Improving Telehealth Knowledge in Nurse Practitioner Training for Rural and Underserved Populations

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ABSTRACT

Background: Telehealth is an emerging technology for the delivery of health care services. Providers need to be trained to maximize the potential benefits for rural and underserved populations. Method: A quality improvement approach to curricular redesign was used to integrate telehealth in a family nurse practitioner program. The intervention consisted of telehealth learning outcomes and a lecture-style presentation in a role transition course. A Plan-Do-Study-Act cycle informed faculty decision making in a small test of change. Self-reported confidence in telehealth knowledge was measured with a knowledge survey to determine whether the change was an improvement. Results: Student confidence in telehealth knowledge increased following the intervention. The change provided an opportunity for faculty to consider additional approaches to integrating telehealth learning experiences in practice courses. Conclusion: This project provided an improvement framework on which faculty can build and test effective pedagogical approaches to training graduate nursing students on the use of telehealth technology. [J Nurs Educ. 2019;58(1):57-60.]

Telehealth has the potential to increase access to high-quality care for individuals in rural or medically underserved urban areas. The technology expands care delivery system models using telecommunication and electronic devices to transmit information at a distance in a virtual patient encounter (Health Resources & Service Administration [HRSA], 2015; Rutledge et al., 2017). The term telehealth encompasses telemedicine, which refers to the diagnosis and management of disease (Rutledge et al., 2017; World Health Organization, 2010). Through the use of technology, health care providers can reach patients in areas where services were previously lacking.

Educating future providers is important as technology use expands and payment structures evolve. The American Hospital Association (AHA, 2018) reports that 65% of U.S. hospitals connect with patients and providers at a distance using telehealth technology and more than half of these hospitals have implemented remote patient monitoring capabilities. Although resources remain an issue for some, the proportion of hospitals with a computerized telehealth system is growing (AHA, 2018). As of 2018, parity laws, which generally require health insurers to cover and pay for services provided via telehealth, currently exist in 33 states and the District of Columbia (AHA, 2018). Although limited, the delivery of telehealth services to patients located in rural areas is covered by Medicare statutes (AHA, 2018). Future health care providers, including RNs and advanced practice nurses, need to develop knowledge and competencies in technology-driven health care to advocate for the underserved and optimize the potential for advancing population health in rural communities.

Opportunities to incorporate telehealth into a family nurse practitioner (FNP) curriculum were identified through a needs assessment. The program prepares RNs to deliver holistic, intercollaborative, population-based health services to patients and families across the life span. A partial redesign of the curriculum focused on the preparation of FNPs for ambulatory primary care service in rural and underserved populations. Because the use of telehealth for the delivery of health care services in rural areas is growing, faculty recognized a need for telehealth learning outcomes in the curriculum.

Different types of learning experiences have been proposed to integrate telehealth in nursing curricula. These experiences include classroom, laboratory, and clinical rotation exposure to telehealth curriculum content (Erickson, Fauchole, & Ideker, 2015; Rutledge et al., 2017). Currently, there are no standards for telehealth education requirements in nurse practitioner (NP) training programs. Although a multimodal approach to tele-
health education is suggested (Rutledge et al., 2017), barriers to clinical telehealth experiences have been reported. These barriers include the tracking and scheduling of students in virtual patient visits (Erickson et al., 2015). Given the lack of previous attention to telehealth across the curriculum and the challenge of practicum placement at the authors’ location, faculty began considering curricular redesign elements by focusing on classroom learning experiences.

Student learning outcomes for telehealth education in advanced practice nursing have not been reported in the literature; however, interpersonal behavioral outcomes for provider training and attributes of care in telehealth delivery have been examined. Henry, Block, Ciesla, McGowan, and Vozenilek (2017) explored communication skills, professionalism, and “telepresence” in a qualitative systematic review of the literature. Six themes were identified as considerations for practice and education. These included perceptions of the utility of telehealth, differences in communication patterns (e.g., pace and type of discourse), reliance on visual cues in communicating empathy and building rapport, and confidentiality and privacy in telehealth care delivery (Henry et al., 2017). These attributes provide a basis for the establishment of student learning outcomes in a classroom setting.

