EDUCATION BRIEF

Peer-assisted Learning: Clinical Skills Training for Pharmacy Students

Jaclyn D. Cole, PharmD, BCPS, Melissa J. Ruble, PharmD, BCPS, John Donnelly, PharmD, Benjamin Groves, PharmD

University of South Florida College of Pharmacy, Tampa, Florida

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Objective. To assess the impact of peer-teaching on student scores and confidence when preparing for a final objective structured clinical examination (OSCE) within a Doctor of Pharmacy program.

Methods. First-year pharmacy students (n=45) attended a peer-led training session led by upperclassmen (n=17) on a variety of clinical skills to be assessed on a final course OSCE. Their scores were collected and compared to students who did not attend the training. Confidence scores were also evaluated using voluntary pre- and post-surveys.

Results. An overall 3% increase in scores was recorded from the objective skills examination. Student confidence scores also increased for each of the skills evaluated with an overall improvement of 1.1 on a 5-point Likert scale.

Conclusion. Peer-assisted learning was effective in increasing student performance and confidence in the OSCE. Based on the positive results, the peer-led training event will be improved upon and used again in the future.

Keywords: Pharmacy, peer-assisted learning, peer teaching

INTRODUCTION

The Accreditation Council for Pharmacy Education (ACPE) requires Doctor of Pharmacy (PharmD) degree programs to include teaching and learning methods that actively engage learners and foster collaborative learning.¹ Objective Structured Clinical Examination (OSCE) is a common method used by a variety of health care professions to evaluate student competency in clinical knowledge, communication, and patient counseling. It is used to test student performance in the application of their didactic coursework in both high- and low-stakes examinations.² This deviation from the traditional clinical examination allows for a greater emphasis on problem-based teaching and has become the gold standard because of its reliability and validity in evaluating the clinical skills of students.³ While both students and faculty value OSCEs as a means of evaluating clinical skills, as many as 54% of students consider them to be more stressful than traditional examinations.⁴ Efforts to limit stress through appropriate training while simultaneously addressing ACPE requirements may be achieved through the use of peer-assisted learning programs.

Peer-assisted learning is a useful tool in professional education and may positively impact students'

cognitive development, psychomotor development, and self-confidence.⁵ It can help overcome barriers of learning as students may feel more comfortable discussing performance issues with peers as opposed to faculty.⁶ This learning method may provide student training at a more appropriate level as student peers are able to recognize difficulties in learning that may not be easily identified by faculty members.⁷ The student-peer teachers also benefit from this method as they are required to use higher level Bloom's taxonomy through synthesis and evaluation to ensure mastery of a skill prior to teaching it. Peer teachers must first ensure they are competent and confident in the skill before they can assess students and their knowledge.

Benefits to student learning perceptions and performance with this instructional method have been documented in professional literature. Perceived benefit is recognized through positive student perception responses on evaluations of pharmacy student-peer mentoring programs targeted at enhancing experiential education and composing drug information responses.^{8,9} Additionally, the utilization of peer-assisted learning for clinical skills training in medical schools has shown improvement in student performance.¹⁰ However, the effectiveness of peer-assisted learning for clinical skills has not been extensively studied in pharmacy education.^{11,12}

This study seeks to assess the impact of peer-teaching in clinical skill training for a final OSCE within a PharmD

Corresponding Author: Melissa J. Ruble, 12901 Bruce B Downs Blvd., MDC 30, Tampa, FL 33612. Tel: 813-974-6560. Fax: 813-905-9890. E-mail: mruble@health.usf.edu

program. The primary study objective is to determine if a peer-led training session improves student scores on OSCEs. The secondary objective is to determine if a peer-led training session improves student confidence in performing clinical skills.

