Teledermatology Simulation: Piloting Efforts and Future Strategies to Model Interprofessional Collaboration in a Digital Workflow

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Background

Expansion of telemedicine (TM) during the COVID-19 pandemic has highlighted a potential to improve access-to-care for underserved communities. To maximize impact, health professional learners must practice using TM in various primary care situations. Considering that 6-7% of primary care visits are for a dermatologic complaint, faculty at the University of Oklahoma School of Community Medicine developed a teledermatology simulation to teach TM and evaluate competency development.

Third-year medical students and second-year physician assistant (PA) students take a health-systems science course that includes duties in a primary care clinic, a quality-improvement practicum, and 11 full-day workshops on practice management. For one workshop, subject matter experts, informaticians, and educators worked with target learners and adapted work published by Palmer et al. to develop a dermatology-focused instructional module (**Table**).

We used a case of tinea versicolor to simulate both store-and-forward and live videoconferencing workflows (**Figures 1-3**). In the simulation, learners needed to review a furnished history, inspect digital photos of skin, interview the patient, make a diagnosis, and suggest treatment.

IPEC Competencies

- Choose effective communication tools and techniques, including information systems and communication technologies, for facilitating discussion and interactions that enhance team function
- Communicate one's role and responsibilities clearly to patients, families, and other professions
- Explain the role and responsibilities of other care providers and how the team works together to provide care
- Reflect on both individual and team performance improvement

Methods

The module included a pre-session reading and a 12-item multiple choice assessment on the readings performed individually and in mixed Medical and PA student groups.

For skill acquisition, we mapped AAMC telemedicine competencies to three entrustable professional activities (EPAs). SPs scored students on these EPAs using a 3-point scale. To measure learner attitudes about the simulation, we used an online survey adapted from Levett-Jones et al. We also collected field notes during piloting.

Results

Forty-nine students completed the module. The average quiz score was 9.6 out of 12 (sd = 1.3). The SPs indicated 70-97% of students were entrustable or approaching entrustment for each EPA. At the time of writing, we received 26 survey responses (53%). While learners harbored mixed attitudes about the value of the experience, 88% said the session met or exceeded their expectations (**Figure 4**). Most applied the didactic content effectively to complete the simulation and manage diagnostic uncertainty. Several students had difficulty finding and reviewing the images saved on computer desktops.

Figure 1. Telemedicine simulation configuration

Figure 2. Live videoconferencing session

Figure 3. Digital images of skin findings

	Activity	Duration	Description
1	Individual readiness assessment test (IRAT)	60 minutes	Multiple choice knowledge assessment followed by small group discussion and faculty-led debrief
2	Dermatologic conditions lecture	80 minutes	Review of dermatologic conditions commonly encountered in primary care and suitable for triage and management using telemedicine
3	Teledermatology and virtual skin exam lecture	30 minutes	Teledermatology practice trends, technical standards, conditions appropriate for virtual care, and workflow models including store-and-forward and live streaming
4	Teledermatology simulation	60 minutes	Standardized patient presenting to a telemedicine appointment with a complaint of a new rash; includes digital images of skin findings
5	Large group debrief	30 minutes	Faculty-led group discussion to explore challenges with the sessions, successful strategies, and lessons learned

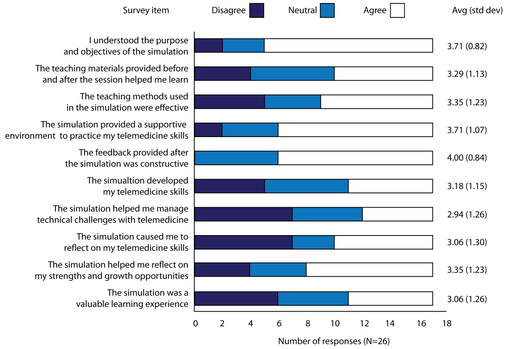

Figure 4. Results from learner post-simulation satisfaction survey

Discussion

High functioning teams must reflect upon and discuss group performance. Our module included multiple opportunities to work and learn together. Our quiz included individual and group components. The group component promoted problem-solving among medical and PA students. Our module also included time for group discussion during the faculty-led debrief. This time allowed students to share communication strategies and telemedicine best-practice techniques.

Entrustment scores suggest that most students met our learning objectives. However, we identified ways to improve the module. First, we intend to incorporate nursing students in the simulation to better mimic clinic workflow while fostering interprofessional skill development and collaboration. In this pilot, to simulate live videoconferencing and store-and-forward workflow, we provided parts of the history and the dermatology images. However, we want every professional to understand their respective roles and strengths for a given context (e.g. teledermatology visit). In a live setting, the nurse might help with history collection, image procurement, and documentation. Hence, including nursing students may create opportunities for medical, PA, and nursing students to focus on handoff communication and collaboration between professions. Second, we will stream pre-recorded excerpts from real or simulated encounters to show examples of best-practice interprofessional workflows. Third, we must study how to provide learners with opportunities to practice troubleshooting technology failures while still providing a realistic and standardized educational experience.

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