

2021

Educational Intervention to Increase Telemedicine Knowledge in Nurses

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Walden University

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Walden University

College of Nursing

This is to certify that the doctoral study by

Jean Sylvestre Ayissi Essono

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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Walden University

2021

Abstract

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by

Jean Sylvestre Ayissi Essono

MSN, Walden University, 2018

BSN, Missouri State University of Springfield, 2011

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

March 2021

Abstract

Limited access to healthcare services is a factor that can reduce quality of care, and it is more pronounced in rural settings. One plausible solution to this concern is telemedicine, the use of electronic information and telecommunication technologies to provide care when an individual and provider are not in the same location. Although telemedicine has been suggested as a solution to the access to care concern, it is not widely integrated into the nursing practice. Using Nightingale's holistic theory of caring, the purpose of this DNP project was to determine if an educational study geared towards telemedicine increased knowledge and confidence among RNs and LPNs practicing in a rural acute care facility. A total of 10 individuals (RNs and LPNs) were recruited and agreed to participate in a self-phased educational intervention. Following a pretest, participants reviewed a self-phased educational intervention focused on telemedicine and then completed a posttest. The average pretest score was 16.7 ($SD = 6.37$) and the average posttest score was 32.6 ($SD = 5.16$). Using a Likert Scale of 1 to 7, with 1 = *not at all* and 7 = *extremely confident*, the participants were asked to rate their confidence in the use of telemedicine. The average pretest confidence score was 1.7 ($SD = 0.67$) and the average posttest confidence score was 4.6 ($SD = 1.34$). A Wilcoxon Signed Rank test indicated a statistically significant difference in pretest and posttest scores ($z = -2.80, p < 0.01$) and in pretest and posttest confidence levels ($z = -2.81, p < 0.01$). The results of this project contribute to positive social change by increasing the nurses' knowledge and confidence in the use of telemedicine, which may translate to an increased use of telemedicine and improved access to care for patients living in rural areas.

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Dedication

I dedicate this scholarly project to my wife, Ann M. Ayissi Essono for her support in furthering my education. Your continued support of my educational journey is amazing and I will always remember what you have done for me! I remembered when my computer was messing up with me and I got very mad. You ran out to the store and purchased a new computer – the same computer that I am using to write you this dedication. I remembered you portrayed a patient for me to implement a physical exam for my clinical assignment. I remembered again when you reminded me of doing my assignment when I was slacking and procrastinating. Again, I appreciate your unending times you cleared your schedule for me to do my schoolwork. I love you!!!

I also dedicate this doctoral project to my son, Jaylen W. Ayissi Essono, the one who is ridiculously handsome like his dad. I love you and this doctoral project hence the doctoral degree is for you as an inspiration so that you also will become a doctor in whatever field you choose. I love you dearly and I want you to know that you can make it in this country of opportunities, the land of free and home of the brave. I came from Cameroon where lack of opportunities were predisposing me to failure and less ambition and was able to achieve this in a country of opportunities where everybody can fulfill his dreams. Finally, I dedicate this project to my mother Regine G Mbango who played a crucial role for me to come in the US to further my education. Thank you, mom!!!

Acknowledgments

My glory to AMON-RA the almighty GOD, the invisible, the hidden one, who encompasses all aspects of creation seen and unseen for giving me to accomplish my dream of becoming a doctor. I honor my blessed ancestors whose blood flows in my veins have being looking down on me by guiding me on my daily life and especially in completing this doctoral project therefore, to become a doctor. For that, Thank you to be part of my life and reminding me where I come.

I express my profound gratitude to my DNP Chair Committee, Dr. Lyn Stankiewicz Losty for her critical advices, editing, and expertise in making this project comes to fruition. Dr. Lyn Stankiewicz Losty, with your encouragement and faculty contributions, you gave me birth in the scholar world. Thank you!!! I extend my appreciation to my committee member Dr. Janine Everett, Dr. Cathleen Colleran, Dr. Janice Long for assuring that this project meets all the scholar canons by editing, reviewing to guaranteeing accurate standards. I acknowledge Kimberly Schmader, RN whose expertise informed the content of the educational intervention and expert opinion on content validity. I will not forget anyone, nurses and healthcare professional who contributed to the design and implementation of the project. Finally, to you who believed in me, in my potential to achieve this milestone and has prayed for it, has motivated me by your thoughts, words, and actions, I say great THANKS!!!

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Section 1: Nature of the Project

Introduction

Telehealth or telemedicine is the employment of telecommunications in the diagnosis and treatment of illnesses mainly for health promotion and surveillance functions (Wilson & Maeder, 2015; Zhang & Zhang, 2016). The U.S. Health Resources and Services Administration (n.d.) defined telemedicine as “electronic information and tele-communications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration” (para. 4). In a review of 1,300 studies, Wootton (2012) found that telehealth interventions were equal or better than traditional face-to-face approaches. As a result, telehealth has become an effective tool to improve efficiency and patient access to health care.

According to Whitten et al. (2010), the function of healthcare providers including nurses has expanded into the use of telemedicine in healthcare delivery. These services include the ability to guide patients to emergency department visits, clarification of treatment options, diagnosis and treatment of acute illnesses, and management of chronic diseases. According to Serper and Volk (2019), procedural and surgical management of diseases, as well as remote patient monitoring, are greatly enhanced with telemedicine approaches. As a result, patient satisfaction is improved in clinical settings where telemedicine is incorporated (Kruse et al., 2017).

One important role of telemedicine is expanding access to and improving the quality of health delivery to rural areas. The use of telemedicine in rural areas to deliver high-quality and specialized care can reduce traditional challenges and burdens of patients such as transportation

or lack of specialty care. Pardue (2015) acknowledged telemedicine as the primary and plausible solution for a healthcare system to assist patients in remote and rural areas where the affordability of and access to healthcare services are limited. In this way, telehealth can address and reduce health disparities in areas where there are limited physicians and other healthcare providers and has the potential to eliminate the costs of transportation of patients (Mechanic & Kimball, 2019).

