RESEARCH

Assessing the Impact of Standardized Patient Encounters on Students’ Medical History-taking Skills in Practice

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Objective. To investigate whether exposing students to professional standardized patients (SPs) in a didactic course would impact the transferability of students’ medical history-taking skills to practice.

Methods. In 2018, peer role-play and virtual simulation activities were used to teach medical history-taking in a first-year physical assessment and medication administration course. An unannounced SP evaluated students’ medical history-taking skills during a subsequent community introductory pharmacy practice experience (IPPE) using a 17-item medical history checklist. In 2019, 3 SP encounters were added to the course to supplement existing learning activities. This student cohort was then assessed by the same unannounced SP during their IPPE in summer 2019. Medical history-taking performance was compared with the 2018 control group to assess the impact of the changes to the course.

Results. Thirty-nine students in both the summer 2018 and 2019 cohorts had usable data. There was a statistically significant increase in the 2019 mean composite score on the medical history checklist (24.3 vs 18.1). The 2019 cohort performed significantly better than the 2018 cohort in 7 of the 17 items on the checklist. The correlation between students’ performance on the summative medical history-taking assessment during the course and their performance in practice was r = .15 in 2018 and r = .08 in 2019.

Conclusion. Incorporating SPs into a physical assessment and medication administration course contributed to an improvement in students’ ability to take a medical history in practice as compared with solely using a virtual patient simulation program.

Keywords: standardized patients, medical history, experiential practice, simulation

INTRODUCTION

According to the American Association of Colleges of Pharmacy, collecting information to identify patients’ medication-related problems and health-related needs is an entrustable professional activity that all pharmacy graduates must be able to perform without direct supervision upon entering practice. An example of a task supporting achievement of this skill is collecting a medical history from a patient or caregiver, which is also the first step of the Pharmacists’ Patient Care Process (PPCP). Despite its importance, few reports in the pharmacy literature examine approaches to teaching medical history-taking. Ellington and colleagues surveyed pharmacy schools to elicit information on methods used to teach the medication history interview. Although various exercises were reported, respondents expressed a need for a standardized teaching tool. Sando and colleagues described success in using a game to increase second-year Doctor of Pharmacy (PharmD) students’ confidence in taking a medication history. Rivkin described using a simulated medication history scenario to teach the initial step of the PPCP where students observed an encounter between 2 faculty members and documented history information on a worksheet.

Simulation, a commonly used technique in pharmacy education, mimics aspects of the real world in a fully interactive, risk-free manner. Types of simulation in pharmacy education include manikins, virtual software, and standardized patients (SPs). At the Arnold & Marie Schwartz College of Pharmacy and Health Sciences, Long Island University (LIU Pharmacy), medical history-taking is taught in the latter half of the first professional year of the PharmD program in the Principles of Physical Assessment and Medication Administration course. Traditionally, students enrolled in this course used peer role-play
and a virtual patient simulation program to practice medical history-taking skills. Although students generally performed well in educational settings, it was unknown how well they would perform a medical history in practice. It was also unknown whether using a different simulation technique, such as a SP, could improve students’ transfer of medical history-taking skills from the classroom to practice. Therefore, the purpose of this study was to investigate whether exposing students to SPs in addition to peer role-play and virtual patients would impact the transferability of students’ medical history-taking skills to practice. The 3 specific aims of this study were: to compare the use of SPs to the virtual patient simulation program in training students to take a medical history in practice; to determine if students’ performance on the summative medical history-taking task in the physical assessment and medication administration course could predict students’ performance in practice; and to compare the strength of the correlation between SP training and performance in practice with virtual simulation training and performance in practice.

METHODS

In spring 2018, 197 students who enrolled in the physical assessment and medication administration course were taught medical history-taking skills via a 1-hour lecture and a 2-hour laboratory that included peer role-play. Additionally, students completed weekly homework using a virtual patient simulation program (Shadow Health 2018, Digital Clinical Experience, Version 5.0). The assignments required students to obtain a medical history from a digital SP, perform a virtual physical assessment, and document their findings. Summative assessment of students’ medical history-taking skills occurred via a final virtual patient case completed at the end of the course.

To determine whether students could transfer their medical history-taking skills to the real world, this same group of students were evaluated by 1 unannounced SP during the Community Pharmacy Introductory Pharmacy Practice Experience (IPPE). The SP was an actor hired from a firm that provides interactive educational training services to health profession programs. Students were assigned by the experiential education office to complete the IPPE during 1 of 3 4-week blocks that took place June-August 2018. The SP visited select students during a 3- to 4-day period that spanned the third week of each IPPE block. This visit timing was intentional to provide students opportunity to acclimate to the practice setting. The investigators and the SP were unaware of which students were assigned to each pharmacy. Student selection was based solely on whether they were assigned to a participating community pharmacy. Pharmacies were included in the activity based on their location and accessibility to public transportation, the preceptor’s willingness to participate in the project, and the preceptor’s availability during the week in which the student assessment was expected to take place.

