ORIGINAL RESEARCH

Virtual objective structured clinical examination for family nurse practitioner students using a Zoom platform in the time of COVID-19

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ABSTRACT

Objective: In response to school shut downs amid the COVID-19 pandemic, nurse educators from the University of Southern California implemented a virtual objective structured clinical examination (OSCE) using standardized patients (SPs) to assess family nurse practitioner (FNP) students' clinical and communication skills as an alternative to the traditional in-person OSCE format. The intent of this paper is to share the nurse educators' experiences with the transitional process and students' feedback about their virtual OSCE experiences.

Methods: Students ($N = 36$) enrolled in a childbearing/childrearing clinical course participated in the virtual OSCE using Zoom. The experience included briefing and debriefing sessions. Students were evaluated for their communication and clinical decision making skills based on their assessment of two adolescent patients: one acute with behavioral problems presenting for a checkup and one with headache.

Results: All students who participated in the virtual OSCE experience demonstrated appropriate clinical and communication skills. Students perceived the virtual OSCE as a realistic model for telehealth but missed social interaction with faculty and peers and found their inability to conduct physical exam maneuvers challenging. The majority (79.3%) preferred interacting with patients face-to-face.

Conclusions: Virtual OSCEs used as low-stakes formative assessments provide FNP students with effective and valuable learning experiences. Transitioning from in-person to virtual OSCEs using Zoom is feasible but requires extensive collaboration between nursing educators and those with access to simulation facilities, such as faculty from schools of medicine. Findings from this experience will serve as a guide for deliberate process improvements for future iterations.

Key Words: Virtual learning, Objective structured clinical examination (OSCE), Simulation, Standardized patients, On-site clinical intensive (OCI), Telehealth

1. INTRODUCTION

In an era where fewer and fewer opportunities for human interfacing are available and hybrid and online nursing education models have become more and more ubiquitous,[1] it should not be surprising that nurse educators have turned to virtual opportunities for objective structured clinical examination (OSCE) implementation through platforms such as ZoomTM.[2] This alternative also is being used to assess medical students.[3] As the COVID-19 pandemic, almost overnight, rendered the traditional education landscape impractical and schools shut down to slow the spread of the virus, promote social distancing, and keep students and faculty safe, more nurse educators have turned to virtual OSCEs as an alternative to the in-person OSCE they typically used

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to assess family nurse practitioner (FNP) students' clinical skills.

In response to school shut downs amid the COVID-19 pandemic, at the University of Southern California (USC) Suzanne Dworak-Peck School of Social Work, Department of Nursing, four nurse educators, in collaboration with five faculty of the Keck School of Medicine's (KSM) Clinical Skills Education and Evaluation Center (CSEEC), developed a virtual OSCE model using pseudo pediatric standardized patients (SPs) for FNP students in an online clinical childbearing/childrearing course. The development and implementation of the virtual OSCE experience reflected best practices outlined by Goh et al.[4] and included the four basic components of Doerr and Murray's[5] simulation learning pyramid.

The most important part of the simulation experience is debriefing.[6, 7] The debriefing activity for the virtual OSCE was developed based on Zigmont et al.'s 3D model of debriefing with special attention paid to alleviating student anxiety as described by Becker et al.[8] The overall transition process was guided by the curriculum integration framework.[9]

The intent of this paper is to share the nurse educators' experiences with the transitional process and students' feedback about their virtual OSCE experiences. An explanation of simulated and case-based learning, the OSCE model, and SPs provides a framework for describing the transition process and for understanding student experiences. Student feedback is presented, and implications for nursing education are included in the conclusion.

2. BACKGROUND

2.1 Simulated and case-based learning

An important benefit of simulation is that it is a decisive means of mimicking diverse clinical characteristics of patients in a safe and controlled environment[9] and acute patient situations that are difficult to capture in actual clinical settings.[10] Virtual simulation contributes to the development of clinical judgment skills and overall improved student learning.[11, 12] However, not all simulations are effective. Doerr and Murray's simulation pyramid provides guidance in this regard. Built on concepts drawn from Knowles's[13] adult learning theory (i.e., adult learners are experienced and intend to contribute to how their learning process is constructed and to how they are evaluated), Doerr and Murray's[5] simulation pyramid is a framework in which a well-organized and structured simulation plan (bottom tier of the pyramid) supports the implementation of a simulated exercise followed by focused debriefing that effectively promotes transfer of knowledge to actual clinical skills in practice.

