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By Faculty for Faculty

A Distance Accessible Education Model: Teaching Skills to Nurse Practitioners

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A B S T R A C T

Introduction: Health care providers in rural areas are often unable to attend continuing education trainings due to limited staffing coverage. The coronavirus pandemic has created a unique situation, requiring many health care providers to obtain continuing education through virtual offerings.
Methods: This study used a descriptive design with a team-developed presurvey for demographics, 2 posttraining instruments, and a team-developed competency validation checklist.
Results: The study sample included nurse practitioner (NP) students and practicing NPs. All participants met competency in the skills validation.
Discussion: The results indicate that continuing education and competency validation of procedures is feasible in a virtual format.

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Introduction

In the state of Alabama, there is a shortage of primary care providers in rural and underserved areas. According to the Rural Health Information Hub, Alabama has 117 rural health clinics and 104 Federally Qualified Health Center sites.[1] Alabama ranked 47th in citizen health status among all states for 2019, a drop from 48th in 2018.[2] The challenges of access to care is increased for those living in rural areas of the state. Approximately 44% of the population in Alabama lives in a rural area[1]; however, living in a rural area is not only a challenge for residents.

Alabama has more than 5,000 nurse practitioners (NPs) in collaborative practice, but the available data do not define practice locations.[3] Continuing education is essential for all health care professionals, but the use of a face-to-face format can be difficult for providers in rural areas. Providers in rural and underserved areas are often reluctant to leave their practice area to attend continuing education courses for an extended time due to staffing shortages and the high cost of workshops and travel arrangements.

Background and Significance

Working in health care in a rural area poses problems to obtaining and maintaining current education and technical skills. Workshops and conferences with up-to-date health care management information create a mechanism for providers to effectively treat their patient population, but challenges include a shortage of providers, which hinders the ability to leave the practice for conferences, and a lack of rural health financing.[4] Although education provided over the Internet is available, one study noted that health care providers often had complaints about training offered due to lack of interaction between the participants and the facilitator, quality of the content, and limited opportunities for questions.[5] A distance-accessible education model that uses recorded material and live virtual interaction can provide NP providers in rural areas access to continuing education training from experts without the need to travel.

One health care team converted a primary care mock code course into a virtual format due to the COVID-19 pandemic.[6] The study team created an interprofessional small group for a mock code using a video conferencing platform. Before the virtual day, the facilitator provided the group with information. On the virtual day, the facilitator demonstrated equipment and treatment recommendations as needed to guide the participants through a mock code. The team concluded that the virtual format allowed them to meet the learning objectives, and participants (97%) were able list 2 key points from the session on the postsurvey.

The approach developed for this project uses self-directed learning combined with a virtual format that supports the ability to validate procedural skill competency through virtual training sessions during which participants gained immediate feedback. Self-directed learning is based on adult learning theory and is common practice in health professions education to facilitate lifelong learning practices through personal experience and new knowledge.[7] This distance-accessible education model for training is innovative and bridges gaps in practice by offering those in remote areas the same access to continuing education as those in

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urban areas without leaving their practice. This distance education model can enhance the quality of primary care provided to residents in rural and underserved areas and provides a new approach to deliver and validate procedural skills for graduate-level advanced practice nursing students in distance accessible programs.

Purpose

Few studies in the literature have focused on identifying best practices for virtual learning as it relates to procedural skills.[8,9] The first aim of this study was to develop a distance accessible education model in which rural NP providers and NP students could gain competency in basic suturing and incision and drainage of a skin abscess. The second aim was to determine best practices in using a distance accessible education model to offer education and test validation on basic primary care procedures.

Methods

The Distance-Accessible Education Model

Phase 1

In the first phase, facilitators video recorded the steps to perform 2 procedures: basic suturing and incision and drainage of a skin abscess. Each video included information about when and how to perform basic suturing and do incision and drainage of a skin abscess safely and accurately using an evidence-based approach. The videos were recorded and uploaded into Kaltura, a video platform housed within the Canvas learning management system (Instructure; https://www.instructure.com/canvas). The research team collaborated with the instructional design team to create links for the procedure videos that could be emailed to registered participants.