The adoption of the standards set up by the American Academy of Ambulatory Care Nursing for the provision of telemedicine care by both practical and registered nurses highlighted the significance of these standards in the delivery of effective and safe patient-centered healthcare with convenient and accessible qualities (Bashir & Bastola, 2018). Most of today's population of nurses were born before the emergence of technology in the healthcare systems and this poses many challenges to their adoption of and adaptation to the use of telemedicine in healthcare (Khemapech et al., 2019) as telemedicine knowledge favors nurses who tend to be more comfortable and competent with technology (McClellan et al., 2020). Thus, it is imperative that nurses be educated in the use telemedicine for healthcare organizations to reap the benefits of telemedicine.

Problem Statement

Healthcare provision and nursing practice face various challenges including the poor access of the patients to nursing services. This serves as a hindrance to quality healthcare. In a rural setting, the targeted healthcare facility is a licensed 174-bed hospital that serves a population characterized by low income, high unemployment, and low education levels. The remoteness of the area is a barrier for patients to obtain full access to specialty healthcare

providers and facilities. For this community, telemedicine allows patients to minimize this barrier and engage with specialty providers. However, in many cases, the nursing staff lacks knowledge on the use of telemedicine for patient-centered care remotely. C. Bingman (personal communication, November 29, 2019) concluded that most of the nurses have limited education and training regarding the use of telemedicine and this presents as a potential risk to healthcare provision. These challenges and barriers related to patients, staff, and programs impede the improvement and thriving of telemedicine practice, which is dependent on nurses' education on telemedicine practice.

Purpose of the Study

The use of telemedicine is essential for vulnerable populations such as those in the area of study owing to the poor access to healthcare services. For the effective provision of telemedicine services by the nurses to counter poor access to quality healthcare services by the patients, nurses must have adequate knowledge of telemedicine and how they can effectively adopt this technology. Thus, the purpose of this project was to determine if an educational intervention geared towards telemedicine technology increases the knowledge and confidence level of registered nurses (RNs) and licensed practical nurses (LPNs) practicing in a rural acute care center.

Nature of Doctoral Project

According to Teoli and Aeddula (2018), patient privacy, lack of patient-physician relationship, regulatory issues, reimbursement, diagnostic accuracy, lack of nurse education on telemedicine, and technology-related issues were some of the barriers to effective telemedicine practice in the healthcare systems. Kruse et al. (2018) added that barriers to telemedicine and its

use were specific to the patients, organization, staff, programmers, and county. The authors further noted that resistance to change and technical staff challenges posed obstacles to the advancement of telemedicine.

The perceptions of both RNs and LPNs change in positive ways with their engagement in an environment conducive to telemedicine as healthcare provision (Hope-Kollveit et al., 2017). The ability to provide affordable, quality, and safe healthcare in rural areas is enhanced by nurses comfortable with telemedicine (Hope-Kollveit et al., 2017). Donohue et al. (2019) added that LPNs and RNs who were well educated on the use of telemedicine in nursing service provision displayed competence in enhancing outcomes for patients living in the rural areas. Van Houwelingen et al. (2019) ascertained that the maintenance of confidence related to telemedicine practice was primarily based on sufficient knowledge by the nurses regarding telemedicine. As such, the researchers noted that a policy for competent implementation and facilitation of telemedicine practice is needed to fulfill its promise.

Bashir & Bastolla (2018) stated that information technology solutions empower the nurses to educate, monitor, collect data from, and follow up with patients for remote interventions. The education intervention for this project was aimed to take place at an acute care facility. The hospital, being the sole healthcare provider within a radius of 50 miles, is surrounded by low income and indigent populations. Owing to the high numbers of people requiring robust medical attention, the hospital contains a busy telemedicine center that provides most of the patients for easy access to physicians and nurses.

The promotion and facilitation of the Doctor of Nursing Practice (DNP) project was primarily based on participating in daily meetings with the hospital leaders to solve issues that

face the hospital facility. I had general access to the committees, directors, and other relevant hospital personnel for support whenever needed. Additionally, I worked closely with the hospital stakeholders including the CEO, bedside practice and registered nurses, telemedicine registered nurses, the CNO, hospital board, health insurance, and patients.

Significance of the Doctor of Nursing Practice Project

The stakeholders of the DNP project comprised the CEO, practice and registered nurses, telemedicine registered nurses, the CNO, hospital board, health insurance, and patients. The patients will be the main beneficiaries of the project as much of the focus was based on enhancing patients' accessibility to healthcare services and a reduction in the costs of medication treatment. For the nursing profession, the doctoral project enabled the nurses to gain adequate knowledge in telemedicine practice, which boosted their competence and understanding of its use for effective healthcare service provision. Practice areas such as the pharmacy, medical diagnostics, and physicians also learned from the project by gaining adequate knowledge on telemedicine, which enhances the smooth provision of healthcare services and relieves various duties that would entail utilization of more time. The telemedicine program greatly helped to mitigate the low access to healthcare facilities and healthcare services of the study area population.

Summary

Telemedicine is critical for the future of medical intervention by providing a means to address the patients' needs remotely. Patients with historically poor access to physicians and healthcare facilities benefit greatly from telemedicine. Considering that the hospital of study is located in a remote area where patient access to healthcare services is limited by unemployment,

low income, and distance, the DNP project was aimed at understanding the level of nurses' knowledge and education on the use of telemedicine in healthcare services provision. Through an assessment involving hospital leaders, committees, and directors, a go-ahead recommendation was drafted to enhance the nurse's education on the adoption of telemedicine for quality healthcare provision to the patients.

Section 2: Background and Context

Introduction

RNs and LPNs are faced with challenges related to nurse education on the delivery of services via telemedicine. The targeted hospital has installed a telemedicine facility as most of the inhabitants in the region are faced with challenges of poor access to quality healthcare to an extent due to the high cost of transportation and low income. However, most nurses were raised and educated in an era before the advent of the technology that allows for the practice of telemedicine. Thus, the purpose of the DNP project was to determine if an educational intervention geared towards telemedicine technology would increase the knowledge and confidence level of RNs and LPNs practicing in a rural acute care center. This was achieved primarily through the engagement of hospital stakeholders including leaders, committees, and directors. In this section I explore the concepts, models, and theories of the project and its background as well as the relevance of the DNP project to the nursing practice. I also provide a detailed description of the rationale for the use of the theories and models in the DNP project and highlight the local background and context of the project, my role as the DNP student, and the role of the project team.