The plan includes goals and objectives for the simulation exercise, the choice of an appropriate patient, and the development of a simulation that provides learners with scenarios that will allow them to achieve the identified goals and objectives of the simulation plan.[5] Ideally, the clinical cases studied should be similar to the patient cases the students will encounter in their actual clinical practices.[9] Prior to implementing the simulation, it is important that students are informed about the expectations for the exercise, including not only the physical elements of the simulation but the importance of believability in the patient and scenario.[5] Debriefing after simulation should be conducted in a safe and nonthreatening environment[14] and begin with an overview of the expectations for the debriefing activity[7] and positive feedback about what students did well,[5] an important step for reducing student anxiety and generating a positive mental space that promotes growth.[8] Students should then be engaged in the defusing and discovering phases where they are encouraged to share their emotional reactions to their experience and evaluate their performance, respectively.[7] Only then should debriefing facilitators offer constructive criticism and a plan for addressing shortcomings, limited to only a few focused areas of weakness.[5] Ideally, students should be provided a chance to deepen their learning through immediate application in practice.[7] Whether or not offering such opportunities is feasible, facilitators should provide a summary of lessons learned[7] and allow students to reflect on their overall experiences considering, in particular, their levels of satisfaction with the experience—a final step in reducing student anxiety as they exit the encounter.[8]

Student reflection on their learning experiences during debriefing is critical to knowledge transfer[5] because this reflection allows students the opportunity to consider the reasoning behind their actions during the simulation, a process that promotes not only self-assessment but also self-correction.[9] To facilitate student learning during debriefing, it is essential that simulation facilitators be well-trained in the debriefing process.[14]

Well-designed simulation that effectively promotes hands-on learning includes time to practice clinical case scenarios.[5, 9] This practice helps develop students' motivation to learn, reinforces actual learning, and promotes retention.[5] As opposed to problem-based learning in which students typically are not prepared for the case scenarios with which they are presented,[15] case-based learning also exposes students to the case content in advance of the practice exercise.[16] The use of case-based learning in preparation for the OSCE has been shown to help students better connect theory to practice[17] and to improve interpersonal skills, communication, and clinical performance on the actual OSCE.[18]

2.2 The OSCE model

The OSCE model was developed as an alternative to traditional clinical examinations and provided a method for better control of the examination variables and their complexities and for broader testing of student knowledge.[19] The model has been well-established as the standard tool in clinical assessments in the medical field since 1970.[4] During its early use in nursing education, questions arose as to the reliability and validity of using a modified OSCE model that better reflected the clinical competencies expected of nurses[20] and its value as an assessment of clinical competencies.[21] Since that time, studies have shown the OSCE is a valid and reliable measure of core skills[4, 22–24] and professionalism[25] and that it is well-received by nursing students as a fair method of assessment.[22, 26] Use of the OSCE with nursing students is now widely accepted and used by nurse educators.[4, 26] Important elements in the design of OSCEs for assessing clinical nursing skills and knowledge are (a) alignment between the number of assessed competencies and the number of OSCE stations (at least three), (b) a specified time frame for the entire OSCE experience (1-3 hours) and for each of the stations (10-20 minutes), and (c) use of a global rating scale to ensure objective assessments across evaluators and to provide a normed reference for determining passing criteria.[4]

When compared to traditional OSCEs, virtual OSCEs are advantageous because they allow for easy digital recording of sessions for playback and review, eliminate the need for student and faculty travel, and are cost-effective.[2] Most importantly, they expose students to the growing phenomenon of telehealth.[2, 27] When developing a virtual OSCE program, technical support is imperative and may require collaboration with other schools, such as schools of medicine, that have technical resources and training or simulation labs.[2] Existing in-person case scenarios can be repurposed for the virtual setting but ultimately should reflect an actual telehealth exchange between a patient and the provider.[2] When used in its full capacity as an evaluation of skills necessary to meet requirements for graduation, as opposed to strictly for practice, students should be provided ample opportunity to become familiar with the virtual platform and expectations of the virtual encounter.[3]

