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Healthcare Experience Impact on First-year Physician Assistant Students' Communication Self-efficacy

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Abstract

Purpose: Healthcare experience (HCE) is required by most physician assistant (PA) programs for application, but it is not known what role HCE might play in the success of PA students. Communication skills are an important trait for a successful clinician, and previous HCE might lead to an improved ability to communicate with patients. This study examined the relationship between PA students' healthcare experience (HCE) and their communication self-efficacy (SE). **Methods:** First-year PA students from Michigan PA programs were eligible to participate in an anonymous electronic survey. A previously validated survey to assess communication SE was used. HCE was assigned into 3 broad categories based on required training/education. Communication SE scores were compared for each program. Correlation between communication SE and HCE type and hours were analyzed.

Results: There was a 44% response rate (N=117). The most reported type of HCE was medical assistant (23.9%) and nursing assistant (31.6%). There was no difference in communication SE scores between PA schools (p=0.394). There was no correlation between communication SE and total HCE hours (p=0.367), type of training/education for HCE job (p=0.577), and the number of weeks of training/education (p=0.384). **Conclusion:** There was no correlation between the type of HCE and communication SE in first-year PA students. It is possible varying types or amounts of HCE could result in greater preparedness for PA school by improving traits outside of communication ability.

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ABSTRACT
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Keywords: physician assistant, healthcare, survey

INTRODUCTION

As the PA profession has grown in popularity in the Unites States, there has been a 484% increase in the number of applicants to PA programs between 2002 and 2019.[1] This increase has placed additional pressure on PA programs to ensure the most qualified applicants are selected for matriculation. Grade point average (GPA), graduate record exam (GRE) score, type of healthcare experience (HCE), and the number of HCE hours are among the factors which influence a PA program's decision to matriculate a student.[2, 3]

HCE is required by most PA programs for application,[4] and includes a broad category of experiences, including direct patient contact experience, healthcare shadowing, community service, and research experience.[2, 5] In 2017, most PA school matriculants obtained their HCE in jobs requiring either limited formal training or certificate level education, such as medical assistant, certified nursing assistant (CNA), medical scribe, or home health aide.[2] Other pre-PA healthcare jobs such as registered nurse, paramedic, and athletic trainer are less common but traditionally require more education and training. The average matriculating PA student in 2019 had a median of 2,634 HCE hours,[2] but some Michigan PA programs will accept students with as little as 500 hours.

It is not known what role HCE might play in the success of a PA student. Most studies that examined the role of HCE looked at cognitive outcomes, such as PA school GPAs,[5,6] clinical year outcomes,[3,7] and the Physician Assistant National Certifying Examination (PANCE) scores.[5,8] No correlation has been shown between HCE and these standardized, cognitive outcomes of student success. This poor evidence linking HCE with positive student outcomes extends into other medical specialties, including medicine and physical therapy.[9,10] It becomes important, therefore, to consider the role of HCE in non-cognitive attributes of PA student success, such as professionalism, teamwork, and oral communication. However, these non-standardized, non-cognitive traits are difficult to measure.[11,12] Studies have shown communication skills are a major factor in patient outcomes and patient satisfaction[13,14] and should be considered a core competency for good patient care.[15] It is imperative to understand what factors may impact communication skills in PA students; it might be previous high-quality HCE has an impact on this non-cognitive trait.

Self-efficacy (SE) is the personal belief an individual is capable of performing the behaviors required to accomplish a given task.[16] SE within a certain domain has been shown to correlate with competency within that same domain.[17] It can be presumed communication SE has a similar foundational relationship to communicative ability—an increase in communication SE will have a positive effect on communication abilities. This implies aspects of a student's pre-PA experience which improve communication SE may lead to an improved ability to communicate with patients and improved patient-centered outcomes.[18]

This study aims to assess the impact of HCE on a non-cognitive trait of student success by using communication SE as a proxy for the skill of effective communication. The aims of this study are to 1) identify the type and number of HCE hours obtained by Michigan PA students before starting PA school, 2) identify the average self-reported communication SE of Michigan PA students, and 3) determine correlations between the type of HCE and the number of HCE hours and communication SE.