Prior to the first scheduled pharmacy visit, a comprehensive training session was held with the SP. This session included a readthrough of the case and assessment forms, role-play with the investigators, review of senior students’ recorded patient encounters for grading practice, and a “dress rehearsal” with 2 professional fourth-year students. The pharmacist at each site was notified 1-2 days in advance of the scheduled SP visit. The pharmacist was provided explicit instructions regarding the importance of maintaining the project’s confidentiality and how to interact with the student upon the SP’s arrival. Since the pharmacist did not know the identity of the SP, a specific statement by the SP served as the pharmacist’s cue to direct the student to complete the medical history using the documentation form available in a toolkit shared with students during the IPPE orientation. The SP then relayed the standardized script and audio-recorded the student encounter using a concealed recording device. The script was designed such that the patient did not present with a chief complaint. Since the patient was a new community resident, the purpose of the visit was to relay the patient’s medical history prior to a physician calling in the patient’s prescriptions. The medical history assessment form used by the SP was a 17-item checklist created by faculty prior to the start of the spring 2018 semester. The checklist was scored using a scale of completed (2), partially completed (1), or not completed (0). Students were also assessed on their communication/interpersonal skills using a rubric that included 8 domains, each with a 4-category, behaviorally-anchored rating scale. This rubric was adapted from a validated tool used to assess medical residents.8 Both assessment tools were first introduced to students in the physical assessment and medication administration course.

Upon ending the encounter, the SP completed the student assessment off-site, using the audio recording as needed. At the end of each IPPE block, the investigators received all completed rubrics and audio-recordings from the SP and students’ medical history documentation forms from the pharmacists. To ensure accuracy in scoring, the investigators independently reviewed the completed rubrics, audio recordings, and documentation forms. Scoring inconsistencies were resolved among the investigators.

In the spring 2019 iteration of the physical assessment and medication administration course, in which 219 students were enrolled, several changes were made in
Encounters were recorded, and SPs used students with 1 of 4 SPs, each presenting with different symptoms. Summative and extended to 13 minutes. Students engaged at the end of the session. The SP provided each student with verbal and written (ie, the completed checklist) feedback on their performance. The SPs provided verbal feedback on communication skills, based on the communication-skills rubric.

The second SP exposure was a 10-minute, one-on-one, formative encounter. Students were randomly assigned to interview 1 of 3 patients, each presenting with a different chief complaint. As students were now to also collect the patient’s history of present illness, the medical history checklist was modified from 17 items to 18 items. The SP provided each student with verbal and written (ie, the completed checklist) feedback on their performance at the end of the session.

The final SP encounter was also one-on-one, but summative and extended to 13 minutes. Students engaged with 1 of 4 SPs, each presenting with different symptoms. Encounters were recorded, and SPs used students’ medical history documentation forms to complete the content checklist. SPs provided students verbal feedback on communication skills. The course coordinator had access to all completed checklists, medical history documentation forms, and videos, in the event that students challenged their final assessments.

For all 3 encounters, SPs underwent extensive training, including a review of the cases and checklists; practice encounters; and scoring to achieve interrater consensus. For the group encounter, SPs watched and scored 1 recorded and 1 live medical history encounter. For the formative and summative assessments, each SP role-played with a fourth professional year student while the others observed and assessed the encounter.

Student perceptions regarding the use of SPs in the course were assessed via a 14-question survey administered upon course completion. Students used a 5-point Likert scale to rate their level of agreement with 11 statements regarding various learning opportunities in the course; the effect of SPs on students’ confidence; preparation for the community IPPE with respect to medical history-taking skills; the importance of taking a medical history as a pharmacist; and the student’s preferred medical history-taking teaching strategy. The survey was electronically distributed via Baseline (CampusLabs) in May 2019, and 2 automated reminders were sent.

To examine the impact of the SP encounters on students’ ability to take a medical history in practice, students that took the course in spring 2019 were evaluated during the community pharmacy IPPE in summer 2019 using procedures identical to those used in 2018 with the control group. The same SP was rehired, retrained, and played the same role at community pharmacies from June 2019 through August 2019.