2.3 Standardized patients

Barrows and Abrahamson, both from USC, used the first standardized patient in 1963.[28] Barrows and Abrahamson,[29] an assistant professor of neurology and the director of research in medical education, respectively, identified the need to test medical students' clinical skills in a way that ensured each student was being assessed consistently. The "programmed patient" provided a means to eliminate the need for and potential influence of a third-party evaluator in the scenario and minimize the inequities introduced by (a) variables in patients' capacity for language, awareness, and tolerance to being examined; (b) the lack of control over differences between patients; and (c) the inability to ensure the accuracy of patient histories. The first programmed patient was a professional model and actress who Barrows and Abrahamson trained both to simulate severe spinal cord damage with urinary urgency and to evaluate student performance. Although Barrows and Abrahamson noted that patient expression of some reflexes were a challenge, they concluded the use of the programmed patient to be effective in light of its capacity to eliminate the influence of varying patient behavior and third-party evaluators.

Slow to take off, by 1993, more than three quarters of medical schools that participated in an Association of American Medical Colleges survey reported using standardized patients for student training, and one quarter of the schools were using them for formal examinations.[28] Today, the use of SPs for OSCEs is well-established in the fields of medicine and nursing.[4, 23] As an educational tool, use of SPs has a positive influence on student self-efficacy and motivation to learn, which affects student acquisition of knowledge and clinical skills.[30] SPs may be real or simulated patients, who may be represented by people from within (e.g., faculty member, clinicians, students) or outside (e.g., volunteers, paid actors) the academic setting.[4]

Although not a common practice, children have been used as SPs for assessing pediatric clinical competencies.[31–34] Children are capable of providing effective feedback and can function as valid, reliable, and practical SPs.[34] Older children have reported positive experiences as SPs,[34, 35] and the case has been made for continued use of children as SPs for pediatric assessment, albeit with responsible planning and meticulous execution.[31, 34] However, further ethical consideration is warranted regarding this practice.[35]

3. APPROACH

All FNP students enrolled in the NURS 601 clinical course at USC are required to perform an efficient health history and a relevant, orderly, and complete physical examination for the childbearing or childrearing patient, and to analyze data from the history and physical to prioritize interventions based on the severity and complexity of the health problem. Since the inception of the online master's level FNP program at USC in 2016, the OSCE model has been used as a low-stakes formative assessment of those clinical skills. The opportunity is considered a learning experience.

Students traditionally completed their OSCEs with SPs as part of an on-site campus intensive (OCI), an inaugural venture developed in collaboration with the KSM. With the online portion of the course and in-person OSCE in place, the underlying framework for the virtual OCI, including the virtual OSCE model, was well-established. The translation of the in-person OCI to the virtual OCI was approved by USC's Institutional Review Board as a quality improvement learning process project (#UP-20-00487).

Both the pre-COVID 19 online course with the in-person OCI and OSCE and the post-COVID 19 online course with the virtual OCI and OSCE were facilitated using Zoom and a commercial learning management system. Both courses included the same instruction in content knowledge and practical skills, patient assessment practice (student role-playing), and OCI with OSCE experience using pseudo pediatric patients and including briefing prior to and following the OSCE experience. Table 1 shows the modifications to the course to accommodate the virtual OCI and OSCE experience.

3.1 Virtual OCI
The virtual OSCE experience was part of a 2-day virtual OCI event. On OCI Day 1, students learned and practiced clinical skills. On OCI Day 2, students participated in a short orientation (i.e., briefing) and the virtual OSCE experience, engaged in a mindfulness exercise focused on self-care, and attended a virtual lecture on respiratory radiology that included a potential COVID-19 differential diagnosis. All students ($N = 36$) in the NURS 601 clinical course participated in the virtual OCI and OSCE experience. The students, located throughout the United States, were registered nurses in the FNP program at USC.

3.2 Virtual OSCE
Five KSM faculty and three SPs served as OSCE monitors and were responsible for opening the breakout rooms, beginning the sessions, activating the shared screen with patient data, keeping track of time, and ending the sessions. KSM faculty were familiar with the Zoom platform. The KSM SP educator familiarized the monitors with the Zoom platform. During the orientation, students were briefed on expectations for the OSCE experience and how the experience would be facilitated in the Zoom platform.