Concepts, Models, and Theories

Implementation science involves progressively adopting a set of theoretical concepts and models to understand and explain why and how implementation fails or succeeds. Nilsen (2015) ascertained that mixed results for problems are often a result of a limited theoretical basis. This implies that poor theoretical underpinnings would make it difficult to understand and explain how implementation fails, undermining development strategies for a project. Through the

adoption and understanding of applicable models, theories, and concepts, it is easier to implement solutions to research problems in a structured approach.

Stetler et al. (2010) described a model of evidence-based practice that involved a prescriptive, critical thinking approach. It consisted of numerous decision-making steps that allows for the effective use of research in practice. By educating nurses on telemedicine and telehealth, their comfort level in the use of these tools may increase which will allow them to focus on the needs of the patient from a holistic perspective without focusing on the mechanic requirements of telehealth. This model demonstrates how having the experience allows practitioners to problem-solve more effectively. Thus, by educating nurses on telehealth, they will be able to use telehealth to better implement holistic care as prescribed by Florence Nightingale.

Nightingale viewed nursing care from a humanistic and unified view (Jasemi et al., 2017) where nurses have a key role in ensuring the provision of total care to the patients, including the use of tools to enhance care delivery. Bullington and Fergeborg (2013) often see holistic care theory as subjective and nebulous given the challenges of care delivery. Thus, through education, nursing is a discipline where empathy and care can be embraced through the use of technology with the overarching goal of enhancing patient care and outcomes.

Definitions

For the purposes of this DNP project, several terms are defined as follows:

Clients: Patients seeking the services of the nurses for various medical conditions (Marzorati & Pravettobi, 2017).

Educators in the DNP project: Healthcare professionals with knowledge on the use of telemedicine for the provision of healthcare services (World Health Organization, 2009).

Remote areas: Places where individuals are unable to access adequate healthcare services due to some extent to the high cost of transportation and low income, which calls for telemedicine related healthcare interventions (Goodridge & Marciniuk, 2016).

Relevance to the Nursing Practice

Telemedicine potentially addresses the problem of the shortage of healthcare providers globally and improves the quality of healthcare for some patients through remote diagnosis, evaluation, and treatment (Mars, 2013). However, a study conducted by Glinkowski et al., (2013) highlighted that most of the nursing students in Poland universities had little understanding of telemedicine and telenursing practice. Schlachta-Fairchild et al. (2008) further posited that most nurses were unable to deliver effective and safe patient care as a result of a poor understanding of telemedicine practice. Nurses are sometimes faced challenged by an inability to fully use technology (Zadvinskis et al., 2018). Many nurses were educated and employed in an era prior to the advent of digital technology in the medical workplace. Many such nurses tend to exhibit little knowledge on telemedicine, which requires a clear evaluation of educational intervention on telemedicine in the nursing practice.

Bashir & Bastola (2018) ascertained that the perceptions of professional nurses towards telehealth quality were positive indicating a willingness to adopt telemedical care. Rutledge et al. (2017) described the importance of integrating educational programs in nursing in the area of telemedicine to train nurses in telehealth care and telenursing. Much of the nursing training has been centered on clinical care without the involvement of technology-based nursing care. This

suggests that some nurses lack adequate knowledge on telemedicine-based nursing care owing to the limited training and lack of exposure to this kind of health care (Cassano, 2014) however, because many patients are unable to access healthcare facilities as a result of limited funds and a limited number of healthcare providers, the adoption of telemedicine-based care is needed.

To facilitate and improve the healthcare provided to people in remote areas, telemedicine care must be adopted. This kind of healthcare requires adequate training of the nurses on telemedicine practice. According to Yob et al. (2016), the implementation of educational intervention involving telemedicine would increase the confidence and knowledge of the nurses and support social change through improved patient care.

Compelling the nurses to adopt telemedicine while offering telemedicine education enhances telemedicine use (Hope-Kolltveit et al., 2017), and Rutledge et al. (2017) described the incorporation of nursing education on telemedicine as a means of improving healthcare. Through the use of nursing informatics, most nurses are now able to effectively adopt technology-related care including telehealth and telemedicine (Darvish et al., 2014). Very little has been done to understand the education intervention of nurses involving telemedicine despite the strategies to educate nurses on telemedicine. This DNP project, therefore, was aimed at determining whether the nurse professionals have adequate knowledge of telemedicine following educational intervention on the subject.

Local Background and Context

Telemedicine utilizes electronic communication systems to provide healthcare services and information to patients, which is a cost-effective healthcare service provision strategy (Pardue, 2015). Remote areas where healthcare affordability and access are limited can receive

more healthcare services through telemedicine practice. The use of telemedicine allows nurses to deliver effective and safe nursing care, which bridges the barriers related to effective real-time nursing care. Nonetheless, most nurses face challenges in adopting telemedicine care, and this might be a result of poor education intervention involving telemedicine (Glinkowski et al., 2013; Schlachta-Fairchild et al., 2008). It is therefore important to evaluate the educational intervention involving telemedicine practice to determine the competence and ability of the nurses to deliver quality healthcare through the use of telemedicine for the benefit of the patients.

The educational intervention took place at a rural healthcare facility which forms part of a larger healthcare system for the improvement of the health of the community. The population surrounding the facility comprises people of low income, high unemployment, and limited education levels, which makes access to appropriate healthcare services a challenge. Telemedicine, therefore, becomes a resource for quality healthcare provision owing to the limited staffing in healthcare available in the area and the high cost of in-person healthcare access.

I determined the goals for this project through participation in meetings to observe how the hospital leaders go about address problem issues to create solutions. The remoteness of setting presented challenges in serving the healthcare needs of a population with limited funds. Adopting telemedicine was identified as a solution for the delivery of quality healthcare services in areas where populations otherwise have limited access to healthcare (Harvey et al., 2018).

