The most frequently noted clinical skills learned were "measuring blood pressure" and "surgical knot tying." Reflecting on what they learned, one student stated, "I learned many things including how to measure blood pressure using a stethoscope, surgical knot tying, and many more. . . ." These examples show the importance of the experiential component of the MPA program. Moreover, findings revealed that students' integrated their experience with their knowledge of the healthcare professions at large. 85.7% of high school students were able to identify the role of the PA on a multiple-choice question after completing the program compared with 63% in the pre-surveys (e.g., PA

is a licensed medical provider who evaluates patients on his/her own in collaboration with a doctor and prescribes medications).

In incorporating Kolb's ELT into the MPA program, we noted that students conceptualized their learning experience in two ways: 1) by linking involvement in the MPA program to their career aspirations, and 2) by developing their understanding of the PA profession.⁽¹²⁾ Speaking to how their experience informed their future plans, one student reported:

"This program taught me a lot about being a Physician Assistant. Before this program, all I knew about physician assistants is my pediatrician has one, but now I know PAs play a significant role in healthcare professions, and if I decide I want to go in the medical field, I will most likely go to [university] for their 6 year PA program."

Additionally, to examine whether this learning was associated with increased interest in becoming a PA, we conducted a *t*-test comparing the pre-and post-survey responses to the question of whether a student was interested in a career as a PA. Table 2 shows that, contrary to the aim of the MPA program, students' interest in applying to a PA program was slightly higher before the program ($M=4.1$, where 4=moderately interested) than after ($M=3.5$, 3=very interested) and that this decrease is statistically significant ($p=0.036$). We supplemented the above analysis using a multiple regression model shown in Appendix A, which is consistent with those presented here.

Overall, student responses indicated that participants gained knowledge of the PA profession through concrete experiences and opportunities for abstract conceptualization offered by the MPA program; but these experiences did not significantly increase their interest in becoming a PA. Although, they still expressed to be "very to moderately interested" in applying to a PA program in the future.

Discussion

In this pilot study, we found an increase in HS students' knowledge about the PA profession. Overall, we interpret these quantitative and qualitative results as suggesting that participants gained knowledge of the PA profession, but after learning more about PAs' requirements and work, some students became less interested in a career as a PA. These findings aligned with Kolb's ELT, with two dominant themes: abstract

conceptualization and concrete experiences. Abstract conceptualization is evident in our qualitative data, which shows that they gained experience about the PA career through participation in the MPA program. However, more data is needed to understand specific aspects of the program that increased or decreased participants' interest in becoming a PA. Thus, introducing more opportunities for students to engage in reflective experiences of their time in the program may provide a chance for students to engage in more abstract conceptualization, which would also present opportunities to collect data on 'students' evolving understanding of the work of PAs and their thoughts on pursuing this line of work. The qualitative results demonstrated students' enhanced knowledge of the PA role. This may stem from concrete experiences and interactions with PA students and having opportunities to practice some of the clinical skills used by PAs. Future research could help unpack how this learning occurs.

Additionally, the quantitative results showed that although students' interest in applying to a PA program slightly decreased over time, they still reported being, on average, "very interested" in applying to a PA program. It is unclear why we observed this decrease in interest in the current MPA program, though several factors may be relevant. It may be that students who participated in the program had relatively little understanding of the work performed by PAs, allowing their initial interest to be shaped by other factors. Since our qualitative results show that students learned about the profession, some students may have realized that it differs from their preconceptions, and so expressed reduced interest. Including formative assessments in future iterations of the MPA program could help to test this hypothesis. Alternatively, it may be that students' expressed interest in becoming a PA was influenced by the COVID-19 pandemic and its coverage in the media, which was widespread by the time that our post-survey was administered and may have led students to perceive the PA profession as riskier due to stories of healthcare workers becoming infected by the virus.

These findings suggest that pipeline programs aiming to increase the number of healthcare providers from underrepresented backgrounds can give participants important information about the profession and the requirements but may need to operate at a larger scale to increase the number of students looking to enter it. Although the MPA program aligns with the two stages of Kolb's ELT, abstract conceptualization and concrete experiences, the other stages were not explored. We suggest that future work include reflective observation exercises, active experimentation sessions, and data collection representing all themes to better support and understand students' learning.