Thirty-five of the students participated in the OSCE experience on Day 2 of the virtual OCI. All of those students were briefed as a group during the short OSCE orientation; students learned about the expectations for the patient assessments and how the assessment process would work in the Zoom platform. To accommodate the limited number of SPs, the students were divided into five groups of seven, each group with a different schedule for rotating through the SP assessments, debriefing, mindfulness exercise, and respiratory radiology lecture. One student completed the virtual OSCE experience the day after the other students. Other than the change of day, no changes were made to the OSCE protocol.

Each student was required to assess two pseudo pediatric patients–one acute with behavioral problems presenting for a checkup and one with headache, the latter of which required physical exam maneuvers–to generate differential diagnoses through clinical reasoning and formulate an appropriate plan of care. Students were allowed 25 minutes to review the patient data, conduct the assessment, and render their differential diagnoses. The case scenarios, used for previous in-person OSCEs, (a) provided students the opportunity to demonstrate their clinical and communication skills, including obtaining an appropriate patient history and performing a physical exam; (b) were appropriate for 2nd-year FNP students; and (c) reflected the content and patient population under study in the NURS 601 childbearing/childrearing course. Faculty from the KSM helped the nurse educators modify the in-person case scenarios for use in the virtual platform. Because of the virtual nature of the student-patient encounter, students verbalized their intentions for physical examination maneuvers (e.g., I would assess the sinuses; I would conduct a complete neurological exam) and made differential diagnoses and action plans based on (a) case data provided to them at the beginning of the scenario about the patient's presenting situation and vital signs, (b) data they collected through patient histories, and (c) data they collected asking probing questions. The assessment sessions were recorded. Immediately following the assessments, students were asked to reflect on their experience by responding to six prompts focused on working diagnoses, assessment approach, positive aspects of their performance, learning moments, and application of knowledge. Debriefing in designated breakout rooms followed.

Nurse educators, who facilitated the debriefing sessions, opened each debriefing session by clarifying their role in the moderation of the discussion and reassuring students that the debriefing session was an open and safe place to promote reflection and learning. Facilitators then encouraged students to consider their overall experience and identify successful aspects of their performance before asking students to consider areas of needed improvement. The debriefing session ended after facilitators summarized key learning points and students had an opportunity to verbalize a personal takeaway from the experience. Each debriefing session lasted 60 minutes.

Table 1. FNP Program Elements: Online with In-Person OCI/OSCE Versus Online with Virtual OCI/OSCE

Program element	Online with in-person OCI/OSCE	Online with virtual OCI/OSCE
FNP curriculum		
Instruction in content knowledge/practical skills	Established program for FNPs (via Zoom)	Established program for FNPs (via Zoom)
Patient assessment practice	Student role-playing with peer-to-peer feedback prior to the OCI/OSCE (via Zoom)	Student role-playing with peer-to-peer feedback prior to the OCI/OSCE (via Zoom)
OCI	In-person	Virtual
Day 1	Clinical skills	Clinical skills
Day 2	OSCE experience	OSCE experience
OSCE implementation		
Location	In-person on campus (OCI)	Virtual in breakout rooms (via Zoom)
Setting	Exam room at the CSEEC with 8 cameras	SPs' homes with 1 laptop camera
Patients	Standardized (in-person)	Standardized (at a distance)
Recording	Via CAE Learning Space software	Via Zoom
Monitors	2 KSM faculty (1 for managing student movement in and out of the exam room and 1 for managing announcements, recording performances, and keeping time)	5 KSM faculty and 3 hired assistants (each responsible for managing 1 breakout room: student movement in and out of the breakout room, providing patient data, recording performances, and keeping time)
Evaluators	3 nurse educators via live observation of 8 television screens in a viewing room at the CSEEC/via recordings on cloud link	4 nurse educators via recorded Zoom videos
IT management	Faculty from KSM	Faculty from KSM, SPs
Student OSCE experience		
Briefing	Expectations for OSCE (via Zoom)	Expectations for virtual OSCE including use of Zoom (via Zoom)
OSCE	2 pediatric patient encounters	2 pediatric patient encounters
Debriefing	Immediately following OSCE (in-person in debriefing room at the CSEEC)	Immediately following OSCE (via breakout rooms in Zoom)
Reflection	Assignment completed during the week following OSCE	Assignment completed during the week following OSCE