The mean composite score on the medical history checklist conducted in the community pharmacy IPPE among students who were exposed to SPs (2019) was compared with that of students solely exposed to the virtual simulation program (2018) using an independent sample t test. G*Power, version 3.1.9.7, revealed that with a power of 0.8, α = .05, and estimated medium-effect size between 0.6 and 0.7, the required sample size per cohort was between 34 and 45 students. Chi-square tests for independence were also used to compare the percentage of students who attained a score of “completed” on individual checklist items. While students’ communication/interpersonal skills were evaluated by the SP for both years, descriptive statistics were solely used to describe performance on the communication/interpersonal skills rubric, as students did not receive formal instruction on communication skills until their second professional year. A Pearson correlation was computed between the final virtual patient case scores in the course and the composite medical history checklist scores in the community pharmacy IPPE (2018), as well as between the composite medical history checklist scores on the final SP encounter in the course and the composite checklist scores in the community pharmacy IPPE (2019). The strength of the correlation from the 2019 assessment was compared to that obtained in 2018. Student demographics/characteristics (eg, age, work experience) were not controlled for in any of the analyses. Student survey results were summarized using descriptive statistics. All statistical tests were two-sided, and a P value of <.05 was considered significant. Statistical analyses were performed using SPSS, version 25.0. The research was deemed exempt by the LIU Institutional Review Board.
RESULTS
In summer 2018, the unannounced SP visited 22 pharmacies and assessed 40 out of the 169 students enrolled in the IPPE; data from 39 students were usable. Results from 1 student were excluded due to protocol deviation by the pharmacist. In summer 2019, the same SP visited 25 pharmacies and assessed 42 out of the 177 students enrolled in the IPPE. Thirty-nine students had usable data; 3 students’ data were excluded because they were not exposed to SPs in the physical assessment and medication administration course.

Table 1 displays the mean composite scores on the 17-item medical history checklist (range 0-34) and the 8-item communication/interpersonal skills rubric (range 8-32) for both cohorts. A statistically significant difference in the mean composite score on the medical history checklist was noted in 2019 (24.3 vs 18.1, \textit{P} < .001). A significantly greater percentage of students from the 2019 cohort attained “completed” on 7 of the 17 items on the medical history checklist (Table 2).

Regarding whether students’ performance on the summative medical history-taking task during the physical assessment and medication administration course was predictive of students’ performance in practice, a small correlation ($r = .15$, NS) between the mean score on the final virtual patient case in the course and performance in...
practice during the community IPPE was observed in 2018. In summer 2019, performance on the final summative SP encounter in the course did not correlate with performance in practice during the IPPE ($r=0.08$; NS). Overall, the correlation in 2019 was not stronger than that in 2018.

Table 3 displays results of the survey completed at the conclusion of the course in spring 2019 by 123 (56.2%) students. When asked which teaching strategy students preferred to use for practicing medical history-taking skills, 5 (4.1%) selected the virtual patient simulation program, 81 (65.9%) selected SPs, and 34 (27.6%) preferred a combination of SPs and virtual simulation. Three (2.4%) students responded to neither strategy.

### DISCUSSION

Taking a thorough medical history is integral to ensuring appropriate drug therapy. Yet, pharmacy literature regarding the best way to teach this skill is sparse. Moreover, little has been published on students’ ability to move from the “shows how” level of Miller’s pyramid to the “does” level with respect to medical history-taking. In this study, the transferability of students’ medical history-taking skills from virtual simulation to practice did not occur at the desired level, justifying changes to improve the course. The incorporation of SPs in the didactic curriculum resulted in a significant improvement in students’ medical history-taking in practice.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The group encounter with standardized patients (during week 3) was a useful way to learn how to take a medical history from a patient.</td>
<td>78 (63.4)</td>
<td>35 (28.5)</td>
<td>7 (5.7)</td>
<td>1 (0.8)</td>
<td>2 (1.6)</td>
</tr>
<tr>
<td>The one-on-one encounter with a standardized patient during the midterm examination was helpful in preparing me for the final practical exam.</td>
<td>76 (61.8)</td>
<td>42 (34.2)</td>
<td>4 (3.3)</td>
<td>1 (0.8)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>The standardized patients provided constructive feedback.</td>
<td>71 (57.7)</td>
<td>40 (32.5)</td>
<td>9 (7.3)</td>
<td>2 (1.6)</td>
<td>1 (0.8)</td>
</tr>
<tr>
<td>The standardized patient encounter on the laboratory final practical exam was an appropriate way to examine my abilities in taking a medical history.</td>
<td>67 (54.5)</td>
<td>40 (32.5)</td>
<td>9 (7.3)</td>
<td>5 (4.1)</td>
<td>2 (1.6)</td>
</tr>
<tr>
<td>In addition to practicing with my classmates and on Shadow Health, the use of standardized patients made the overall training more effective.</td>
<td>61 (49.6)</td>
<td>44 (35.8)</td>
<td>14 (11.4)</td>
<td>4 (3.3)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>The use of standardized patients enhanced my confidence in gathering a medical history from a real patient.</td>
<td>72 (58.5)</td>
<td>39 (31.7)</td>
<td>8 (6.5)</td>
<td>4 (3.3)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>The use of standardized patients prepared me well for gathering a medical history from a real patient that I may encounter in the community introductory pharmacy practice experience (IPPE).</td>
<td>67 (54.5)</td>
<td>41 (33.3)</td>
<td>14 (11.4)</td>
<td>1 (0.8)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>The use of standardized patients increased my sense of responsibility for patient care.</td>
<td>69 (56.1)</td>
<td>43 (35.0)</td>
<td>10 (8.1)</td>
<td>1 (0.8)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>The use of standardized patients instilled in me the importance of medical history–taking skills as a pharmacist.</td>
<td>67 (54.5)</td>
<td>47 (38.2)</td>
<td>8 (6.5)</td>
<td>1 (0.8)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Overall, PHM 326 was instrumental in building my skills in gathering a medical history from a patient.</td>
<td>67 (54.5)</td>
<td>46 (37.4)</td>
<td>9 (7.3)</td>
<td>1 (0.8)</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>
Despite some improvements, overall student performance during the IPPE was not ideal. Perhaps this is because students were assessed during their first IPPE, and so they did not have the pharmacotherapeutic knowledge base to understand the relevance that some components of the medical history have to drug therapy; or, they may have simply forgotten best practices as taught in the physical assessment and medication administration course. Outside stimuli in the pharmacy environment (eg, music, phones) and time restriction may have also impacted student performance. Notably, fewer than 50% of students received a score of “complete” on collecting prescription and nonprescription medication information (Table 2).

