Performance and Perceptions: Evaluation of Pharmacy Students' Consultation via Telepharmacy

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Abstract

Background: Pharmacy education standards highlight the importance of effective communication skills and the use of technology to provide patient care. As technology evolves, pharmacists have opportunities to communicate in different and broader ways. **Objective:** The objectives of this study were 3-fold: to evaluate student ability to counsel via telepharmacy, to determine if there is a difference in students' abilities to counsel face-to-face or via telepharmacy, and to determine students' perceptions regarding patient consultation via telepharmacy. **Methods:** Professional pharmacy students completed a pharmaceutical care laboratory activity focused on communication via telepharmacy. Comparisons were made between students' ability to provide patient consultation via telepharmacy and face-to-face utilizing a faculty-developed rubric. Students also completed a questionnaire on their perception of utilizing telepharmacy technology to provide patient consultation. **Results:** Eighty-two second-year professional pharmacy students participated in the study. Results showed students are able to successfully provide patient consultation via telepharmacy without prior practice; however, there was a statistically significant difference between students' ability to counsel face-to-face and via telepharmacy ($P < .001$). Overall, students were more successful at providing face-to-face consultation than via telepharmacy, and students who were first assessed on their ability to counsel face-to-face perceived a greater difference between telepharmacy and face-to-face consultation ($P < .05$). **Conclusion:** Student-perceived differences between the 2 means of consultation and demonstrated a difference in their ability to counsel via telepharmacy and face-to-face. It appears that, when evaluating the need to teach professional pharmacy students how to provide patient consultation via telepharmacy, additional exposure to telepharmacy technology could be beneficial by enhancing student comfort and proficiency.

Keywords

telepharmacy, patient counseling, pharmacy education, telemedicine, telehealth

Introduction

Pharmacists must have effective communication skills in order to provide high-quality health care to patients.^{1,2} It is imperative these communication skills are taught and practiced.^{3,4} The 2011 Accreditation Standards and Guidelines for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree recommend that colleges and schools of pharmacy train students to become effective communicators.⁵ In addition, the Center for the Advancement of Pharmacy Education Educational Outcomes 2013 not only emphasizes the importance of effective verbal and nonverbal communication but also the ability to use technology to assist in communication.⁶

Pharmacists educated in North Dakota are trained to use telepharmacy technology in response to the diminishing presence of pharmacy services in rural communities across the state. North Dakota utilizes telepharmacy technology to

link pharmacists at a central location with pharmacy technicians and patients at remote locations. Currently, North Dakota has 81 pharmacies involved in telepharmacy. Traditional pharmacy services are maintained; however, pharmacists perform duties, such as medication consultation, via audio and video computer links.⁷ Although patient satisfaction with the medication consultation received at telepharmacies is remarkably high, it is necessary to determine if teaching activities educating students on how to effectively communicate via telepharmacy are relevant as the National Association of Boards of Pharmacy (NABP)

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NABPLAW database lists 20 states with laws and regulations pertaining to telepharmacy (NABP Professional Affairs, written communication, September 2014).^{8,9}

This article describes the design and evaluation of an educational activity used to create a learning experience for students focused on the effective provision of patient consultation via telepharmacy technology. The objectives were to evaluate student ability to counsel via telepharmacy, to determine if there was a difference in students' ability to counsel face-to-face or via telepharmacy, and to determine students' perceptions regarding patient consultation via telepharmacy.

Methods

The North Dakota State University Institutional Review Board approved this research.

Setting

Pharmaceutical Care Laboratory II is the second course of a 4-semester laboratory sequence designed to teach and assess practical application of the skills necessary to become a generalist pharmacist. The pharmaceutical care laboratory is a licensed pharmacy within the College of Pharmacy, Nursing, and Allied Sciences. Activities taught throughout the course series include medication dispensing and consultation, nonsterile and sterile compounding, disease state management, self-care and nonprescription medication consultation, medication therapy management, and immunization administration.