METHODS

This project received exempt status from the local institutional review board.

Survey Development

A literature search was conducted to find a scale that would serve as a measurement of communication SE. A 15-item Likert scale survey, developed by Michael et al. (2018), was selected for use based on its ability to predict communication attitudes and empathy attitudes.[18] Each item had a possible score ranging from 1 to 5, making the greatest possible score 75 and the lowest possible score 15. Permission to use the Michael et al. (2018) survey was obtained via e-mail (O. Karnieli-Miller, personal communication, November 21, 2019).

A novel measurement tool was developed to capture demographics, type of HCE, number of HCE hours, and communication SE using the 15-item survey previously described. The survey was supplemented with the Physician Assistant Education Association (PAEA) annual student survey.[19] The measurement tool was piloted using Qualtrics software XM (Qualtrics, Provo, UT) among a convenience sample of 30 PA student volunteers to ascertain survey question clarity, relevance, and ease of administration, thus supporting content and face validity. To further assess content validity, face-to-face interviews were conducted with two PA student volunteers by the PI (JT). This was designed to ensure respondents interpreted the questions as intended and identified any wording which may have resulted in bias.[20] The survey was then adapted from the responses. Reliability for the 15-item communication SE survey was assessed using Cronbach's alpha and found to be $\alpha = 0.877$. This meets the criterion of evidence of reliability set at $\alpha > 0.7 - 0.8$ (good).[21] The 15 items had minimal variation if deleted, which ranged from $\alpha = 0.856$ to 0.876. In general, all 15 items appeared to strengthen the overall reliability. These results are similar to the Cronbach alpha results reported by Michael et al. of $\alpha = 0.84$.[18]

The reported type of HCE was assigned into three broad categories based on the training/education the HCE job required: no specific required training, certificate or license, and advanced degrees (which included associate's, bachelor's, master's, and doctorates). If respondents reported having multiple HCE jobs, they were asked to identify which job gave the best experience in communicating with patients and were instructed to use this job to answer questions regarding education/training. Data were collected for the total number of paid HCE hours and the total number of paid hours at the HCE job which provided the best patient communication experience.

Survey Deployment and Recruitment

The Accreditation Review Commission on Education for the Physician Assistant, Inc. (ARC-PA) was used to identify all accredited MI PA programs. All first-year PA students from the six identified PA programs were eligible for enrollment. The total possible sample population was determined by the published ARC-PA approved maximum class size. Program directors from each school were contacted via e-mail and asked to forward an anonymous survey link to their first-year PA students within the first two months of starting PA school. Non-responder programs were contacted on two occasions via email and once by phone. To encourage participation, one $25 Amazon gift was offered as an incentive.

Statistical Analysis

Independent variables were checked for assumptions of normality, linearity, and homoscedasticy. Descriptive and frequency analyses were run for demographic variables. A one-way ANOVA was conducted to determine if differences existed in total communication SE scores for the respondents from the 6 PA programs. Pearson product-moment correlation coefficients were computed to assess the relationship between communication self-efficacy and total HCE hours, total hours of HCE in the job which provided the best communication experience, and number of weeks of training. A Spearman's rho correlation was run between communication self-efficacy and type of training for the HCE job. A Bonferroni approach was used on these comparisons to control for Type I error across the four correlations, which resulted in a p-value of less than 0.0125 (0.05/4 = 0.0125) to achieve significance. Finally, simple linear regressions were calculated to predict communication self-efficacy based on the independent variables of total hours of HCE, total hours of HCE which provided the best communication experience, and the total number of hours required to obtain a certificate/license. An alpha level of 0.05 was selected for all analyses a priori.

