

BRIEF

Interprofessional Medication Error Disclosure Training Using a Telehealth Consultation Simulation

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Objective. Health professions students must develop collaborative skills to disclose errors effectively and improve patient safety. We proposed that an interprofessional simulation using telehealth technology would provide medical and pharmacy students the opportunity to practice, develop, and grow in their confidence and skills of working collaboratively and disclosing medication errors.

Methods. A three-phase interprofessional student simulation was developed. Phase 1 included individual student preparation. An interprofessional telehealth consultation encounter occurred in phase 2 for the error disclosure between the pharmacy and medical students. Phase 3 included faculty-led interprofessional debrief sessions. A pre- and postsimulation survey assessed students' experiences regarding their confidence in error disclosure, use of telehealth technology, and the role of the community pharmacist. Faculty evaluated pharmacy student performance using a 12-point rubric.

Results. Presimulation survey responses (n=173) were compared to postsimulation survey responses (n=140). Significant changes were seen for all students' confidence in error disclosure and use of telehealth technology. No significant change was noted in the students' understanding of the community pharmacists' role on the interprofessional team. Pharmacy student performance-based rubric data (n=148) revealed a median score of seven out of 12 for error disclosure and interprofessional communication items.

Conclusion. Medical and pharmacy students perceived their confidence improved in interprofessional error disclosure and use of telehealth consultation technology through this interprofessional simulation. Pharmacy students' error disclosure and interprofessional communication skill development were assessed through this simulation.

Keywords: interprofessional education, simulation, error disclosure, telehealth consultation, community pharmacy

INTRODUCTION

Medical errors, defined as “the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim,” often result in preventable adverse events including increased morbidity and mortality. Medication errors are one of the most common types of medical error and frequently occur due to inadequate medication reconciliation during transitions of care.^{1,2} Pharmacist-led

medication reconciliation has reduced health-system use and improved medication safety.² Dillon and colleagues demonstrated that teams with a pharmacist showed a significant reduction in the severity of medication errors.³

It is vital that a coordinated error communication approach is used between health professionals, particularly when pharmacists identify medication errors during medication reconciliation. Mazan and colleagues reported that full medication error disclosures to the patient are not being achieved by practicing pharmacists, and they identified the importance of integrating this skill into the pharmacy curriculum.⁴ Pharmacy school curricula are required to prepare and assess students' practice readiness to

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collaborate in an interprofessional team to promote the health of populations through minimizing medication errors.⁵⁻⁷ To accomplish this, students must be able to display effective interprofessional team error disclosure behaviors, which include three general stages of team disclosure: discussion of medical error, planning of disclosure to a patient, and conducting an actual disclosure to the patient.⁸ Studies by Gardener, Krumwiede, and colleagues noted the importance of effective error disclosure communication in the interprofessional setting while emphasizing the limited formal training graduates of health professions receive in error disclosure.^{9,10} Their approaches, with work from McDonough, Marshall, and colleagues, demonstrated changes in student attitudes and confidence through interprofessional error disclosure simulations with standardized patient actors and debriefing sessions.⁹⁻¹² Ragucci and colleagues conducted similar research that demonstrated improved confidence and team proficiency in disclosing medical errors.¹³ These studies, with research by Porier and colleagues, demonstrated increased student confidence and value in disclosing medical errors in the interprofessional setting through the training experience.^{10,13,14} While evaluation of the team as a whole has been demonstrated, individual student evaluation of skill development in error disclosure is lacking.¹³

Interprofessional collaboration now encompasses technology, such as telehealth or the use of electronic information and telecommunication strategies, including synchronous video conferencing, to provide virtual health care to patients in a real-time, face-to-face manner.^{15,16} Telehealth consultation is the use of telehealth resources to facilitate collaboration and communication among health professional team members to manage mutual patients' health and jointly develop care plans.¹⁷ As students prepare