Each participant was mailed a simulation kit at least 30 days before the virtual training session. These kits consisted of supplies for each procedure: a suture kit (needle holders, pickups, suture thread packs, hemostat, and a suture pad with precut wounds) and an 11-inch scalpel and pus pocket model. The pus pocket model was created with oatmeal, food coloring, and water and required refrigeration until the virtual training session.[10] Participants were instructed to participate in a presimulation that included self-directed learning by practicing with the simulation kit while watching the videos before the scheduled virtual training session. The video links remained active for 30 days after the virtual training.

Phase 2

In the second phase, the research team offered 2 virtual training sessions through Zoom. Each occurred over a 2-hour period. The first training session was for NP students, and the second was for rural primary care NP providers (practicing NPs) in Alabama. The virtual training sessions were offered free of charge and included access to the basic suturing and incision and drainage of a skin abscess video recordings, and the facilitator developed simulation kits.

During a prebrief, facilitators reviewed the learning objectives for basic suturing and incision and drainage of a skin abscess. Learning objectives of the basic suturing component were demonstration of proper instrument handling while suturing, proper instrument knot tying, and doing a simple interrupted stitch. Learning objectives for the incision and drainage of a skin abscess component were describing the anatomy and physiology of an abscess, indications for incision and drainage of a skin abscess, and demonstration of a simple incision and drainage of a skin abscess. After the conclusion of the prebrief, participants spent the first 30 minutes viewing a live demonstration on how to perform basic suturing by a facilitator.

Simulation: During the next 30 minutes, participants practiced basic suturing while the facilitators, who were all research team members, provided verbal and visual feedback. Participants then spent 20 minutes viewing a live demonstration on how to perform an incision and drainage of a skin abscess by a facilitator. Participants then had 20 minutes of practice time while facilitators provided verbal and visual feedback.

Debrief: The final 10 minutes of the training was devoted to a debrief. Facilitators addressed any area of concern regarding either procedure that the participants identified. The live demonstration of basic suturing, practice basic suturing with verbal and visual feedback, live demonstration of incision and drainage of skin abscess, practice incision and drainage of skin abscess, and a question-and-answer session with the facilitators lasted approximately 2 hours.

Phase 3

The third phase was a validation of competency using a facilitator-developed evidence-based checklists for basic suturing and incision and drainage of a skin abscess.[11,12] Facilitators hosted a 2-hour private virtual session 1 week after the virtual training session, with 2 facilitators per session. Participants were asked to select a 30-minute time slot during that 2-hour window. Participants were emailed the virtual session link the day before their scheduled validation session. Each individual participant logged into their assigned facilitator session and completed the validation for basic suturing and incision and drainage of skin abscess. The facilitators used the competency checklist for each procedure to validate up to 4 participants over the 2-hour time. A certificate of attendance for 3.0 continuing education units was provided to participants after completion of the study surveys.

Study Design

A descriptive research design was used to evaluate outcomes of this approach, using a demographic presurvey; 2 posttraining instruments, Educational Practices Questionnaire (EPQ) and Student Satisfaction and Self-Confidence in Learning (SSSCL), published by the National League for Nursing (NLN) and used with permission; and a team-developed competency validation checklist used to assess participant skill attainment and participant satisfaction with the virtual procedural skills training. The authors' university institutional review board approved the study as exempt.

The project team recruited a convenience sample of 21 primary care NP providers from rural and underserved areas in Alabama and 5 primary care rural NP students participating in a rural primary care scholars program initiative. The rural primary care NP providers were recruited with permission through institutional established listservs and social media sites. The NP students were recruited through the School of Nursing's listserv. Inclusion criteria for primary care NP providers included primary care NP certification (family, adult, women's health, or pediatric), Alabama resident, and English speaking. Exclusion criteria for primary care NP providers included not certified as a family, adult primary, women's health, or pediatric primary care NP; not being an Alabama resident; and non–English speaking. Inclusion criteria for the NP students included acceptance into a primary care NP specialty track (adult primary care, family, women's health, or pediatric primary care) and enrollment in coursework during the semester when the virtual training was scheduled. Exclusion criteria for the NP students included not currently enrolled in coursework during the semester when the virtual training was scheduled and not pursuing adult primary care, family, women's health, or pediatric primary care nurse practitioner concentration.