Post hoc power analysis was conducted utilizing G*Power Version 3.1.9.7 to test correlation results using alpha 0.05.[22] All data were otherwise analyzed using IBM SPSS Statistics for Windows, version 27.0 (IBM Corp., Armonk, N.Y. USA).

RESULTS

Demographics

Unique responses were obtained from all six Michigan universities which housed a PA program (See figure 1). One hundred seventeen responses were received out of an estimated sample size of 268, resulting in a response rate of 44%. This response rate is considered "adequate" for an online survey.[23] Respondents were 84% female (n=98), 16% male (n=18), with a mean age of 25 (range 19-51). Eighty-eight percent (n=103) were white and 92% (n=108) reported they were not of Hispanic/Latino/Spanish origin. (Table 1).

Table 1: Demographics

Demographic	Current Study, % (95% CI)	PAEA 2019 Student Report[10]
Age (mean)	25.19 (24.4, 26.4)	25.6
Gender		
Female	84.5 (77.6, 90.5)	75
Male	15.5 (9.5, 22.4)	25
Race/Ethnicity		
Not Hispanic	93.1 (87.9, 97.4)	90.9
White	88.8 (82.8, 94)	86.2
Number of HCE hours (mean)	5037 (3622, 6453)	4631
Prior HCE		
Nursing Assistant	31.6 (23.1, 40.2)	30.4
Medical Assistant	23.9 (16.2, 31.6)	26.5

95% CI, 95% confidence interval; HCE, health care experience

Figure 1. PA Schools and their Frequency of Responses
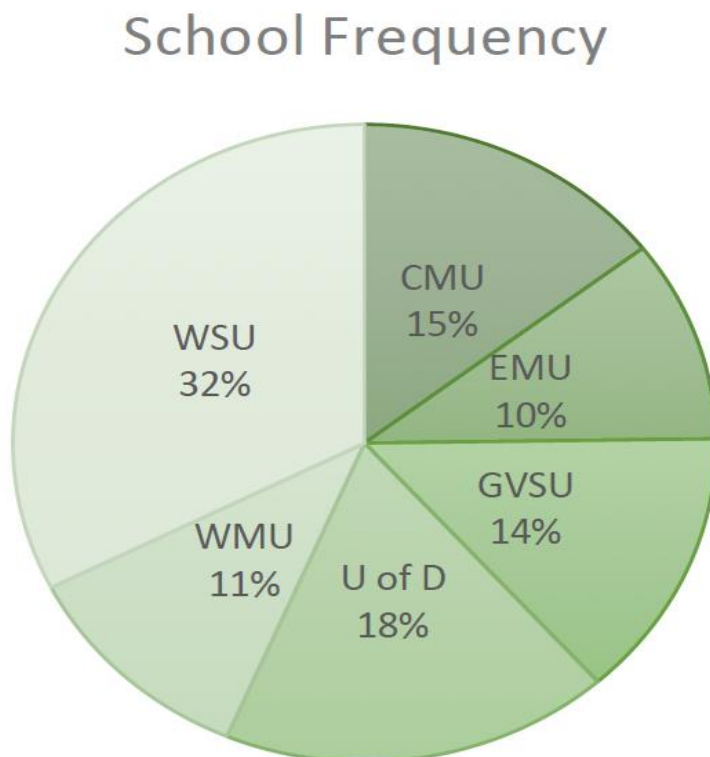
CMU = Central Michigan University; EMU = Eastern Michigan University; GVSU = Grand Valley State University; U of D = University of Detroit Mercy; WMU = Western Michigan University; WSU = Wayne State University

Research Aim 1): Type and Number of HCE Hours
The most reported type of HCE was medical assistant/medical technician (23.9%) and nursing assistant (31.6%.) (Table 1). Half (49.6%; n=58) of respondents reported their HCE job required certificate/license, while 31.6% (n=37) required no training/education and 18.8% (n=22) required an advanced degree. (Table 2). Some job categories, such as medical assistant or CNA, could be classified into multiple categories. For respondents whose HCE job required a certificate/license, the mean number of weeks required to obtain the certificate/license was 18.62 (range 0-150).