Role of Doctor of Nursing Practice Student

The quality of nursing care can be linked to effective and affordable access to healthcare by the patients. Nursing professionals must, therefore, be competent in the provision of

healthcare services using technology-based healthcare. This DNP project helped determine the nurses' knowledge of telemedicine use and provided future directions on how such educational interventions would be provided to the nurses to facilitate their nursing practice.

With this DNP project I looked at possible changes to the telemedicine healthcare approach as well as the patient perspective in regard to affordability and access to healthcare services. To minimize potential bias, I involved hospital providers, staff, patients, and other stakeholders to determine the problems they face and the possible solutions to the problems.

Role of the Project Team

The project team comprised the hospital CEO, CNO, bedside registered nurses and telemedicine nurses, hospital board members, and patients. These individuals contributed to the DNP project by providing relevant information and data on the nature of telemedicine and the education intervention involving telemedicine practice at the hospital setting. The background information, evidence, and other information regarding this project were relayed to the hospital stakeholders through email. The email included notification of a meeting that was conducted for the verbal briefing of the stakeholders on the background of the DNP project. Following this briefing, the team members had the opportunity to provide their views about the DNP project's use of questionnaires and structured interviews. The team members determined the relevance of the DNP project, identified the problem the project addressed, and provided the possible approaches to how the DNP project was conducted.

Summary

Nurses have many responsibilities with patient care but have limited opportunities to raise their concerns about their competence, experience, and education level on the use of

telemedicine practice. The education intervention on telemedicine practice was important to determine nurses' effectiveness with that mode of healthcare service and provide future direction for nursing practice and telemedicine use. These issues were addressed by the DNP project, which involved contributions from a team of stakeholders to assure the effectiveness of the project.

Section 3: Collection and Analysis of Evidence

Introduction

Telemedicine provides an effective healthcare provision approach in response to a limited number of healthcare staff and access and affordability challenges for healthcare services. Some nurses have limited understanding of the use of telemedicine. Based at a rural facility located in an area where there is a large low-income population, the DNP project evaluated an education intervention involving telemedicine practice among the nurses. As a result of the project, I provide directions and recommendations for interventions to be offered in nursing training and practice to enhance nurse competence in the use of telemedicine. Evidence focused questions were essential to conduct the project.

Practice Focused Questions

Limited access and affordability of healthcare services by the patients living near the rural healthcare facility calls for telemedicine practice to enhance the quality of patient care by the nurses and physicians. However, there is limited nurse education on telemedicine use. As such, practice-focused questions for the DNP project centered on an education intervention on telemedicine for nurses to determine whether nurse competence in telemedicine positively impacts patient care. The practice-focused question for this DNP project was:

PFQ: Does an educational intervention geared towards telemedicine technology increase the knowledge and confidence level of RNs and LPNs practicing in a rural acute care center?

Sources of Evidence

I used various sources of evidence from the literature for the DNP project. A systematic review conducted by Kruse et al., (2018) indicated several barriers to telemedicine use. These barriers included resistance to change, staff challenges, and reimbursement complications. These authors suggested policy development was needed to address these barriers. The perceptions of nurses regarding telemedicine use can be changed if the work environment embraces adaptability (Hope-Kolltveit et al.,2017). Furthermore, nurse access to telemedical education can improve their confidence in telemedicine practice (Nalder, et al., 2018). Therefore, determining the level of nurses' knowledge of telemedicine and following with adequate educational opportunity will enhance their confidence and performance with telemedicine for the benefit of their patients.

Published Outcomes and Research

I used databases and search engines including CINAHL, PubMed, and Google scholar for searching the relevant literature on the topic of study. The search terms included *telemedicine AND intervention, nurses AND telemedicine, educational intervention AND telemedicine* (see Appendix A).

The scope of the review covered studies published within the last 10 years and those published in the English language. The types of literature included cohort studies, systematic reviews, random controlled trial studies, case-control studies, case reports, and series studies (see Kapoor, 2016). The studies focused on education intervention involving telemedicine among nurses in various clinical settings. To enhance the exhaustiveness of the search, I utilized the key terms along with Boolean operators (see Ecker & Skelly, 2010). Similarly, I used a PRISMA

flow diagram. I reviewed the studies reviewed after excluding duplicates and noneligible studies (see Appendix B).

Evidence Generated for the Doctoral Project

Study Participants

Participants for this DNP project were recruited from a convenience sample of RNs and LPNs working in an acute care facility located in the Eastern United States. The participants were recruited with flyers to participate in an online educational intervention focused on telemedicine and its uses. The potential participants were free to decline participation in the project and to withdraw from the project at any time without consequence. The participants were not monetarily compensated for their participation in the project, and they were asked to evaluate the self-study module as part of the project.

Procedures

Following Walden Institutional Review Board (IRB) approval, I worked with my preceptor to first, identify appropriate stakeholders to be part of the DNP team that would assist in guiding and supporting my project. Additionally, the team would have the responsibility of establishing the content validity of the educational intervention. From the discussion, an educational intervention based on the current literature was identified and modified to meet the needs of the organization. Along with the educational program, a pretest and posttest was created to match the educational intervention. Once completed, the stakeholders reviewed and established the content validity of the educational program, pretest, and posttest using the I-CVI and S-CVI (Polit & Beck, 2006). Once content validity was established, flyers to participate in the educational intervention were posted in common areas in the hospital. The pretest included

five demographic questions in order to describe the sample, one question for unique identifier, eight questions regarding telemedicine, and one question asking the participants to rate their confidence level of telemedicine. The pretest was given prior to the intervention. Following the educational intervention, the posttest was given. The posttest contained the same one question for unique identifier, eight questions regarding telemedicine, and one question asking the participants to rate their level of confidence of telemedicine.

Protection

I obtained Walden IRB approval prior to starting the project (#09-24-20-0574814). No identifying information regarding the participants was requested, collected, or recorded. All participants created and used their own unique identifiers so that the pretest could be linked to the posttest. The unique identifier was not known to me nor was it recorded. All data reported from this project was reported in the aggregate. This project had minimal risk to the participants. Additionally, IRB approval was received from the project site as well.