METHODS

Objective Structured Clinical Exams (OSCEs) are used in the host program's first year Pharmaceutical Skills II course to evaluate clinical knowledge and patient communication. Students are randomly assigned one of six administration techniques that they will need to communicate to a patient as a final simulation within the course. The six clinical skills to be used during the OSCEs included otic medication administration, dry powder inhalation (DPI) technique, rectal suppository administration technique, manual blood pressure reading technique, glucometer testing, and insulin injection technique using a vial and syringe. Students are introduced to the six clinical skills and their accompanying grading rubrics throughout the semester.

In preparation for this low-stakes, end-of-the-year OSCE, a practice session was organized by two second-year pharmacy (P2) students to provide a voluntary opportunity for first-year students (P1) to practice and enhance their clinical skills. The event was created in collaboration with the course coordinators for the Pharmaceutical Skills II course. The voluntary practice session was scheduled for one hour immediately following the P1 class to maximize student attendance. Students were informed of the training session via class listserv, social media, and in-class announcements made by course coordinators. P1 students who were planning on attending the event were asked to complete a brief voluntary, electronic Qualtrics (Provo, UT) survey prior to the event to assess which techniques they were most interested in and evaluate baseline student confidence on each of the six techniques on a scale from 1 (least confident) to 5 (most confident).

Peer teachers were recruited via email, social media, and in-class announcements. Seventeen second-, third-, and fourth-year pharmacy students participated as teachers. They were provided the same grading rubrics for each technique that P1 students were given during the semester and would be used to assess the final OSCE. A training session was held for all peer teachers in which they demonstrated each skill prior to the peer-teaching session. Expectations were reviewed with each peer teacher to allow for consistency among all groups. Peer teaching stations reflected where students requested the most help based on pre-session surveys that were completed by the P1 students. Five peer teachers were assigned to the insulin vial and glucometer stations, three students at the

blood pressure station, two students at the otic station, and one student at both the DPI inhaler and the suppository station. There were no more than four learners per one peer teacher in an effort to provide more effective teaching opportunities.

The 1-hour training session consisted of six stations, one for each clinical skill being evaluated. Peer teachers were allocated to each station according to teacher preference and by need as assessed by pre-training survey results. P1 students were allowed to attend whichever station they preferred and could stay at each station for as long as they wanted during the 1-hour session; they were not required to stay for the entire hour. During the session, peer teachers briefly reviewed the clinical skill and then allowed trainees to pair up with a teacher or another P1 student to practice the clinical skill at that station. Peer teachers answered questions the P1 students had and provided feedback as necessary. Forty-five P1 students ($n=51\%$) attended the practice session as documented by a sign-in sheet.

After the training session, P1 students who attended were asked to complete an online post-training Qualtrics survey that re-assessed their confidence in each of the clinical skills and reported how much time was spent at each station per self-report. This survey also included a text box entry that requested feedback regarding the training experience in order to identify strengths and opportunities for improvement in the future. The P1 students were evaluated via an OSCE in the Pharmaceutical Skills II course during the week following this training session. The scores from this examination were collected and de-identified by the course coordinators and provided for statistical analysis.

A statistical analysis was performed to determine if there was an improvement in confidence and performance in students who attended the training session. A two-tailed Wilcoxon signed-rank test was used to evaluate the pre- and post-training survey data on student confidence in each of the clinical skills. A two-tailed unpaired student t-test was used to evaluate the difference between the OSCE scores of P1 students who attended the training session to those who did not attend the training session. The significant difference for both of these tests was set at $p<.05$. Analysis was performed using Statistical Package for Social Sciences (SPSS) version 22 (IBM, Armonk, NY). This study received IRB approval from the host institute.

RESULTS

The scores of the 45 P1 students who attended the voluntary peer-taught training session were compared to the scores of 44 P1 students who did not attend the session. Student baseline demographics were similar in each group

(Table 1). The mean score was 95.6% (SD 5.6%) in the group of students who attended the session and 92.3% (SD 8.8%) for students who did not attend ($p = .04$) (Table 2).