Predictors of student performance in practice may need improvement, as they would be useful to identify students that may require skill remediation prior to experiential courses. The results indicated that regardless of the teaching method used in the physical assessment and medication administration course, the final course assessments (summative SP encounter or virtual patient case) were not good predictors of students’ medical history-taking in practice. Since the SP encounter was more realistic than one with a virtual patient, it was hypothesized that the strength of the correlation between the medical history composite score in the IPPE and the final SP encounter would be stronger than the correlation with the final virtual patient case; however, this was not the case. This could be due to several factors. First, the physical fidelity of the environment used in the final SP encounter (faculty office) did not replicate real-life practice. Also, students prepared for the final, summative assessment in the course, whereas in practice, the encounter was unannounced and the preceptor was not assessing the student. The lag time from when students learned and practiced the skill in the course to when they performed it in practice may have impacted the outcome as well.

This study had several strengths. An unannounced, professional SP was used during the IPPE both years to capture student performance in the most authentic manner and to standardize student assessment across each pharmacy site. Audio recording of the encounters ensured assessment accuracy. Participating pharmacists received explicit instructions regarding the study’s confidentiality, as well as standardized language and instructions on how to engage the SP and the student upon the SP’s arrival. Professional SPs, rather than faculty/residents, were also used in the didactic course. In all phases of the project, standards of best practice for working with SPs were followed, including extensive SP training.10

Notwithstanding, there were limitations. While the greatest change to the course was the incorporation of 3 SP encounters, the time devoted to medical history-taking in lecture was extended, and students also viewed and evaluated a recorded mock encounter. Therefore, improved student performance in practice relative to the prior year may have been impacted by these other minor course changes. Student demographics and characteristics were not collected; thus, it is unclear whether there were confounding variables (eg, prior work experience) that may have impacted student performance. Cost and time prohibited all students from being assessed by the SP in summer 2018 and summer 2019. It is also possible that pharmacists had inadvertently deviated from the instructions, and in doing so, may have clued students in on the identity of the unannounced SP. Finally, the SP scenario used may not have been typical for a community pharmacy setting.

The impact of this research is several-fold. At the college, students’ preference for SPs as a teaching strategy, their positive perceptions regarding the use of SPs overall (Table 3), and improved performance in practice all provided justification for the decision to permanently switch to the use of professional SPs in the physical assessment and medication administration course and to formally incorporate them throughout the entire professional didactic curriculum. More globally, while unannounced SPs have been used to assess medical students, few, if any, reports are published on using this modality to assess pharmacy students.11,12 This study suggests that using unannounced SPs is feasible in pharmacy experiential education. This initial investigation has also laid the groundwork for further research to determine whether student demographics and/or the length of time between teaching and skill assessment influence transferability to practice.

CONCLUSION

Incorporating SPs into a physical assessment and medication administration course contributed to an improvement in students’ ability to take a medical history in practice, compared with solely using a virtual patient simulation program. Students’ performance in practice did not correlate with summative medical history assessments administered in the course. The study findings provide justification for the continued use of SPs in the professional didactic curriculum.

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REFERENCES