Analysis and Synthesis

The participants of the educational intervention used a unique identifier to match the pretest to the posttest in order to determine if there was a difference in scores between the pre- and posttest, which served as a proxy for increased knowledge. The data from pretest was matched with the data from the posttest, entered into an Excel spreadsheet, and transferred into SPSS. I used descriptive statistics to describe the sample and inferential statistics to determine if there was a difference in pretest and posttest scores regarding knowledge of telemedicine. I used inferential statistics to determine if there was an increase in confidence of telemedicine.

Summary

This staff education approach was in alignment with addressing the gap in practice concerning the limitation of the RNs and LPNs knowledge and confidence in using telemedicine. The purpose of this DNP project was to educate RNs and LPNs to increase their knowledge of and confidence in using telemedicine. The project included the organization's stakeholders who are committed to the continuous education of employees in order to promote positive patient and organizational outcomes. As demonstrated, each stage of the process was evaluated for refinement of the plan or the objectives of the project.

Section 4: Findings and Recommendation

Introduction

The identified healthcare organization faces many challenges regarding quality access to patient care. The 174-bed facility serves a population largely composed of low income, high unemployment, and low education clientele. Access to health care from specialist practitioners is a challenge due to the remoteness of the area. Thus, it is imperative that the organization invest in and implement telemedicine to mitigate such barriers. However, Fathi et al., (2017) demonstrated that that most nurses lack the knowledge and confidence necessary to implement telemedicine training as part of patient-centered care. Thus, the purpose of this DNP project was to determine if an educational intervention on telemedicine technology increased the knowledge and confidence level of RNs and LPNs practicing in a rural acute care center.

Sources of evidence for this project were first obtained from a thorough review of the literature, which included the critical analysis of 30 articles. These articles provided a sound basis for the DNP project. The source of evidence was a project-developed pretest and posttest knowledge questionnaire that measured the educational intervention's success in increasing nursing knowledge and confidence regarding the use of telemedicine. Descriptive statistics were used to describe the sample and inferential statistics were used to determine if there was a difference in means between the pretest and posttest.

Findings and Implications

Findings

A total of ten individuals ($N = 10$) were recruited and agreed to participate in the educational intervention. The average age of the individuals were 41.4 years of age ($SD = 10.34$)

with a range of 32 to 60 years. Sixty percent ($n = 6$) of the individuals were female, while 40% ($n = 4$) were male. Twenty percent ($n = 2$) had an AA degree, 70% of the sample ($n = 7$) had a BS/BSN degree, and one individual (10%) had an MS/MSN degree. On average, the participants had 12.7 years ($SD = 8.78$) of nursing experience (range of 4 to 35 years) and were in their current position an average of 4.3 ($SD = 3.12$) years with a range of 1 year to 10 years (Table 1).

Table 1

Descriptive and Inferential Statistics

	$N = 10$	Frequency (%)	Mean (SD)	Range
Gender				
Male	4	40%		
Female	6	60%		
Highest education				
AA/diploma	2	20%		
BS/BSN	7	70%		
MS/MSN	1	10%		
Age	10		41.40 (10.34)	32.0 to 60.0
Years as a nurse	10		12.70 (8.78)	4.0 to 35.0
Years in current position	10		4.30 (3.12)	1 to 10.0
Pretest scores	10		16.70 (6.37)	8.0 to 31.0
Posttest scores	10		32.60 (5.16)	24.0 to 40.0
Pretest_confidence score	10		1.70 (0.67)	1.0 to 3.0
Posttest_confidence score	10		4.60 (1.34)	3.0 to 6.0

Prior to the educational intervention, the participants were asked to rate their knowledge of telemedicine benefits, delivery modes, terminology, devices, etiquette, HIPPA concerns, and equipment (Questions 2 to 9 in Appendix F) on a Likert scale of 1 to 5 where 1 = *very weak* and 5 = *very strong* creating a total overall score of 8 to 40. The average pretest score was 16.7 ($SD =$

6.37) with a range of 8 to 31. Following the educational intervention, the participants were asked to rate their knowledge on the same eight items using the same Likert scale. The average posttest score was 32.6 ($SD = 5.16$) with a range of 24 to 40 (Table 1). Using a Wilcoxon Signed Rank test, there was a statistically significant difference in pretest and posttest scores ($z = -2.80, p < 0.01$).

Additionally, prior to the educational intervention, the participants were asked to rate their confidence of telemedicine use on a scale of 1 to 7 with 1 = *not at all* and 7 = *extremely confident*. The average pretest confidence score was 1.7 ($SD = 0.67$) with a range of 1 to 3. Following the educational intervention, the average posttest confidence score was 4.6 ($SD = 1.34$) with a range of 3 to 6 (Table 1). Using a Wilcoxon Signed Rank test, there was a statistically significant difference in pretest confidence scores and posttest confidence scores ($z = -2.81, p < 0.01$).

Implications

Based on the project findings, the results of the Wilcoxon Signed Rank tests indicated that the staff education increased the RNs' and LPNs' knowledge and confidence of telemedicine among those who participated in the project. These results echo the essence of the current literature that states the need for educational programs to enhance knowledge deficiencies among professional healthcare providers. By identifying and enhancing the nurses' existing telemedicine practice competencies, the hope is that their increased knowledge and confidence will translate into practice by improving their facility with telemedicine and result in enhanced patient and organizational outcomes.

Additionally, the results of this project demonstrate the need for telemedicine education on an annual basis to maintain nurses' telemedicine skills and confidence levels. Interestingly, the need for telemedicine education is often overlooked despite the importance of this tool in healthcare delivery (Lamb & Shea, 2006). Few nursing programs include telemedicine as part of the curriculum, and as a result, few nurses have the necessary knowledge to use telemedicine despite its importance in delivering care in rural areas. Thus, the need for ongoing education in telemedicine is critical and should be designed for all levels and types of providers who use telemedicine (Lamb & Shea, 2006).