Table 2: HCE Job Titles and their Respective Type of Training/Education Required

None (n=37)	Certificate/license after completing a class (n=58)	Advanced degree (Associate's, BS, MS, Ph.D., etc.) (n=22)
MA/Medical technician (n=21)	CNA (n=30)	Dietitian (n=4)
CNA (n=7)	EMT-B (n=8)	Athletic trainer (n=2)
PT technician (n=4)	ER technician (n=8)	MA/medical technician (n=2)
ER technician (n=2)	MA/medical technician (n=5)	Radiology technician (n=2)
Phlebotomist (n=1)	EMT-P (n=3)	Registered nurse (n=2)
Scribe (n=2)	LPN (n=1)	Research coordinator (n=1)
	Military medic/corpsman (n=1)	OT (n=1)
	Scribe (n=1)	PT (n=1)
	Other (n=1)	Respiratory therapist (n=1)
		Stress test technician (n=1)
		Surgical technician (n=1)
		Other (n=4)

MA, medical assistant; CNA, certified nursing assistant; PT, physical therapist; ER, emergency room; EMT-B, emergency medicine technician – basic; EMT-P, emergency medicine technician – paramedic; LPN, licensed practical nurse; OT, occupational therapist.
HCE jobs can be reported in multiple categories depending on the type of education/training described by respondent.

The total mean number of HCE hours was 5037 with a range of 500-60,000. The total mean number of hours of HCE from the job with the most patient communication experience was 3616 (SD +/- 6974) with a range of 20 - 60,000 hours. (Table 1).

Research Aim 2): Average Communication SE
The mean communication SE score for all participants was 65 with a standard deviation of 6.70. The highest reported score was 75 and the lowest score was 51 (Table 3). There were no significant differences in total communication SE scores between PA schools; $F_{(5,116)}=1.047$, $p=0.394$.

Table 3: Communication Self-Efficacy by School

School	n	Mean	Standard Deviation	95% Confidence Interval
CMU	17	65.12	6.36	61.85 – 68.39
EMU	12	63.5	7.78	58.56 – 68.44
GVSU	16	62.25	7.6	58.2 – 66.3
WMU	13	65.38	6.89	61.22 – 69.55
WSU	38	66.34	6.74	64.13 – 68.56
U OF D	21	65.9	5.15	63.56 – 68.25
TOTAL	117	65.13	6.7	63.9 – 66.35

CMU = Central Michigan University; EMU = Eastern Michigan University; GVSU = Grand Valley State University; WMU = Western Michigan University; WSU = Wayne State University; U of D = University of Detroit

Research Aim 3): Correlations Between Communication SE and HCE
There was no correlation between communication SE and total HCE hours, type of training for HCE job, and number of weeks of training (Table 4). When asked to identify the job which provided the best communication experience, there was no correlation with these hours and communication SE. Post-hoc power analysis of correlations ranged from 0.302 – 0.788 (Table 4). Linear regression analysis did not predict a relationship between total SE and total hours of HCE ($F_{(1,115)}=0.367$, $p=0.367$), total hours of HCE which provided the best communication experience ($F_{(1,114)}=1.632$, $p=0.204$), and a total number of hours required to obtain a certificate/license ($F_{(1, 56)}=0.770$, $p=0.384$).