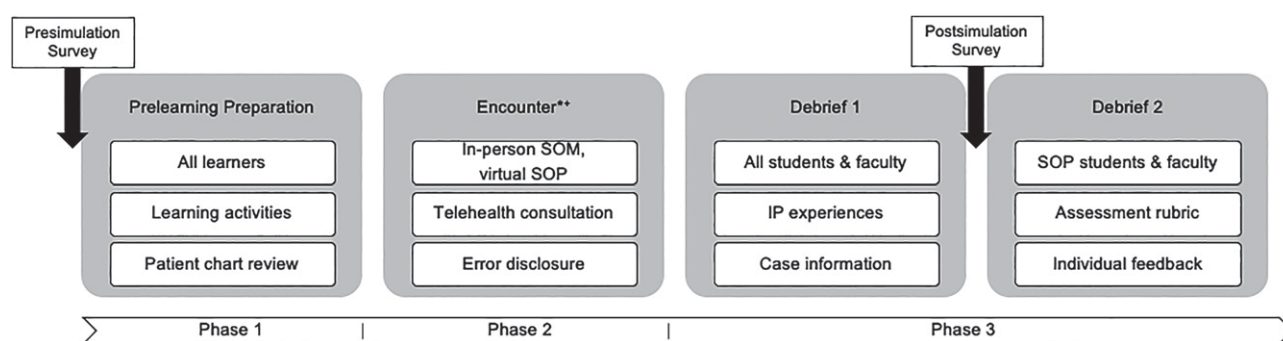
for direct patient care, they must be familiar with how to properly use and collaborate with others through this format.

The purpose of this study was to understand the effect that a simulation, which involved a telehealth consultation between a medical student and pharmacy student to disclose medication errors, had on their confidence and the faculty-assessed competence of their skills. The primary outcomes measured were students' self-perceptions of confidence in error disclosure, use of telehealth consultation, and roles of the community pharmacist when providing medication therapy management. The secondary outcome was assessment of pharmacy students' skills in disclosing errors to another health professional.

METHODS

This simulation paired pharmacy students with medical students located on different campuses using Zoom version: 5.5.5 video recording software (Zoom Video Communications Inc). During the 2018-2019 academic year, second-year pharmacy students and third-year medical students were involved in the simulation experience, fulfilling both programs' interprofessional education requirements. The simulation case timeline spanned the day of hospital discharge to the day after discharge in the community pharmacy. The simulation included three phases as detailed in Figure 1.

The first phase consisted of prelearning activities to prepare all students for the simulation. All students reviewed a medication error identification and disclosure podcast.¹¹ Additionally, medical students participated in a team planning simulation at the time of hospital discharge.¹⁸ All pharmacy students viewed a prerecorded standardized patient actor encounter video of a community



This simulation included three phases of student engagement. Phase 1 included individual student preparation for the simulation. All students reviewed pertinent patient chart information and a medication error identification and disclosure podcast. Additionally, pharmacy students viewed a medication therapy management encounter video, and medical students participated in a discharge planning simulation. Phase 2 included the telehealth consultation between medicine and pharmacy students for the error disclosure. The final phase included faculty-led interprofessional and profession-specific debrief sessions.

Key: * =real-time video viewing; **=video recorded for later review; IP=interprofessional; SOM=school of medicine; SOP=school of pharmacy.

Figure 1. Error Disclosure Simulation Components and Flow

pharmacist providing medication reconciliation services the day after discharge. Pharmacy students were instructed to reconcile and identify medication errors based on the health information provided related to the patient's discharge and recorded video.

The second phase, the simulation encounter, consisted of a telehealth consultation between a pharmacy student as the community pharmacist and a medical student as the discharging hospital physician. During this encounter, the pharmacy student discussed concerns regarding the patient's discharge medication orders with the medical student who was responsible for the patient's discharge. Discussion between students involved rectification of discharge medication orders, addressing identified medication errors, and implementing a plan to disclose and correct the errors. Video feed of the encounter was observed by interprofessional faculty during the encounter and for later review by pharmacy faculty via recording capabilities.

The final phase was the debrief phase of the experience. An interprofessional faculty-conducted, structured team debrief regarding students' interprofessional experiences occurred immediately following the simulation. Pharmacy students later participated in a pharmacy only faculty-led debrief and were able to review their individualized feedback via a performance-based rubric.

The performance-based rubric was developed by pharmacy faculty and incorporated elements from the Accreditation Council for Pharmacy Education (ACPE) Standards, Center for the Advancement of Pharmacy Education (CAPE) Outcomes and core entrustable professional activities and work of Kim and colleagues.⁵⁻⁸ The rubric focused on the population health promoter and interprofessional team member entrustable professional activity domains and CAPE domains 2 and 3. Faculty evaluated students' pre-advanced pharmacy practice experience (pre-APPE) achievement level regarding medical error disclosure and interprofessional communication entrustable professional activities on 12 items each assigned a point-based score. Higher scores denoted higher proficiency of completion and satisfactory demonstration for each item.