Students were asked to complete a voluntary survey before and after the peer-training session to assess their confidence in performing each of the techniques they attended prior to the official OSCE. Of the 45 students who attended, only 20 students (44%) completed both the pre- and post-survey and were therefore included in the data analysis of the confidence surveys. The students who attended the training session reported an increase in confidence overall and in each of the six training skills that were to be tested in the OSCE. The overall mean confidence for all six skills increased by 1.1 points on the 5-point scale ($<.001$). For all skills, the reported increase in confidence was statistically significant with the exception of manual blood pressure reading (Table 3). The percentage of students reporting high confidence (score of 4 or 5) across all skills increased from 33.3% before the training session to 79.2% after the training.

Twenty P1 students completed the optional free response to provide feedback on the peer-training event. Overall, the responses indicated that the students were appreciative of the training event and would like increased or longer opportunities for peer-training in the future. Positive feedback included students reporting that the training was the “biggest contributor to my success in mastering these techniques” and “I enjoyed the help.”

Much of the feedback indicated ways in which the event could be improved in the future. An increase in stations and trainers was a common request. Students provided feedback such as the “P1 to P2 ratio was a little too high,” and to “possibly have more volunteers.” Another student recommended “possibly more blood

pressure/glucose stations since those are what seem to worry students most.” Two students also indicated that the training session would be improved if each station was visited for specified time intervals, such as “15 minutes for each group at each station” or “It might be helpful to set up 20 minute block.” Two students requested more time indicating “an extra half an hour would be so helpful” and “have 1 more” of the training sessions.

DISCUSSION

The goal of this peer-training session was to provide students the opportunity to practice their clinical skills through peer-teaching in an effort to improve student scores on their final OSCE. Students were able to practice in a low-stress environment outside the confines of class with their peers. Upper classmen were able to relate to the initial challenges associated with learning these clinical skills and speak to their past OSCE experiences. The additional practice in this environment and feedback from their peers were also intended to improve student confidence in performing the evaluated skills.

Study results support the hypothesis that peer-assisted learning of clinical skills in P1 students can improve student performance. The mean score on the OSCE increased across all skills assessed, and the overall increase for the entire class was statistically significant for those who attended the optional training session. Although mean scores in both groups equated to a letter score of A, the higher performance in the peer-led group suggests potential for stronger mastery of the techniques assessed. Differences in student scores for each skill were not statistically significant but could be due to a small sample size in each group. As a result, a statistical difference may not have been

Table 1. Baseline Characteristics of P1 Students

Characteristics	Attended (n=45)	Did Not Attend (n=44)	p value ^a
Mean Age	22.6	22.8	-
Female (%)	55.6	57	-
Highest Degree			-
High school	22	17	-
Associate's	8	5	-
Bachelor's	15	21	-
Master's	0	1	-
Composite PCAT Score	66.5	58.6	.04
GPA			
P1 Fall	3.53	3.44	.26
P1 Cumulative	3.46	3.35	.15

^aP value calculated using two-tailed unpaired *t*-test

Table 2. Comparison of Average Scores of Students Who Attended and Did Not Attend the Training Session

Skill	Percentage Mean (SD) Attended (n=45)	Percentage Mean (SD) Did Not Attend (n=44)	p value ^a
Blood Pressure	98 (2)	95.9 (5)	.39
DPI	92.5 (6.6)	87.5 (11.4)	.4
Glucometer	97 (3.4)	91.8 (9.8)	.25
Insulin	96.9 (4.2)	90.3 (7.5)	.06
Otic	91.9 (7)	88.8 (11.4)	.52
Rectal Suppository	97.9 (4.1)	96.7 (3.9)	.64
Overall	95.6 (5.6)	92.3 (8.8)	.04

^aP value calculated using two-tailed unpaired t-test

Abbreviations: DPI=dry powder inhaler

identified until all data was pooled for an overall evaluation. Students also reported a significant increase in confidence for skills reviewed in the peer-led training session. Although a 1.1 increase may not seem large, this moved the students up to a new confidence category on the 5-point Likert scale. Overall, the student response was positive and this event will be organized again in the future.