Self-efficacy in predicting academic performance on telehealth learning outcomes formed the basis for development of the intervention. Bandura (1977) described self-efficacy as a student’s confidence in his or her ability to perform a task. Previous research suggests that a lack of confidence in telehealth and associated technology is a potential barrier to its use (Browning, Tullai-McGuinness, Madigan, & Struk, 2009; Buckley, Tran, & Prandoni, 2004; Courtney-Pratt et al., 2012; Demiris, Edison, & Vijaykumar, 2005; Ford, Avey, Deruyter, Whipple, & Rivkin, 2012; Henry et al., 2017). The intervention in this study included a presentation designed to increase knowledge of telehealth as a tool for delivery of health care services. Student confidence in telehealth knowledge was expected to increase as a result of the classroom learning activity.

This project was conducted to incorporate telehealth learning outcomes into the FNP curriculum. The aim was to evaluate baseline knowledge of telehealth technology among students enrolled in an FNP role transition course and to examine changes from baseline after a guest speaker presentation in the classroom. Standards for Quality Improvement Reporting Excellence (SQUIRE) V.2.0 (Goodman et al., 2016) were used for completeness of reporting this quality improvement (QI) work.

**Method**

The study setting was a school of nursing at a private university in the midwestern United States; the student population comprised more than 800 students enrolled in undergraduate and graduate nursing degree programs. Approximately 30 students are admitted to the FNP program each year, and full-time students complete the program in seven semesters. Classes are offered onsite at a main campus, and distance students from rural areas join the classroom via teleconferencing technology.

Contextual elements for the QI project considered important at the outset of introducing a change included the nursing program, students, and faculty responsible for curriculum design. The telehealth project team included school of nursing faculty members. The team wanted to take a step approach to integrate telehealth knowledge into the FNP curriculum by testing small changes that would inform more permanent curricular redesign decisions. Faculty examined the FNP program curriculum to identify where telehealth concepts could be incorporated into a didactic course. The team believed an FNP role transition course provided the best opportunity for testing telehealth learning outcomes. All students enrolled in the course during the fall 2017 academic term were eligible to participate in the research. Twenty-eight students attended class onsite and four distance students participated virtually through synchronized video conferencing.

Bloom’s Taxonomy (Anderson & Krathwohl, 2000) was used to specify learning outcomes for a lecture-style presentation. The learning outcomes were statements of what students could do: (a) “I can define telehealth,” (b) “I can identify how telehealth may improve patient outcomes;” (c) “I can cite examples of telehealth in nursing education,” and (d) “I can use telehealth technology in FNP practice environments.” The 1-hour presentation was delivered by an expert in telehealth care delivery. Examples of telehealth care delivery in home health, primary care, and intensive care settings were given. The presentation included data encryption (e.g., blood pressure, weight, and blood glucose), video conferencing for assessment, and real-time telemonitoring to improve access to care. The presenter discussed how telehealth allows patients to stay at home and see providers where they are, thus potentially reducing costs and improving quality of life.

This project used a QI approach to test new telehealth learning outcomes in a Plan-Do-Study-Act (PDSA) cycle of change (Figure 1). The PDSA cycles provide an opportunity to test changes in course learning outcomes on a small scale prior to making more permanent changes to course objectives (Brown & Marshall, 2008; Tam, 2014).

Confidence in telehealth knowledge was the measure chosen to assess learning outcomes. Student confidence was recognized by educators as a predictor of academic performance (Bowers, Brandon, & Hill, 2005; Multon, Brown, & Lent, 1991; Nuhfer & Knipp, 2003). Confidence was measured by a knowledge survey instrument (Nilson, 2013; Nuhfer & Knipp, 2003) that con-

![Figure 1. Plan-Do-Study-Act cycle of change.](image-url)
tained a 4-point Likert scale, with 4 representing the highest level of confidence and 1 representing the lowest level of confidence. Face validity of survey items for telehealth knowledge was established by expert faculty review prior to the research. Items were reviewed by a telehealth expert and members of the FNP faculty. Changes in confidence related to telehealth learning outcomes were measured with a pretest–posttest design. All students enrolled in the course were invited to participate in the research. Those who agreed to participate completed a pre-intervention knowledge survey at the start of class. Students completed a postintervention knowledge survey immediately following the presentation. Survey data were collected on paper forms and entered into SPSS® version 24 for analysis. The research was approved by the Xavier University Institutional Review Board.