This project incorporated the human factor that is often missing in educational interventions focusing on telemedicine. Nursing services will improve significantly when the education programs also incorporate training on communication, empathy, and telemedicine etiquette. Although phone and email communications have existed, the new telehealth nurse-client interaction platforms demand specific technological and communication skills. The education programs must incorporate telehealth etiquette to counter the ethical challenges associated with innovations. For example, telemedicine or telehealth etiquette ensures that nurses adjust their ethical conduct and communication to suit telehealth visits (Lamb & Shea, 2007)

Recommendations

Due to the consistent improvements in telemedicine technology, nursing students' education on telecommunication should fully be incorporated into the nursing education curriculum. Rutledge et al. (2017) posited that nursing schools should be at the forefront of healthcare by introducing telemedicine education programs and preparing nursing students to innovate through hands-on telemedicine experience. The study further recommended detailed

educational intervention to not only improve nurses' knowledge on telehealth but incorporate their unique contributions in expanding telemedicine practice throughout the globe. The interventions should thus be planned such that nurses' healthcare institutions and other stakeholders can contribute to the expansion of telemedicine practice (Rutledge et al., 2017).

Wakefield (2013) made similar recommendations that the proposed interventions recognize nurses' unique position to contribute to enhancing telemedicine practice. The current project demonstrated the need to identify appropriate combinations of interventions required to improve nurses' knowledge and confidence to improve healthcare outcomes. It is important to empower nurses to enhance their knowledge and hands-on skills and to encourage innovative improvements in telemedicine technology (Wakefield, 2013). Thus, interventions that include nurses' training on communication and telehealth etiquette to counter ethical challenges were included in the educational intervention. Moreover, it is recommended that the nurses' existing level of experience using telehealth technology be documented as a baseline to create better education and training programs that match the current needs and skill deficiencies. This recommendation is critical as it will allow educators to target specific individual needs as well as minimize the training costs and promote positive outcomes.

Contribution of the Doctoral Project Team

The doctoral project team that supported me in this project included the CEO, RNs, LPNs, telemedicine RNs, the CNO, and other hospital stakeholders. These stakeholders were responsible for providing relevant information and data on telemedicine's nature and the educational intervention regarding telemedicine at the hospital. The team also conducted reviews to determine the project's relevance and possible challenges and provided better approaches to

handling the project. Most importantly, the team provided further direction and recommendations on educational interventions that enhance nurses' competencies in telemedicine. The goal of the project was to address the gap in practice of the limitation of RNs and LPNs' knowledge and confidence in telemedicine practice. There is a need to constantly improve the project plan to bring all the stakeholders on board and define the roles they can play to ensure continuous education of all employees on telemedicine matters. Therefore, such a plan will birth a more accommodative and effective framework that can be implemented in other areas.

Strength and Limitations of the Project

The project's most impressive strength was that it demonstrated the importance of education to fill a specific gap in nursing knowledge and competency. It is hoped that the nurses' newfound knowledge of telemedicine will change their perceptions and mitigate resistance to change tendencies, which is a major barrier to adopting new technology (Lamb & Shea, 2006). Another strength was that the project involved many crucial stakeholders in the hospital: CEO, RNs, telemedicine RNs, the CNO, hospital board, patients, and more. The inclusion of key stakeholders provided me with access to major concerns across the organization. The information gleaned from these individuals can be used to inform further collaborative projects. Finally, a major strength of this project was the generous commitment of the 10 participants' time to this project. Without them, the project would not have been possible.

Despite these strengths, there were some limitations to this project. Firstly, the nurses who were targeted for this project were recruited from a convenience sample of RNs and LPNs working at one facility, thus, the results may not be generalizable to other groups of RNs and

LPNs. Secondly, the original educational intervention was to be delivered in a group setting; however, due to challenges of the COVID-19 pandemic, the educational intervention was moved to an online environment. Thus, those individuals who were not familiar with an online educational intervention may have opted not to participate in this project. Thirdly, the sample size of 10 participants may not adequately represent the general population of the organization. Lastly, the time frame of 2 weeks for data collection may have been challenging for potential participants and as a result, they may have decided not to participate in the project. It is recommended that this project be replicated with a larger sample to validate the results of this project.

Section 5: Dissemination Plan

Dissemination Plan

This DNP project was the first of its kind looking at the influence of an educational intervention geared towards increasing knowledge of telemedicine among RNs and LPNs. As with any project, it is critical that the results of this project be disseminated to high-ranking individuals such as the CEO, CNO, telemedicine RNs and other stakeholders for next steps to be identified and implemented among target users. Additionally, it is important that the findings of the project be disseminated among the RN and LPN staff. Given that the participants were anonymous, copies of the project will be provided to the staff in a general format via electronic medium so that all staff members have access. Other plans to disseminate this project include possible journal publication or presentation at a local professional organization. The project itself will be uploaded into Walden's Library and available to others through ProQuest.

Analysis of Self

One important role of telemedicine is to expand access and improve the quality of health delivery to rural areas. The use of telemedicine in rural areas to deliver high-quality and specialized care can reduce traditional challenges and burdens of patients such as transportation or lack of specialty care. As a practitioner, I have invested a significant amount of time and effort to understand the gaps and barriers to telemedicine and telemedicine practice. With the knowledge that I have gained from my DNP courses, I was able to understand the role of the DNP process in mitigating these existing gaps and offering an appropriate solution. My future goal will include becoming a key proponent of telemedicine technology and taking part in the implementation process to inspire other practitioners to embrace the importance of telemedicine

in maximizing patient and organizational outcomes. According to Bashir and Bastola (2018), professional nurses showed a positive perception of telemedicine in current practice. Therefore, the project would be valuable for those advocating for educational programs focusing on technology.

As a scholar, I would be concerned if the content of the educational intervention was not integrated into future telemedicine training programs for all hospital staff. My experience of identifying this important issue, conducting a literature review, selecting the best possible evidence, creating a valid educational intervention, implementing my project, and making recommendations has strengthened my confidence as a doctoral prepared nurse. I have a newfound appreciation for the importance of evidence-based practice and for continuing education as a tool to enhance both patient and organizational outcomes. I plan to advocate for future DNP projects that use education as a vehicle to enhance nursing practice.