Educational Practices Questionnaire

As noted earlier, 2 instruments were used at the completion of the virtual training. The first was the EPQ (Student Version) published by the NLN.[13] The EPQ is a 16-item instrument that uses a 5-point Likert-type scale. That questionnaire was designed to assess 4 educational practices: active learning, collaboration, diverse ways of learning, and high expectations (Cronbach's $\alpha = 0.92$). The questionnaire includes items used to assess the importance of each item to the participant (Cronbach's $\alpha = 0.96$). Although the questionnaire is labeled as a student version, it was used with both the student and NP groups because the NPs were also learners in this context. The questionnaire provides data regarding best practices.

Student-Satisfaction and Self-Confidence in Learning

The second instrument, also published by the NLN, was the SSSCL, a 13-item instrument that measures student satisfaction (Cronbach's $\alpha = 0.94$) and self-confidence in learning (Cronbach's $\alpha = 0.87$). The instrument was used for both groups.

Data Collection

All data were collected at 2 separate events in April and June 2020. The presurvey data were collected through an anonymous online program before the prebrief. The data were deidentified, downloaded into an Excel spreadsheet, and kept on a secure computer. A competency checklist for each skill was developed by the authors, using evidence-based, published procedural guidelines. Following the virtual session, facilitators used the competency checklist to validate competency to perform each skill with each participant. The presurvey and the EPQ and SSSCL instruments were uploaded into separate online forms for easy access. The team pretested the links to the presurvey and the EPQ and SSSCL instruments to identify issues with clarity and accessibility. Participants were sent the presurvey after registration before the virtual session. The EPQ and SSSCL links were sent to participants following the competency validation.

Data Analysis

Data were evaluated by the research team to identify any missing information, duplicates, or outliers. Descriptive statistics, including means, standard deviations, and frequency distributions, were calculated. Statistical analysis was completed using Intellectus Statistics 2020.

Results

A total of 26 participants (5 students and 21 NPs) completed the presurvey and answered demographic questions. All but 1 participant identified as female. Fifty-seven percent were either a family NP or family NP student. All students reported no practice as a NP, whereas the majority of practicing NPs ($n = 11$) reported less than 5 years when asked about years in practice as an NP. All participants reported training on the 2 procedural skills during their NP coursework. Four (15%) participants reported additional basic suturing training, and 5 (19%) reported additional incision and drainage of skin abscess training. When asked about confidence in performing basic suturing, 11 (42%) reported little to no confidence, and 10 (38%) reported little to no confidence for incision and drainage of skin abscess.

Only 4 students and 11 NPs among the presurvey participants completed phase 2 and 3, which included completing the educational practices survey and satisfaction and self-confidence in learning surveys. The reasons for not attending the final 2 phases included extra work obligations and childcare issues related to the pandemic. Of the15 participants who completed the validation phase, all met competency.

Educational Practices

The 2 postsurveys were each completed by 15 participants. The first assessed educational practices (Table 1). Active learning was assessed through a 10-question survey, scored with a Likert scale of 1 to 5. Means and standard deviations were calculated for each statement or question. Lowest scores were noted on the question that asked about the opportunity to add comments during debrief, with the same question rated lowest for importance. The highest rated learning came from comments made by the teacher before or during the simulation, and the highest rating for importance was the question that assessed an opportunity to discuss ideas and concepts being taught during the simulation. Collaboration, diverse ways of learning, and high expectations were each assessed with 2 questions. The lowest scores were for collaboration and importance. The highest scores came from the second set of questions that focused on diverse ways of learning regarding simulation and multiple ways of learning. The final set of questions that assessed high expectations, clear objectives, and clear communication also ranked high and had the highest rating for importance.

Satisfaction With Current Learning

The second postsurvey assessed satisfaction with current learning and self-confidence in learning (Table 2). The satisfaction with current learning included learning materials, teaching methods, and instructors and was assessed through 5 questions, scored with a Likert scale of 1 to 5. Means and SD were calculated for each statement or question. The highest rated score was on the question related to teaching materials being motivating and helpful. The lowest rated score was the same for questions 1 (teaching methods used were helpful), 2 (the simulation provided a variety of learning materials and activities to promote learning), and 5 (the way the instructor taught was suitable for the way I learn). The findings support that participants were satisfied with the self-directed learning resources and virtual training session.