Second-year professional pharmacy students are enrolled in the laboratory and a 3-credit didactic course focused on nonprescription medications simultaneously. Students participated in a didactic lecture focused on the history and state legislation supporting telepharmacy in North Dakota. Students then participated in a structured laboratory activity centered on the provision of patient consultation via telepharmacy, utilizing audio and video technology, as legally approved and operating in North Dakota.⁷ After successful completion of the laboratory course, students then went on to participate in an introductory pharmacy practice experience focused on community pharmacy.

Telepharmacy Laboratory Activity

During the structured telepharmacy laboratory activity, students individually interacted with a standardized patient located at a remote, rural pharmacy approximately 100 miles away. Students utilized the telepharmacy technology to interview the patient utilizing the QuEST SCHOLAR method.¹⁰ Students assessed the patient's signs and symptoms of a common self-care complaint, provided an

appropriate self-care recommendation, and counseled the patient on the proper use, side effects, and expectations of the recommended product. During the consultation, one faculty member evaluated students using a standardized faculty-developed rubric to assess their verbal communication and provision of medication information (Table 1). The faculty utilized the rubric to assign a grade, worth a total of 10 points, and determine if they met each of the performance criteria.

The same standardized patient at the remote site evaluated all students on their verbal communication skills during the consultation. Verbal communication was evaluated using the last 3 performance criteria from the faculty-developed rubric (Table 1). Nonverbal communication was not formally assessed; however, the standardized patient did record comments regarding nonverbal communication cues on the rubrics in order to provide students with formative feedback.

A faculty member at the main site evaluated students on the provision of medication information during the encounter. The faculty member was removed from the room that housed the telepharmacy technology and student. This allowed faculty to remain unseen by the student, but faculty could still hear the consultation to appropriately evaluate. This was the first time students had utilized telepharmacy technology. Faculty used the rubric to consistently quantify the students' performance and ability to provide patient consultation services via telepharmacy.

Comparison With Face-to-Face Patient Consultation

Before the telepharmacy laboratory activity, students all had baseline instruction and practical application of counseling face-to-face. In addition, faculty designed a separate laboratory activity to evaluate students' ability to provide patient consultation face-to-face utilizing comparable self-care scenarios, and the same rubric used to evaluate the telepharmacy consultation. The same faculty member involved in the grading of the telepharmacy activity was involved in grading the face-to-face consultations. The class was randomly divided into 2 groups (see Figure 1). Due to scheduling logistics, Group 2 was slightly larger than Group 1. Group 1 was first evaluated on their ability to counsel face-to-face and then their ability to provide patient consultation via telepharmacy. Students in Group 2 were first evaluated on their ability to provide patient consultation via telepharmacy, followed by the face-to-face consultation. Evaluation of the face-to-face consultation allowed faculty to determine if there was a statistically significant difference in students' ability to counsel via telepharmacy or face-to-face.

Immediately following the telepharmacy laboratory activity, students were asked to complete a 13-item questionnaire

Table 1. Average Scores of Student Performance of Rubric Criteria, Mean Scores (N = 82).

	Face-to-Face	Telepharmacy	P Value
Explanation of how medication works (avoiding technical jargon)	0.90	0.76	.63
Dosing information (including special instruction for use if necessary)	0.96	0.92	.24
Potential adverse effects of active ingredient(s) AND how to avoid or manage them	0.86	0.48	.13
Treatment expectations (time to relief and/or cure)	0.84	0.55	.20
Appropriate follow-up and/or when to seek additional medical attention	0.74	0.63	.27
Significant interactions (medications, food, alcohol, allergies, etc)	0.92	0.85	.63
Nonpharmacologic recommendations	0.79	0.51	.46
Verbal communication			
Spoke clearly and avoided long pauses	0.98	0.97	.98
Used terminology appropriate for patient without medical background to understand (ie, gastrointestinal, angina)	0.91	0.88	.39
Minimal use of “um,” “uh,” “like,” “gonna” during the consultation	0.98	0.82	.17
Total scores	0.90	0.78	<.001

Figure 1. Study design (Group 1 and Group 2).

using a 4-point Likert-type scale (1 = *strongly disagree* to 4 = *strongly agree*) rating their perception of providing patient consultation via telepharmacy (Table 2). The 13 questions were developed from a review of the literature indicating communication barriers and communication in pharmacy.¹¹⁻¹⁶ Perception questionnaire data provided results for the study's third objective, to determine students' perceptions regarding patient consultation via telepharmacy.