From a project manager's perspective, I learned the value of the leadership skills needed to accomplish my goals. There were many challenges during the tenure of my project, and I learned to seek advice and support from my team and from colleagues. I also learned to be flexible and look at all possible perspectives when challenged. For example, my initial plan was to offer the educational intervention in a face-to-face environment; however, that needed to be changed due to the COVID-19 pandemic. I needed to remain confident and focus on the goal of my project and, with the help and guidance of my team, was able to overcome barriers and complete the project.

Summary

The purpose of the DNP project was to determine if an educational intervention geared towards telemedicine technology increased the knowledge and confidence level of RNs and LPNs practicing in a rural acute care center. The project incorporated all stakeholders committed to continuous professional growth and development of nurses to promote this project with the hope of improving healthcare outcomes in frontier or remote areas. The project was used to educate RNs and LPNs on telemedicine technology to ensure smooth adoption and implementation of the technology with the hope that the increased education would transition to practice and result in improved patient and organizational outcomes. I hope that by providing a solution to telemedicine technology adoption barriers, the projects will enhance nurses' knowledge and confidence and promote quality, safe, and timely healthcare services for patients.

References

- Bashir, A., & Bastola, D. R. (2018). Perspectives of nurses toward telehealth efficacy and quality of health care: A pilot study. *JMIR Medical Informatics*, *6*(2), e35.
<https://doi.org/10.2196/medinform.9080>
- Bullington, J., & Fagerberg I. (2013). The fuzzy concept of 'holistic care': A critical examination. *Scandinavian Journal of Caring Science*, *27*(3), 493–494.
<https://doi.org/10.1111/scs.12053>
- Boxer, R. J., & Ellimoottil, C. (2019). Advantages and utilization of telemedicine. *mHealth*, *5*, 12. <https://doi.org/10.21037/mhealth.2019.04.02>
- Carter B, Whittaker K, & Sanders, C. (2019). Evaluating a telehealth intervention for urinalysis monitoring in children with neurogenic bladder. *Journal of Child Health Care*, *23*(1), 45-62. <https://doi:10.1177/1367493518777294>
- Cassano, C. (2014). The right balance: Technology and patient care. *Online Journal of Nursing Informatics*, *18*(3), 1-1.
- Darvish, A., Bahramnezhad, F., Keyhanian, S., & Navidhamidi, M. (2014). The role of nursing informatics in promoting the quality of health care and the need for appropriate education. *Global Journal of Health Science*, *6*(6), 11–18.
<https://doi.org/10.5539/gjhs.v6n6p11>
- Donohue, L. T., Hoffman, K. R., & Marcin, J. P. (2019). Use of telemedicine to improve neonatal resuscitation. *Children*, *6*(4). <https://doi.org/10.3390/children6040050>
- Ecker, E. D., & Skelly, A. C. (2010). Conducting a winning literature search. *Evidence-Based Spine Care Journal*, *1*(1), 9–14. <https://doi.org/10.1055/s-0028-1100887>

- Fathi, J. T., Modin, H. E., & Scott, J. D. (2017). Nurses are advancing telehealth services in the era of healthcare reform. *Online Journal of Issues in Nursing*, 22(2), 1320-1325.
- Glinkowski, W., Pawłowska, K., & Kozłowska, L. (2013). Telehealth and telenursing perception and knowledge among university students of nursing in Poland. *Telemedicine Journal and e-Health*, 19(7), 523–529. <https://doi.org/10.1089/tmj.2012.0217>
- Goodridge, D., & Marciniuk, D. (2016). Rural and remote care: Overcoming the challenges of distance. *Chronic Respiratory Disease*, 192-203.
<https://doi.org/10.1177/1479972316633414>
- Harvey, J.B., Valenta, S., Simpson, K., Lyles, M., & McElligott. (2019). Utilization of outpatient telehealth services in parity and nonparity states 2010 – 2015. *Telemedicine and e-Health*, 25(2), 132 – 136. <http://doi.org/10.1089/tmj.2017.0265>
- Hope-Kolltveit, B.C., Gjengedal, E., Graue, M., Iversen, M. M., Thorne, S., & Kirkevold, M. (2017). Conditions for success in introducing telemedicine in diabetes foot care: a qualitative inquiry. *BMC Nursing*, 16(1), 1–10. <https://doi.org/10.1186/s12912-017-0201>
- Jasemi, M., Valizadeh, L., Zamanzadeh, V., & Keogh, B. (2017). A concept analysis of holistic care by hybrid model. *Indian Journal of Palliative Care*, 23(1), 71–80.
<https://doi.org/10.4103/0973-1075.197960>
- Kapoor M. C. (2016). Types of studies and research design. *Indian Journal of Anesthesia*, 60 (9), 626–630. <https://doi.org/10.4103/0019-5049.190616>
- Khemapech, I., Sansrimahachai, W., & Toachoodee, M. (2019). Telemedicine- Meaning, Challenges, and Opportunities. *Siriraj Medical Journal*, 71(3), 246-252.
<https://doi.org/10.33192/Smj.2019.38>

- Koivunen, M., & Saranto, K. (2018.). Nursing professionals' experiences of the facilitators and barriers to the use of telehealth applications: A systematic review of qualitative studies. *Scandinavian Journal of Caring Sciences*, 32(1), 24–44.
<https://doi.org/10.1111/scs.12445>
- Kruse, C. S., Karem, P., Shifflett, K., Vegi, L., Ravi, K., & Brooks, M. (2018). Evaluating barriers to adopting telemedicine worldwide: A systematic review. *Journal of Telemedicine and Telecare*, 24(1), 4–12. <https://doi.org/10.1177/1357633x16674087>
- Kruse, C. S., Krowski, N., Rodriguez, B., Tran, L., Vela, J., & Brooks, M. (2017). Telehealth and patient satisfaction: A systematic review and narrative analysis. *BMJ Open*, 7(8), e016242. <https://doi.org/10.1136/bmjopen-2017-016242>
- Lamb, G. S., & Shea, K. (2006). Nursing education in telehealth. *Journal of Telemedicine and Telecare*, 12(2), 55–56. <https://doi.org/10.1258/135763306776084437>
- Mars, M. (2013). Telemedicine and advances in urban and rural healthcare delivery in Africa. *Progress in Cardiovascular Diseases*, 56(3), 326–335.
<https://doi.org/10.1016/j.pcad.2013.10.006>
- Marzorati, C., & Pravettoni, G. (2017). Value as the key concept in the health care system: how it has influenced medical practice and clinical decision-making processes. *Journal of Multidisciplinary Healthcare*, 10, 101–106. <https://doi.org/10.2147/JMDH.S122383>
- McClellan, M.J., Florell, D., Palmer, J., & Kidder, C. (2020). Clinician telehealth attitudes in a rural community mental health center setting. *Journal of Rural Mental Health*, 44(1), 62–73. <https://doi.org/10.1037/rmh0000127>