Self-Confidence in Learning

Self-confidence in learning, which included confidence in understanding the key concepts, mastering the skill, confidence in the teachers to supply appropriate materials, and confidence in how to use the simulation to learn critical steps was assessed with 8 questions, scored with a Likert scale 1 to 5. The highest scores were for the participant's thoughts on whether it was their responsibility to learn what they need to learn in the simulation. The lowest scores were for the student feeling as though it is the instructor's responsibility to tell them what they should learn from the simulation.

Discussion

This study examined best practices and satisfaction with a distance-accessible education model for continuing education focused on procedural skills. The study also evaluated the ability to assess competency with procedural skills in a virtual environment. The virtual training focused on common, basic skills needed in primary care and demonstrated that health care providers are satisfied with the virtual format for both training and validation.

Table 1
Educational Practices Questionnaire Results

Item	M	SD	Importance M	Importance SD
Active Learning				
1. I had the opportunity during the simulation activity to discuss the ideas and concepts taught in the course with the teacher and other students.	4.47	1.06	4.78	0.43
2. I actively participated in the debriefing session after the simulation.	4.27	0.70	4.17	1.34
3. I had the opportunity to put more thought into my comments during the debriefing session.	4.13	0.74	4.00	1.33
4. There were enough opportunities in the simulation to find out if I clearly understand the material.	4.60	0.51	4.61	0.78
5. I learned from the comments made by the teacher before, during, or after the simulation.	4.80	0.41	4.72	0.75
6. I received cues during the simulation in a timely manner.	4.60	0.51	4.44	0.78
7. I had the chance to discuss the simulation objectives with my teacher.	4.33	0.82	4.50	0.71
8. I had the opportunity to discuss ideas and concepts taught in the simulation with my instructor.	4.53	0.52	4.67	0.59
9. The instructor was able to respond to the individual needs of learners during the simulation.	4.67	0.49	4.67	0.59
10. Using simulation activities made my learning time more productive.	4.53	0.52	4.72	0.57
Collaboration				
11. I had the chance to work with my peers during the simulation.	3.86	0.86	3.56	1.25
12. During the simulation, my peers and I had to work on the clinical situation together.	3.50	1.02	3.33	1.19
Diverse Ways of Learning				
13. The simulation offered a variety of ways in which to learn the material.	4.61	0.78	4.44	0.86
14. This simulation offered a variety of ways of assessing my learning.	4.28	0.96	4.50	0.62
High Expectations				
15. The objectives for the simulation experience were clear and easy to understand.	4.00	1.03	4.50	0.62
16. My instructor communicated the goals and expectations to accomplish during the simulation.	4.00	1.08	4.50	0.62

Table 2
Student Satisfaction and Self-Confidence in Learning Results

Item	M	SD
Satisfaction With Current Learning		
1. The teaching methods used in this simulation were helpful and effective.	4.67	0.49
2. The simulation provided me with a variety of learning materials and activities to promote my learning the medical surgical curriculum.	4.67	0.62
3. I enjoyed how the instructor taught the simulation.	4.73	0.46
4. The teaching materials used in the simulation were motivating and helped me to learn.	4.80	0.41
5. The way the instructor(s) taught the simulation was suitable to the way I learn.	4.67	0.62
Self-Confidence in Learning		
6. I am confident in mastering the content of the simulation activity that my instructors presented to me.	4.33	0.62
7. I am confident that the simulation covered critical content necessary for the mastery of medical surgical curriculum.	4.53	0.74
8. I am confident that I am developing the skills and obtaining the required knowledge from the simulation to perform the tasks in a clinical setting.	4.67	0.49
9. My instructors used helpful resources to teach the simulation.	4.60	0.83
10. It is my responsibility as the student to learn what I need to know from this simulation activity.	4.87	0.35
11. I know how to get help when I do not understand the concepts covered in the simulation.	4.80	0.41
12. I know how to use the simulation activities to learn critical aspects of these skills.	4.67	0.49
13. It is the instructor's responsibility to tell me what I need to learn of the simulation activity content during class time.	3.93	1.10

This type of procedural training addresses the needs of NPs in practice and NP students currently in primary care programs. The intervention group included practicing primary care NPs and student NPs. Presurvey data highlighted the lack of procedural skill training postgraduation with only 15% reporting basic suturing review after graduation, and 42% reported little to no confidence in performing these skills. For incision and drainage of a skin abscess, 26% reported training postgraduation, and 42% reported little to no confidence in performing this skill. These findings support that distance-accessible procedural skill training workshops can be beneficial for students and practicing NPs and can be used to assess competency.