Results

Twenty-four students completed the preintervention knowledge survey, and 22 students returned the postintervention knowledge survey for a 92% response. Results from students who did not complete the postintervention survey were not included in the analysis. Paired t tests were performed to compare mean scores on each survey item before and after the in-class presentation. The level of significance was set at α = .05. Results are presented in Table 1. The overall mean confidence at baseline prior to the lecture was 2.82 (SD ± 0.54). Following the intervention, overall confidence increased to 3.97 (SD ± 0.09). The change in telehealth knowledge was statistically significant (p < .001) for all survey items.

Discussion

Student confidence in telehealth knowledge increased with a small change in the FNP curriculum. Ali, Carlton, and Ali (2015) noted that the integration of telehealth education in nursing curricula does not need to involve massive curriculum revisions. The current authors aimed to determine whether a small change in classroom content would improve student confidence, such as exposure to telehealth concepts in previous courses (informatics) in the curriculum or exposure to telehealth in clinical practice settings where participants were employed. The survey was conducted immediately prior to and following the lecture presentation to minimize the influence of potential confounding variables. However, the study did not include a control group. It is possible that repeated measures of confidence in an intervention group with no controls may have introduced measurement bias. Although the study provided information for QI decision making, the results of the research may not be generalizable to other FNP student populations.

Limitations

This study has several limitations. The sample size was small. Participants surveyed were licensed RNs enrolled in an FNP program. The course was approximately midway through the curriculum sequence, and baseline confidence was fairly high in the preintervention survey. Other factors may have played a role in student confidence, such as exposure to telehealth concepts in previous courses (informatics) in the curriculum or exposure to telehealth in clinical practice settings where participants were employed. The survey was conducted immediately prior to and following the lecture presentation to minimize the influence of potential confounding variables. However, the study did not include a control group. It is possible that repeated measures of confidence in an intervention group with no controls may have introduced measurement bias. Although the study provided information for QI decision making, the results of the research may not be generalizable to other FNP student populations.

Conclusion

This project provides a framework on which to build effective pedagogical approaches to train graduate nursing students on the use of telehealth technology. Knowledge gained from this research is significant for ongoing nursing curricular development to incorporate education on evolving technologies in health care. Implementing telehealth education into FNP programs not only will improve access to health care but also will improve the overall quality of care in rural and underserved populations.

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<th>TABLE 1</th>
<th>Pre- and Postintervention Knowledge Survey Scores</th>
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<tr>
<td>Item</td>
<td>Preintervention, Mean ± SD</td>
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<tr>
<td>I can define telehealth.</td>
<td>3.18 ± 0.59</td>
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<tr>
<td>I can identify how telehealth may improve patient outcomes.</td>
<td>3.05 ± 0.65</td>
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<tr>
<td>I can cite examples of telehealth in nursing education.</td>
<td>2.50 ± 0.80</td>
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<tr>
<td>I can use telehealth technology in FNP practice environments.</td>
<td>2.55 ± 0.67</td>
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Note. FNP = family nurse practitioner.
populations. Expanding the use of telehealth in these settings potentially will reduce overall patient burdens. The technology is important for individuals with chronic medical conditions who may lack transportation, family or social support systems, and knowledge for the self-management of their disease.

Today the use of telehealth to deliver health care services to rural and underserved populations is critical for all health care providers, but especially for advanced practice nurses being trained to practice in primary care. Telehealth can be one solution for increasing access to both primary care and specialty services. In addition, telehealth potentially can help decrease the cost of health care delivery while improving patient satisfaction and patient outcomes (Daniel & Sulmasy, 2015; Marcin, Shaikh, & Steinhorn, 2016; Polinski et al., 2016). Telehealth also could improve provider satisfaction in being able to follow patients more closely, especially those with chronic illnesses. All of these are components of the Quadruple Aim originally set forth by the Institute for Health Improvement (Bodenheimer & Sinsky, 2014).

Primary care partnerships for the academic preparation of family nurse practitioners must involve sites that actively use technology in care delivery models so that students can practice what they have learned in the classroom. Telehealth learning outcomes for clinical practicum courses is a future area for spread to other contexts. Potential practicum sites include federally qualified health centers, school-based health centers, and Veterans Administration Medical Center clinics. The burden of finding, developing, and sustaining partnerships with practicum sites using telehealth in rural and underserved areas must be weighed in terms of the overall clinical curriculum objectives for FNP training and the added benefits of exposure to telehealth in practice. Future research should further quantify the benefits and burdens of a multimodal approach to telehealth in advanced nursing education workforce training.

References