Data Analysis

Faculty first looked at overall scores and performance. Performance was reported as the proportions of students who successfully completed each competency outlined by the rubric (1 = *Achieved*, 0 = *Unachieved*). Overall scores of each consultation activity were compared utilizing a samples sign test and a Wilcoxon signed rank test. Overall scores were then compared between Groups 1 and 2 to determine if students in Group 1, who had first been evaluated during a live consultation, differed in their performance compared with Group 2, who had not yet been formally

evaluated during a live consultation. This comparison was made using a Pearson χ^2 test and Fisher's exact test of sample proportions. Since the perceptions were measured on a 4-point Likert-type scale, results report a distribution of responses across a scale as well as the mean and standard deviation for each item using an independent samples median test. All data were analyzed using SPSS Statistical Package version 22, and all hypothesis tests employed a 5% level of significance.

Results

Eighty-two out of the 84 enrolled students participated in the telepharmacy and live consultation activities. For the telepharmacy activity, students scored an average of 7.8 out of 10 points (78%). Overall, students were more successful during the live consultation, scoring an average of 9.0 out of 10 points (90%). Using an arbitrary benchmark of a 70% pass rate, students demonstrated they were able to successfully counsel via both means of communication. As seen in Table 1, statistical comparisons between the overall scores showed a statistically significant difference ($P < .001$) in

Table 2. Student Perceptions of Providing Consultation via Telepharmacy.

	Strongly Disagree	Disagree	Agree	Strongly Agree	Mean	SD
I found no difference in how I provided patient education when counseling via telepharmacy.	1	30	42	9	2.7	0.67
I found no difference in the importance of conveying empathy and patient understanding when counseling via telepharmacy.	3	21	43	15	2.9	0.75
I found no difference in my voice tones and volume when counseling via telepharmacy.	1	34	39	8	2.7	0.67
I found no difference in the importance of eye contact when counseling via telepharmacy.	5	28	36	13	2.7	0.81
I found no difference in the importance of nonverbal cues such as head nods, and body language when counseling via telepharmacy.	5	22	42	13	2.8	0.79
I found no difference in the importance of my role of an active listener while counseling via telepharmacy.	3	11	47	21	3.05	0.74
I found no difference how attentive I was to patient response while counseling via telepharmacy.	1	22	44	15	2.89	0.70
I did not ask more questions regarding patient symptoms when counseling via telepharmacy.	2	30	44	6	2.66	0.65
I did not find it more difficult to counsel via telepharmacy even though I was physically removed from the scene.	6	42	33	1	2.35	0.64
I found no difference in my ability to identify the level of patient understanding and education while counseling via telepharmacy.	2	33	41	6	2.62	0.66
I found the level of stress during consultation was no greater when counseling via telepharmacy.	10	30	38	4	2.44	0.77
I found I was able identify the emotional and verbal cues from the patient while counseling via telepharmacy.	3	26	46	7	2.70	0.68
I found it was not more difficult to be engaged when counseling via telepharmacy.	1	29	43	9	2.73	0.67

students' ability to counsel via face-to-face and via telepharmacy technology. Further evaluation showed no substantial difference among 2 specific rubric criteria when counseling via the 2 means of communication (Table 1).

Furthermore, data analysis failed to show a statistical difference between Groups 1 and 2. Therefore, additional practice and previous evaluation during a face-to-face consultation did not influence performance during a telepharmacy consultation.