3.2.1 *Standardized patients*

SPs used for in-person OSCE experiences had previously been trained by an SP educator from the KSM. For the virtual OSCE, the SP educator contacted 11 actors who had played SPs in the past to confirm they (a) had availability for the scheduled OSCE dates, (b) possessed a computer or other digital device for accessing the internet, (c) had a reliable internet connection, and (d) would be willing to act as OSCE monitors. Via Zoom, the SPs learned the two adolescent patient scenarios. Each SP learned both scenarios and how to use Zoom to participate in the OSCE and to interact with the FNP students. Because the actors had played SPs in the past, they were familiar with OSCE processes for providing feedback about student performance using a provided checklist and no additional training was needed in this regard. However, SPs were instructed to provide appropriate feedback to the students as they narrated simulated physical examination maneuvers. SPs completed the evaluation checklist

immediately following completion of the assessment.

3.2.2 *Mock OSCE*

Two weeks before the virtual OSCE, the nurse educators, KSM faculty, and SPs participated in a mock virtual OSCE facilitated by the KSM faculty. All participants were provided detailed instructions. The purpose of the mock experience was to test the technology and implementation processes. It was during the mock OSCE that the faculty jointly determined that it was not feasible for the SPs to keep track of time while also playing the role of a patient and completing the evaluation checklist. At that time, the decision was made to assign the time-keeping duty to the KSM faculty monitors and to hire additional monitors (i.e., prior SPs) to assist in monitoring students. The faculty also decided that creating new Zoom accounts, rather than having students use their own, would (a) alleviate student stress of having to manage logistics of the OSCE experience, (b) keep the session video recordings in faculty control, and (c) eliminate concerns for

examination security and case privacy.

3.2.3 *Evaluation*

Evaluation of student performance was conducted as a low-stakes formative assessment of students' clinical and communication skills. The opportunity was considered a learning experience. SPs and nurse educators provided feedback about students' performances by completing Qualtrics surveys adapted from existing KSM SP feedback forms. Possible responses were yes/no, yes/somewhat/no, and yes/maybe/no.

The survey for the patient with the headache had one overall satisfaction item, 17 history items, nine physical exam items, two patient education and counseling items, and 10 nurse practitioner-patient interaction items. The survey for the patient with the behavior problems had one overall satisfaction item, 9 history items, three patient education and counseling items, and 10 nurse practitioner-patient interaction items. SPs completed the surveys immediately following the end of each student's assessment session. Nurse educators completed the surveys after reviewing the Zoom videos.

Table 2. Using Simulation and the (Virtual) OSCE Model: Evidence-Based and Best Practices Matrix

Evidence-based and best practice	Source
Use simulation in healthcare to mimic clinical practice	[9] [10]
Use simulation in healthcare to promote student learning	[11] [17] [18]
Use the OSCE model for comprehensive assessment of student knowledge	[4] [19] [22] [23] [24] [26]
Provide opportunities to practice clinical case scenarios	[5] [9] [16]
Provide opportunities to practice using the virtual platform	[3] [36]
Develop a plan and implement simulation	[9]
Include goals and objectives	[9]
Collaborate to access needed resources	[2]
Ensure adequate technical support is available	[2]
Use realistic case scenarios	[2] [5] [10]
Use well-trained SPs	[4] [23] [25] [27] [29] [30]
Use pediatric SPs as/when appropriate	[31] [32] [33] [34]
Provide 10-20 minutes for patient assessment	[4]
Conduct a mock simulation for troubleshooting purposes	[4]
Brief students about expectations for simulation activity	[5]
Record student performances for later review	[2] [4]
Include debriefing to promote knowledge transference	[5]
Ensure faculty are trained in the debriefing process	[14]
Actively seek to reduce student anxiety	[5] [8]
Debrief in a safe and nonthreatening environment	[14]
State expectations for the debriefing activity	[6] [7]
Encourage student reflection in the debriefing activity	[5] [8] [9] [10]
Begin debriefing with positive aspects of student performance	[5] [8]
Encourage students to share emotional experiences	[7]
Encourage students to evaluate their performance	[7]
Reassure students activity is low-stakes/it is safe to share mistakes and learning edges	[8]
Offer constructive criticism and limited areas of weakness for focused improvement	[5]
Summarize lessons learned	[7]
Encourage students to identify a key take-away message	[8]
Evaluate the simulation implementation process and outcomes	[9]
Use objective assessments	[4] [22]
Train evaluators to use assessment tools	[4]
Revise simulation experience based on feedback	[3] [5] [9] [12]