Students were requested to complete a voluntary, anonymous, nonvalidated, 12-question survey before and after the simulation, which used a five-point Likert scale. Survey item development was informed by the modified Team-Oriented Medical Error Communication Assessment Tool and the faculty team.⁸ Of the 12 questions, there were nine shared questions designed to identify changes in student responses from the simulation in the areas of error disclosure conducted between health professionals, the use of telehealth consultation, and the roles of the community pharmacist when performing medication therapy management. Three questions regarding the student's perception of

the telehealth consultation were asked only postsimulation and were not included in this report.

Descriptive statistical analyses were conducted for quantitative survey and rubric data using Microsoft Excel version 15. Wilcoxon rank sum statistical analysis was performed on the nine survey question results using SPSS version 22 (IBM Corp). We considered $p < .05$ to be significant. This study was approved by the University of Kansas institutional review board.

RESULTS

During the 2018-2019 academic year, 145 pharmacy students and 137 medicine students participated in this simulation. Due to class size differences, the eight additional pharmacy students were paired with a medicine resident or fellow. For the presimulation survey, 99 pharmacy responses (68%) and 74 medical responses (54%) were collected. For the postsimulation survey, 94 pharmacy responses (65%) and 46 medical responses (34%) were collected. School of medicine and pharmacy quantitative survey response data were analyzed separately, and results are provided in Table 1.

Significant improvements in perceived confidence to disclose medication errors and use telemedicine consultative services were seen for all students from before to after the simulation. Significant improvements were also seen in students' reported understanding of medication therapy management as performed by community pharmacists for all students. Students reported no change in their understanding of the role of the community pharmacist in patient care, both in the community setting and as a member of the interprofessional team. Faculty evaluated all participating pharmacy students' error disclosure and interprofessional communication skills using the performance-based rubric ($n=145$), with results provided in Table 2. Data revealed a median overall score of seven out of 12 on the error disclosure and interprofessional communication items. Students scored the highest, indicating greater competency, in the areas of communication and contributing to team discussion of the errors. The lowest scoring areas, indicating lower competency, included acknowledging that errors occurred, planning roles for disclosure of the error to the patient, and planning and anticipating patient questions.

DISCUSSION

This simulation achieved the intended learning outcomes of improving all students' perceived confidence in disclosing medication-related errors. These findings add to the prior body of evidence demonstrating benefit in developing error disclosure skills through use of interprofessional simulations.⁹⁻¹⁴ These skills are essential to

Table 1. Median Survey Data Shared Question Pairs with Significance

Survey items	Pharmacy			Medicine		
	Pre ^a n=99	Post ^a n=94	Significance p value	Pre ^a n=74	Post ^a n=46	Significance p value
Telehealth services						
I would use telemedicine consultative services again	3	4	<.001	3	4	<.001
I feel comfortable communicating with clinicians using a telemedicine system	3	4	<.001	3	4	<.001
Telemedicine is an acceptable way to receive consultative services	3	4	<.001	3	4	<.001
Pharmacist role						
The primary role of community pharmacists is to fill and dispense prescription medications to patients	2	2	.78	3	3	.33
The community pharmacist is an important member of the interprofessional healthcare team	5	5	.97	5	5	.85
I feel confident that I know what MTM is when provided by a community pharmacist	4	5	<.001	3	4	<.05
Error identification and disclosure						
I know how to identify how a medication error may have been caused	4	4	<.001	3	4	<.001
I am comfortable reporting to a fellow colleague/peer an intercepted or actual medication error I made	4	4	<.001	3.5	4	<.001
I am comfortable reporting to a fellow colleague/peer an intercepted or actual medication error someone else made	4	4	<.001	3	4	.001

Abbreviations: MTM=medication therapy management.

^a Responses based on the five-point Likert scale: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree.

ensure health professions students are equipped to prevent future errors across health care systems as they enter practice.

Students also reported gaining confidence in using telehealth consultative services through this simulation. With the growing use of telehealth technology in health care, our simulation allowed students to gain confidence with its use before entering practice. Incorporating telehealth technology in education is noted in emerging proposals for entrustable professional activities within medical and nursing curricula but is not yet within pharmacy curricula.¹⁹⁻²¹ To our knowledge, this is the first report of combining an error disclosure simulation with this key medium of interprofessional communication to inform future practice. The use of video communication technology during the simulation allowed for multiple campuses to connect in real time, reducing the need for travel while also allowing for the continuation of this simulation as a fully remote experience during the COVID-19 pandemic.