Table 4: Correlations of Self-Efficacy with Four Variables

Self-Efficacy	Total HCE hours	Most Valuable HCE	Type of Training	Number of Weeks of Training*
n	117	117	117	58
correlation	0.084[a]	0.119[a]	0.052[b]	0.116[a]
p-value	0.367	0.204	0.577	0.384
power (post-hoc)	0.676	0.53	0.788	0.302

HCE, health care experience; type of training could be no training, certificate, or advanced degree.
*Applied only to HCE which required obtaining a certificate after completing a class
[a]Pearson product-moment correlation [b]Spearman's rho correlation

DISCUSSION

In this regional study, there were no significant differences in the communication SE of first-year PA students between 6 Michigan PA programs. Furthermore, there was no correlation between the communication SE of first-year PA students and their type of HCE or number of HCE hours. Despite the wide variation in HCE jobs, the authors did not find any specific HCE job which resulted in a statistically significant difference in communication SE. The type of HCE or number of hours of HCE did not predict total communication SE.

Effective communication is an important skill for all clinicians and is associated with improved patient-centered outcomes.[18,24,25] SE for a certain task is a necessary part of successful completion of that task[17] and, therefore, communication SE can be a helpful predictor of communicative ability. Our results did not show any correlation between HCE and communication SE. Effective communication is a complex skill and likely not all effects will be mediated by communication SE. It remains possible different types of HCE and varying amounts of HCE hours influence communicative ability in a way not measured by communication SE.

Some studies in the PA literature have looked at methods to improve communication skills in PA students,[26,27] but none have examined if previous HCE would have an impact on communication abilities. A small study reported HCE as an EMT and CNA enhanced students' perceived communication ability and bedside manner,[28] but it did not examine if this was because of the type of HCE; it may be ANY HCE would improve communication ability. This study is the first to attempt to quantify the art of communication and add to the limited data in PA literature examining the role of HCE, both in cognitive[5, 7] and non-cognitive traits of student success.[5,7]

The amount of training/education required for each type of job was used in this study as an objective way to stratify different HCE jobs into discrete categories. However, a job's prerequisite training may not necessarily represent the quality or degree of patient communication required. A respondent whose job required extensive training may not be provided with higher quality opportunities to communicate with patients when compared to a student whose job required no training. Further, all Michigan PA programs require applicants to have at least 500 HCE hours before application. This may result in all participants feeling similarly efficacious in their ability to communicate. There may be a correlation between communication SE and HCE hours in applicants with few (<500) hours of HCE, after which point additional HCE hours are not correlated with communication SE. While only a few PA programs in the United States do not require HCE for application,[4] a future project may look at the communication SE in PA programs that do not require HCE for application.

This study was designed to examine the correlation between HCE and communication SE and not to examine the correlation between HCE and overall student preparedness for PA school. Success in PA school, just like success as a practicing PA, is not based solely on communicative ability with patients; it is the result of a multitude of different skills, attitudes, and character traits. Obtaining a high number of HCE hours or obtaining high-quality HCE could result in greater preparedness for PA school by improving traits outside of communication ability. Varying types or amounts of HCE may correlate with these other skills, attitudes, or character traits. Future studies examining these other non-cognitive traits and qualities of a successful PA student may help propel holistic admission processes and promote student success in education.[11]

Limitations

This was a local study with a small sample size and was underpowered; therefore, results may not be generalizable to other PA programs. However, our subjects were similar to the reported national population (Table 1).[19] There was an unequal response rate between schools, with the respondents at one university representing 32% of the responses; however, there was no difference in mean SE between schools, so the bias was likely negligible. The low response rate might result in non-response bias; because of the anonymous survey, analysis of the non-responders was not possible.

Some HCE jobs could be categorized into multiple categories; it is not known if a CNA with no formal training is any different from a CNA with a certificate-level training. Lastly, the HCE was self-reported and could not be independently confirmed and may be inaccurate. There is the possibility the type of HCE was misclassified and could result in a misclassification bias. However, the type of HCE was analyzed in multiple different ways and no statistically significant correlation was found.

CONCLUSION

This pilot study did not show a correlation between the type of HCE or number of HCE hours and the perceived ability to communicate with patients. It continues to remain unclear what role HCE might play in PA student success and as a factor in the admission process. Further studies are needed to determine how HCE may contribute to a student's non-cognitive traits and qualities which may impact success in a PA program.

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