The results of this study support the theory that peer-teaching in health education may contribute to academic improvement and enhanced confidence, as outlined in previous peer-reviewed publications.⁹⁻¹¹ A notable benefit is also the addition of this knowledge to health literature which highlights the value this teaching method may have in the development of clinical skills within pharmacy education.

Proposed improvements for future training sessions include having a higher trainer to trainee ratio. The P1 students appreciated having individualized trainings and being able to work in small groups to discuss technique and concerns over the OSCE format. Students were not required to practice at each station, but this could be required in future sessions to ensure each student gets experience practicing each assessment with peer-instruction. Recruitment of trainers will likely begin earlier in order to

increase involvement of P2, P3, and P4 students. The length of the training session will likely also be increased. P1 students reported they would appreciate roughly 15-20 minutes to practice each skill. The training session may be broken up into periods dedicated to each skill to allow each student equal opportunity to practice all techniques. Also, while peer teachers attended a review session and were provided with expectations, the format for the activity was left at the discretion of the peer teacher. Streamlining the format may allow for a more uniform delivery and assessment of techniques.

While the data collected in this study shows the promise of peer-assisted learning in a PharmD program, there are some limitations to our study design. The data collected was not originally intended to be used for a research study. Response to the pre- and post-surveys was not required from the students who attended the training session. After three attempts to solicit post-survey responses, 30 of the 45 students who attended the training session submitted a survey. Of those 30 students, only 20 had fully completed the pre- and post-surveys and were included in the final confidence data analysis. This low response rate for the confidence surveys may be too low to generalize to the rest of the students who participated. In

Table 3. Self-Reported Student Survey Confidence Scores in OSCE Skills Before and After the Training Session^a

Skill	Mean Confidence Before	Mean Confidence After	Change in Mean Confidence	Significance (p value) ^b	Number of Trainees	Mean time spent at each station (minutes) ^c
Blood Pressure	3.3	4.0	0.7	.14	8	21
DPI	3.2	4.1	0.9	.004	9	13
Glucometer	3.1	4.0	0.9	.007	15	15
Insulin	2.6	4.2	1.6	<.001	17	15.8
Otic	3.3	4.1	0.9	.002	12	11
Rectal Suppository	2.5	3.9	1.4	< .001	13	9.1
Overall	3.0	4.0	1.1	<.001	20	13.9

Abbreviations: DPI=dry powder inhaler

^aOnly includes data from students who completed both pre- and post-training surveys (n=20)

^bP value calculated using two-tailed Wilcoxon Signed Rank test

^cDoes not include students' reported times of 0 minutes at any station

addition, while the results of the score analysis showed a statistically significant increase in overall scores, the small sample size limited the ability to test the significance for each of the techniques. Another limitation is that this study included a single class of students at one pharmacy college. A survey of pharmacy colleges evaluating the use of OSCE showed differences in several areas, including the number of stations, skills evaluated, and the grading system.⁷ Due to the variety of OSCE programs used at pharmacy colleges, this limits the study's generalizability to other colleges.

To increase generalizability, further research is needed at other colleges to evaluate the effectiveness of peer-assisted learning in teaching clinical skills within PharmD programs. Additional studies at other institutions with varied OSCE formats may support our findings that peer-assisted learning improves student performance and confidence. An experimental study randomizing students into different treatment groups may help eliminate selection bias and confounding variables in our study because the training session was voluntary. Future research may also aim to look at the effect of peer-assisted learning on the peer teachers. Involvement in peer-assisted learning could prove beneficial to the teachers by increasing confidence and knowledge retention.

CONCLUSION

This study indicates that the peer-led training session was effective in increasing P1 student performance and confidence for their final OSCE assessment. Due to the positive results and feedback from students, the peer-led training session will be improved and implemented in the future. Peer-assisted learning programs may be adopted by other PharmD programs to improve student confidence and competency in clinical skills.

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