A significant change was noted in pre- to postsimulation survey results regarding the pharmacists' role in medication therapy management. This is contrasted with no significant change in outcomes related to the primary role of the pharmacist in the community setting and as a member of the interprofessional team. The absence of change noted is attributed to students likely having already developed an accurate picture of the pharmacist as a member of the interprofessional team and their expanded role beyond medication dispensing, but they may have not yet been familiar with community pharmacists' role in providing medication therapy management services.

Additionally, the simulation was effective in allowing pharmacy students to demonstrate foundational skills associated with error disclosure. Currently, this simulation is the only pre-APPE learning activity where students practice error disclosure process skills within the University of Kansas pharmacy curriculum. Using the performance-based rubric median score from the 2018-2019 academic

Table 2. Assessment Rubric for Pharmacy Students

Rubric item	Students who completed the item, No. (%) (n=145)	Median score^a
Contributed to team discussion of error		
Acknowledged error occurred	72 (49.7)	0
Positive instance: Recognizes that an error has happened		
Presented error in a blame-free tone	112 (77.2)	1
Positive instance: Talks about what happened without blaming others, responds effectively to attempts to blame		
Build team consensus	130 (89.7)	1
Positive instance: Solicits and respects team members' viewpoints about what happened; focuses on patient-centered goals, responds empathically to each other's distress about event, willing to speak against authority gradient		
Negotiated differences in opinion collaboratively	129 (89.0)	1
Positive instance: Listens, paraphrases, yields floor/doesn't interrupt, summarizes to check for mutual understanding		
Contributed to team planning for error disclosure		
Advocates for full disclosure	28 (19.3)	0
Positive instance: Lists reasons why full disclosure is desirable; responds respectfully and effectively to arguments presented to the contrary		
Plans role for disclosure	66 (45.4)	0
Positive instance: Collaborates on a plan for the disclosure that includes who will lead and what role each team member will play		
Anticipates patient's questions and reactions	21 (14.5)	0
Positive instance: Anticipates likely questions and reactions from patient		
Plans response to patient	30 (20.7)	0
Positive instance: Formulates reasonable responses to patient from team		
Communication		
Appropriately uses medical jargon, minimizes pharmacy-specific jargon	142 (97.9)	1
Uses appropriate communication to suit the team members	141 (97.2)	1
Has an organized approach to provider encounter	112 (77.2)	1
Pace, volume, and eye contact are appropriate to communicate clearly	137 (94.5)	1
Overall rubric median completion score		7

^a A score of 0=noncompletion of item by >50% of students; 1=completion of item by >50% of students.

year allowed for the identification of students who performed below average compared to their peers, thus allowing faculty to discuss with these students individually the areas/skills in which they needed improvement. Continued exposure to the skills that had the lowest performance—which were acknowledging that errors occurred, planning roles for disclosure to the patient, and planning and anticipating the patient's response, questions, and reactions to the error disclosure—will be considered in future curricular activities. Additional data from surveys and rubric assessments collected in future simulations may confirm or refute data collected and analyzed from the 2018-2019 academic year. This interprofessional education activity is mapped to ACPE Standards, CAPE Outcomes, and entrustable professional activity core competencies related to interprofessional patient care

and medication error minimization.⁵⁻⁷ While error disclosure simulations have been studied for pharmacy students' self-reported attitudes and perceived confidence, this is the first study to specifically evaluate their skill competency in error disclosure.¹¹⁻¹³

Limitations noted that hinder the generalizability of the findings include differing pre- and postsimulation response sizes between both medicine and pharmacy learners. The use of "comfort" versus "confidence" in select survey items may have led to a higher agreement with the statement without fully reflecting true confidence in the targeted skill. Modifications to these survey items would be beneficial to implement in future iterations of this simulation. Finally, data from only a single academic year and institution were included. Further expansion of data collection would strengthen these findings.

This study was not designed to assess the competency of the team (as a whole) in the error disclosure process, as completed by Marshall, Kim, and colleagues, which made it difficult for pharmacy evaluators to assess only pharmacy students' role within the team unit's discussion surrounding the error.^{8,12} Additionally, this study addressed the initial steps of team discussion of the error and planning for the disclosure. Future expansion of the simulation experience may include incorporating a simulation component allowing students to disclose the error(s) identified to a standardized patient actor to build confidence and competence with this interprofessional skill.

CONCLUSION

This interprofessional simulation allowed students to practice using interprofessional communication to disclose a medication error, resulting in increased perceived student confidence in error disclosure. The use of telehealth consultation provided a unique educational experience and allowed multiple campuses to be involved.

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