3.3 Evidence-based and best practices

Critical to the success of the virtual OCI and virtual OSCE was the use of evidence-based and best practices in their development. Table 2 shows the impetus for choices made during the development processes.

3.4 Collaborative effort

The success of the virtual OCI and OSCE was the result of interdisciplinary collaboration. Table 3, which shows the division of contributions by discipline, demonstrates the importance of strong interdepartmental relationships.

Table 3. Collaborative Framework

Program element	Nurse educators	KSM faculty
FNP curriculum		
Clinical content preparation	X	
Facilitation of in-class, case-scenario practice using Zoom (student role-playing and peer-to-peer feedback during synchronous live sessions)	X	
Post-OSCE reflective exercise	X	
OSCE development and preparation		
Adaptation of in-person case scenarios for applicability in the virtual setting	X	X
Trained SPs with case scenarios and using Zoom		X
Created OSCE breakout rooms		X
Developed monitor and SP scripts		X
SP checklists	X	X
Student self-assessment	X	
Logistical planning for the mock OSCE using case scenarios	X	X
Facilitation of mock OSCE		X
OSCE implementation		
Student briefing	X	
Placed students in breakout rooms		X
Managed students/SPs during OSCE		X (w/assistants)
Kept time during OSCE		X (w/assistants)
Generated link to Zoom recordings for nurse educators (i.e., evaluators)		X
Student debriefing	X	

4. STUDENT FEEDBACK

Immediately following the OSCE, all 36 of the students who participated in the activity were invited, via email, to complete a 9-item survey using Qualtrics. Four closed-ended survey items were designed to assess learner satisfaction with the virtual experience. Two of those four items were measured using a 5-point Likert scale with scores ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), and two were measured using a Likert-type scale with scores ranging from 1 (*poor*) to 5 (*excellent*). One dichotomous item was designed to determine students' preference of platform for assessing patients. Two open-ended items were designed to collect feedback about the students' experiences with the technology and the perceived realism of the experience. Two open-ended items prompted students to share suggestions for improving the virtual OSCE experience, and additional comments and thoughts. Students had 48 hours to complete the survey; 29 (80.5%) students responded.

4.1 Virtual OCI Experience

A number of students provided unsolicited feedback about the virtual OCI experience. Generally, the feedback was positive. Twelve students expressed their appreciation for the faculty's efforts putting the virtual OCI experience together. Students also described the experience using the terms "great," "absolutely/wonderful," "well-organized," "prepared," "valuable," "pertinent," and "extremely helpful." One student said, "I felt very supported and cared about." Another student noted the cost-effectiveness of the virtual OCI, which saved the student "about $1,000 by not flying and spending money on hotels and food." Other students found the use of breakout rooms helpful.

Fourteen students expressed their preference for an in-person OCI, particularly with regard to hands-on skills learning (OCI Day 1) and student interaction. Students said they "missed the social aspect of the face-to-face OCI" and "the sense of community and support." A number of students

wanted the OCI to be extended to have more time to delve into topics and so that they did not feel rushed completing activities. Students also asked for more practice with new skills, more breaks in between activities, and earlier access to asynchronous materials for lectures (OCI Day 1).