Last, the questionnaire results for students' perceptions of providing consultation via telepharmacy were analyzed (Table 2). Overall question analysis showed Group 1 found a greater difference between live and telepharmacy consultation compared to Group 2 with mean scores of 2.6 and 2.74, respectively ($P < .05$). Students in Group 1, who had already been evaluated during a face-to-face consultation tended to disagree with questionnaire item statements more so than students in Group 2, demonstrating that students in Group 1 found a greater difference between patient consultation via telepharmacy and face-to-face ($P < .05$). When these individual questions were analyzed, the only statistically significant difference was found with the question, "I

found no difference in my voice tones and volume when counseling via telepharmacy."

Although information regarding nonverbal communication was not formally assessed during the evaluation of student performance, the standardized patient provided multiple written comments throughout the evaluation process. The standardized patient consistently reported students' eye contact was not acceptable during the telepharmacy encounter.

Discussion

Study results showed that students were able to successfully provide patient consultation via telepharmacy without prior practice with telepharmacy equipment. This is based on an arbitrary faculty-set benchmark of 70% to signify successful completion. Although students successfully provided consultation via both methods, students were significantly more successful providing face-to-face consultation. Since no statistically significant differences were seen among 2 specific rubric criteria, this suggests there was not one certain skill assessed by the rubric that

students missed consistently between the 2 forms of consultation. Although all students had baseline instruction and practical application of face-to-face consultation, the additional practice and evaluation had by Group 1 did not affect students' ability to provide patient consultation via telepharmacy.

Overall, students with additional practice and evaluation during face-to-face encounters perceived a greater difference between the 2 forms of consultation. Students noticed differences in difficulty, stress, interpreting patient cues, and in maintaining eye contact and tone of voice between the 2 means of consultation. The students' perceived differences could be attributed to their comfort with the face-to-face consultation as this is the method in which they most frequently practice in the laboratory setting. Furthermore, these perceived differences could have attributed to students being more successful providing the face-to-face consultation. Although the design of telepharmacy technology is to show little difference between remote and face-to-face interaction, the results of this study show when it comes to pharmacy education, having more exposure and practice with the telepharmacy technology could potentially benefit the students.

One limitation of this study is that data were not collected to determine if students had used or observed the use of telepharmacy technology during their internships or experiential education. Also, data were not collected to evaluate students' exposure to technology embedded in modern social media including Skype or FaceTime. Students who have utilized such technology may feel more prepared to use telehealth technology without prior formal training. Also, demographical makeup of student populations in colleges and schools of pharmacy can vary. Another limitation of this study was such information was not collected to be extrapolated to various institutions. Furthermore, all forms of telemedicine and telepharmacy are not equal. Although this study is applicable to the North Dakota model of telepharmacy, it may not be applicable to the standards of practice in every state. Last, standardized patient utilized in this research was consistent and trained for the encounter. The consultation scenarios and the standardized patient cannot possibly represent all patient consultations and populations students could potentially encounter while providing pharmaceutical care.

Follow-up research could be conducted to determine if additional practice and evaluation in providing patient consultation via telepharmacy enhances overall telepharmacy activity scores and diminishes perceived differences. Future research could also focus on students' nonverbal communication skills using telepharmacy technology. Criteria could include distracting gestures, eye contact, body position, and ability to see the patient during the entire encounter on the video monitor.

Conclusion

From this study, students appear to have the ability to counsel patients via telepharmacy in North Dakota regardless of how much experience or formal evaluation they have with face-to-face consultation. However, students performed better during the face-to-face consultation so additional practice with telepharmacy consultation may be warranted. This could be attributed to students' perceived difference between providing consultations via telepharmacy and face-to-face. When evaluating the need to educate professional pharmacy students on how to provide consultation services via telepharmacy, results of this study show it may not be required to aid in overall student success, but it may be beneficial so students become more comfortable and proficient with the technology.

Declaration of Conflicting Interests

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