Limitations

Our study had several important limitations. One was that our sample of 24 HS students limited the generalizability of our findings. Participants in the program were not representative of the overall student population or the population of underrepresented students. The majority of the participants in the study were females and 11-grade HS students. Only one participant self-identified as Black or African American.

Furthermore, we could not examine within-student changes over time because the participants could not be matched with their pre-and post-program surveys. Importantly, the end of this program coincided with the earliest stages of the COVID-19 pandemic. This forced the last session with students to switch to a virtual modality, which qualitatively changed students' experiences that may have in turn impacted their perceptions of the program. Additionally, the emphasis on healthcare professionals in the popular media during this time could have impacted students' interest in health care fields independent of the MPA program, potentially by decreasing/increasing students' interest in the PA field or in healthcare professions generally. Relatedly, we observed attrition in survey participation from the pre- to the post-program survey, from 100% to 79%. This could bias our results if the students who opted not to participate in the post-program survey had greater or lower than average interest in applying to PA school. Here, too, our data preclude us from investigating these possibilities, though we argue that future research could illuminate how various programs that focus on PA career may stimulate interest in related fields or professions.

Conclusions

Our findings suggest that pipeline programs can help students learn about the PA profession, but further research is needed to examine how they shape participants' career aspirations. Additional research could help to address this by more regularly collecting data on students' experiences and beliefs about the program and their long-term goals. Additionally, a multi-institutional PA school precollege outreach program with various HS districts throughout the US would provide a larger and more representative sample with statistical power and may allow researchers to examine the relationships that different program characteristics have with outcomes.

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APPENDIX A. Multiple Regression Model

We supplemented the *t*-test analysis using multiple regression, which uses as the outcome variable the student’s response to the item that asked about their interest in applying to PA school, with the independent variables being demographics (gender, ethnicity, HS grade level), prior participation to the MPA program, and a variable indicating whether the response came from a pre- or post-program survey. Here, our independent variable of interest is Post, the pre-post indicator, which represents the average change in students’ interest in applying to PA school after participating in the program, controlling for covariates (Table 3).

Results of this model illustrate that 12-grade HS students report an interest in PA school that is 0.41 points higher (on a 5-point Likert scale) than the 10-grade HS students and that the average response of 11-grade HS students is 0.52 lower than the 10-grade HS students. However, neither difference is statistically significant at the $p < 0.05$ level. Furthermore, the interest in PA school for URM (Black or African American/Hispanic or Latino HS students’ responses were 0.23 points lower than White HS stu-

dents. Here, too, none of these differences were statistically significant. Additionally, female students showed greater interest in applying to PA school (0.54) than males, which also were not statistically significant. Students who participated in the MPA program the previous year expressed greater interest in a PA school program by 1.04 scale points (that was significant at the $p=0.05$ level) compared to new students in the program. However, our coefficient of interest, whether the response was before or after the program, is both negative and significant, showing that, on average, students’ interest in applying to a PA program was 1.04 scale points lower at the end of the program. Moreover, the findings indicate that 28% of the interest to apply to PA school is explained by this model ($R^2 = 0.28, p=0.05$).

Our MPA study found an increase in the knowledge of HS students about the PA profession. Additionally, female HS students and students with prior participation in the program were more interested in applying to PA school compared to white and male HS students. The lack of statistical significance for this finding may be due to our small sample, which could be addressed in future research.

TABLE 3. Regression Analysis Summary Model of Pre- and Post-Program for High School Student for the Outreach Program

	Beta (coef.)	SE	Significance
Pre/Post	-0.66	0.28	$p < 0.05$
Prior participation	0.95	0.38	$p < 0.05$
Ethnicity (Caucasian or White=0)			
Asian or Pacific Islanders	-0.59	0.51	
Black or African Americans/Hispanic or Latino	-0.23	0.51	
Gender (male=0, female=1)	0.54	0.36	
HS grade level (10=0, 11=1, 12=2)			
11	-0.52	0.42	
12	0.41	0.45	

Note: No. = high school students who completed the survey. Adjusted R^2 square = 0.28, $F = 3.39$ ($p < 0.05$).