In prior studies, students have favored the inclusion of active learning strategies and time to discuss details with the instructor.[8,9] Results of this study were similar. The student and practicing NPs in our study gave importance of having the ability to discuss their performance the highest scores for the dedicated time for facilitator feedback.

The score for a "variety of ways of learning" was 4.60 and its importance score was 4.44, whereas the "variety of ways of assessing learning" was 4.28 and 4.50, respectively. We would anticipate the "variety of ways of learning" to have a higher importance; however, the mix of practicing NPs and students may have influenced the results. The disconnect between the variety of ways of learning and assessment of the learning needs to be further assessed.

The inclusion of the self-directed learning component before the virtual session allowed for increased engagement and flow of information between the participant and the facilitator rather than just the facilitators.[14] These findings support that the training provided diverse ways for learning and that offering a variety of options for learning is important to the participants, as identified in other studies.[14]

Satisfaction with current learning received the highest rating. Overall participants were satisfied with the learning materials and instructor teaching strategies. Participants were also confident in their ability to master the content and understand what they should learn. The final question on self-confidence in learning assessed the responsibility of the instructor to tell the student what they need to learn received a moderate rating. This finding indicates that there is a disconnect between the stated objectives provided to the participants or what the participants understands as their responsibility.

Finally, distance accessible procedural training provides an opportunity for health care providers and students to learn and be validated on skills necessary for safe practice. Participants provided

several comments indicating that the training helped them refresh their skills and expressions of appreciation for the videos and practice kits. Many NPs practice in rural areas and do not have convenient, affordable access to high-quality procedural training without traveling a long distance from their practice sites. Because of the COVID-19 pandemic in 2020, health care providers needed more virtual conference opportunities. A significant benefit to virtual trainings is that NPs can safely and efficiently participate in them without leaving their practice sites. In addition, virtual training workshops provide specific benefits to learners, including widespread access in a range of settings, personalized instruction, and regularly updated content. Facilitators realized that having breakout rooms after the demonstration would have been more effective for practice. Although facilitators were able to provide feedback in the session, more individualized feedback could have occurred if participants were placed in breakout rooms lead by a facilitator.

Limitations

After the completion of the study, the team identified several limitations. First, the COVID-19 pandemic required the team to modify the skills kit component. The team originally planned to order supplies in bulk package individual kits. However, because of the stay-at-home orders supplies were purchased through an online retailer. Ordering online limited the ability of the facilitators to add a simulated abscess and precut the suture pad for an abscess. Second, the sample size was smaller than projected, likely because of the pandemic and limited marketing. Students were also working in facilities with new policies and procedures implemented because of COVID-19 and were likely under stress. The practicing NPs may have faced patient census fluctuations and several unknowns related to the pandemic. In addition, the research team used the institution's list serves and social media sites to communicate with potential participants, which may not have reached all practicing NPs in the state.

Because this study is a descriptive study and the data collected pre and post was not the same, the data could not be compared and limited the use of advanced statistics for this study. However, results indicate that participants could learn and demonstrated that they could do these skills through this distance accessible design. Facilitators were also able to validate these 2 skills—basic suturing and incision and drainage of a skin abscess. Finally, although this study was conducted virtually, it did not address the fact that many participants would have different computers and be in various environmental settings. The varied camera angles and lighting could have potentially affected the participants' ability to see the demonstration and hinder the facilitators' ability to give accurate, constructive feedback.

Implications for Practice

Minimally invasive office procedures, such as incision and drainage of an abscess and suturing of a laceration, are routinely performed by NPs. Until recently, most skills training has been provided in person. However, during the COVID-19 pandemic, virtual learning opportunities have been shown to be both a popular and, based on results of studies such as this, an effective option for obtaining clinical skills education.

Virtual training workshops can provide numerous benefits to learners, including saving time and money because travel and overnight stays are not a requirement for participation. Virtual learning can be as effective as traditional face-to-face opportunities for procedural skills training based on this study's results and other reported research.[15] The findings from this study support the use of a distance accessible format to offer procedural skill training and obtain continuing education units in a virtual environment. Additional research focused on the optimal platform and process for providing skills training and assess competency virtually is needed.

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