4.2 Virtual OSCE Experience

Feedback specifically about the OSCE experience was positive, with 58.6% of students describing their overall patient encounter as "excellent" and 34.5% describing it as "very good." Students expressed that they "enjoyed it a lot," "thought it was excellent [because] everything was extremely well organized," were "impressed with how smoothly it all [i.e., the virtual OSCE experience] went," and found it "beneficial to do . . . [the] assessment at home." Most students strongly agreed (51.7%) or agreed (41.4%) that the platform was acceptable for conducting a virtual OSCE. They also strongly agreed (38.0%) or agreed (48.3%) that the platform was an effective teaching method for conducting patient encounters in preparation for clinical practice, although 79.3% of students expressed a preference for face-to-face interactions with patients as opposed to virtual encounters.

Of the students who provided feedback about the realism of the virtual OSCE, almost all the students expressed that the experience was realistic. They described the experience as "incredibly realistic" (4.5%), "very realistic" (50.0%), "pretty realistic" (9.1%), and "realistic" (22.7%). One participant (4.5%) said the experience "seemed comparable" to other patient assessments of this nature, and one participant (4.5%) said it was "fairly realistic." Only one participant (4.5%) said "it was not realistic because it was difficult to separate from the fact that it [i.e., the SP] was an actor." When responding directly to the survey item about realism, more than one third of students (34.5%) made statements about the applicability of the OSCE in the era of telemedicine, specifically the value of being able to practice and become more comfortable in that capacity. Four additional mentions of telehealth/telemedicine were made in response to Item 9 (i.e., additional comments and thoughts). Students also indicated debriefing was beneficial and "provided such valuable clinical pearls."

Most students did not have any technical difficulties during their OSCE experience. One student suggested that "already being familiar with Zoom . . . helped" them be successful using the platform. Three small issues were noted on the day of the OSCE experience. One student mentioned getting "kicked out of Zoom during one session," and one student experienced a broken link for a SP rotation, which "was quickly resolved." Another student generally stated that when they "did have technical difficulties, it was swiftly taken care of."

Students did indicate they found it challenging to assess patients without the capacity to conduct physical exam maneuvers and suggested they would have appreciated more explanation and instruction about the expectations for the patient assessments as well as the opportunity for more SP encounters and encounters with more complex patients. Ideally, students would have benefited from practicing patient assessments in face-to-face encounters with patients. Additional suggestions were made to provide students equal amounts of feedback during debriefing and to consider the time zones in which students lived when generating the OSCE schedule so that students on the East Coast did not have conduct patient assessments later in the evening.

5. DISCUSSION OF FINDINGS

Students identified challenges of participating in a virtual OSCE experience, most notable the inability to engage in physical exam maneuvers when assessing patients. Despite these limitations, students were generally satisfied with the virtual format and indicated their OSCE experiences were realistic and resembled actual telehealth exchanges between a patient and their provider. Students were familiar with the Zoom platform and had little or no difficulty with the platform or the technology. Debriefing and feedback from SPs and faculty were beneficial. Student comfort and skill in assessing and communicating with patients in a telehealth capacity was improved and perceived to have practical applications.

These findings are similar to those reported by others who have implemented virtual OSCE experiences. The majority of students who participate in virtual OSCEs are capable of using technology to participate in the experience.[2, 3] Students consider the virtual OSCE similar to the in-person OSCE[3] as an acceptable means not only of demonstrating clinical and communication skills but of evaluating them as well.[2] Students find debriefing useful[2] and perceive the virtual OSCE to be a valuable exercise for future nursing practice in telehealth.[2, 3] Students appreciate the flexibility and cost savings associated with participating in an OSCE virtually[2] although the virtual physical examinations pose challenges.[3, 27]

6. CONCLUSIONS

Transitioning an in-person OSCE to a virtual platform required interdisciplinary collaboration and critical attention to detail. Despite having had the benefit of developing a virtual OCI and OSCE within the framework of an existing online nursing course, challenges for students became evident. Opportunities for growth include more explicit communication of expectations for students, more patient-assessment oppor-

tunities, and better processes for managing physical exam maneuvers similar to those currently used in existing telehealth practices. Virtual OSCEs used as low-stakes formative assessments provide FNP students with effective and valuable learning experiences. Findings from this first experience will serve as a guide for deliberate process improvements for future iterations.

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CONFLICTS OF INTEREST DISCLOSURE

The authors declare that they have no conflicts of interest.

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