- Mechanic, O. J., Persaud, Y., & Kimball, A. B. (2020). Telehealth Systems. In *StatPearls*. StatPearls Publishing.
- <https://www.ncbi.nlm.nih.gov/books/NBK459384>
- Mohammadi, E., Abbasi, K., & Saadati, M. (2015) Barriers to the implementation of nursing theories in clinical practice from the perspective of nurses. *Iranian Journal of Nursing and Midwifery Research*, 10(1), 13-24. <http://ijnr.ir/article-1-1477-en.html>
- Nalder, E., Marziali, E., Dawson, D. R., & Murphy, K. (2018). Delivering cognitive-behavioral interventions in an internet-based healthcare delivery environment. *British Journal of Occupational Therapy*, 81(10), 591-600. <https://doi.org/10.1177/0308022618760786>
- Nilsen, P. (2015). Making sense of implementation theories, models, and frameworks. *Implementation Science*, 10, Article 53. <https://doi.org/10.1186/s13012-015-0242-0>
- Pardue, D. (2015). Time can mark the difference between life and death. *Physician Leadership Journal*, 2(3), 14–16.
- Polit, D.F., & Beck, C.T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health*, 29, 489 – 497. <https://doi.org/10.1002/nur.20147>
- Rutledge, C. M., Kott, K., Schweickert, P. A., Poston, R., Fowler, C., & Haney, T. S. (2017). Telehealth and eHealth in nurse practitioner training: Current perspectives. *Advances in Medical Education and Practice*, 8, 399–409. <https://doi.org/10.2147/amep.s116071>
- Schlachta-Fairchild, L., Elfrink, V., & Dieckman, A. (2008). Patient safety, telenursing, and telehealth. In R. G. Hughes (Ed.), *Patient safety and quality: An evidence-based*

handbook for nurses. Agency for Healthcare Research and Quality.

<https://www.ncbi.nlm.nih.gov/books/NBK2687/>

Serper, M., & Volk, M. L. (2018). Current and future applications of telemedicine to optimize the delivery of care in chronic liver disease. *Clinical Gastroenterology and Hepatology*, 16(2), 157–161. <https://doi.org/10.1016/j.cgh.2017.10.004>

Starren, J.B., Nesbitt, T. S., & Chiang, M.F. (2014). Telehealth. In E. H. Shortliffe & J. J. Cimino (Eds), *Biomedical informatics: Computer applications in health care and biomedicine*. Springer-Verlag London.

Stetler, C.B. (2010). Stetler model. In J. Rycroft-Malone & T. Bucknall (Eds), *Models and frameworks for implementing evidence-based practice: Linking evidence to action*. Wiley-Blackwell.

Taylor, J., Coates, E., Brewster, L., Mountain, G., Wessels, B., & Hawley, M.S. (2015). Examining the use of telehealth in community nursing: identifying the factors affecting frontline staff acceptance and telehealth adoption. *Journal of Advanced Nursing*, 71(2), 326-337. <https://doi.org/10.1111/jan.12480>

Teoli, D., Aeddula, N.R., Mechanic, O.J., & Kimball, A.B. (2020). *Telemedicine*. Stat Pearls Publishing. <https://www.ncbi.nlm.nih.gov/books/NBK535343/>

U.S Health Resources & Services Administration. (HRSA, n.d.). *Telehealth Programs*. <https://hrsa.gov/rural-health/telehealth>

van Houwelingen, C. T. M., Ettema, R. G. A., Kort, H. S. M., & ten Cate, O. (2019). Hospital nurses' self-reported confidence in their telehealth competencies. *Journal of Continuing Education in Nursing*, 50(1), 26-34.

<https://doi.org/10.3928/00220124-20190102-07>

Wakefield, B.J., Scherubel, M., Ray, A., & Holman, J. E. (2013). Nursing interventions in a telemonitoring program. *Telemedicine Journal and e-Health*, 19(3), 160–165.

<https://doi.org/10.1089/tmj.2012.0098>

Whitten, P., Holtz, B., & Laplante, C. (2010). Telemedicine: What have we learned? *Applied Clinical Informatics*, 1(2), 132–141. <https://doi.org/10.4338/ACI-2009-12-R-0020>

Wilson, L. S., & Maeder, A. J. (2015). Recent directions in telemedicine: Review of trends in research and practice. *Healthcare Informatics Research*, 21(4), 213–222.

<https://doi.org/10.4258/hir.2015.21.4.213>

Wootten, R. (2012). Twenty years of telemedicine in chronic disease management – an evidence synthesis. *Journal of Telemedicine and Telecare*, 18(4), 211-220.

<https://doi.org/10.1258/jtt.2012.120219>

World Health Organization. (2009). *Guidelines on hand hygiene in health care*.

<https://www.ncbi.nlm.nih.gov/books/NBK144006/>

Yob, I., Danver, S., Kristensen, S., Schulz, W., Simmons, K., Brashen, H., Krysiak, R. S., Kiltz, L., Gatlin, L., Wesson, S., & Penland, D. (2016). Curriculum alignment with a mission of social change in higher education. *Innovative Higher Education*, 41(3), 203–219.

<https://doi.org/10.1007/s10755-015-9344-5>

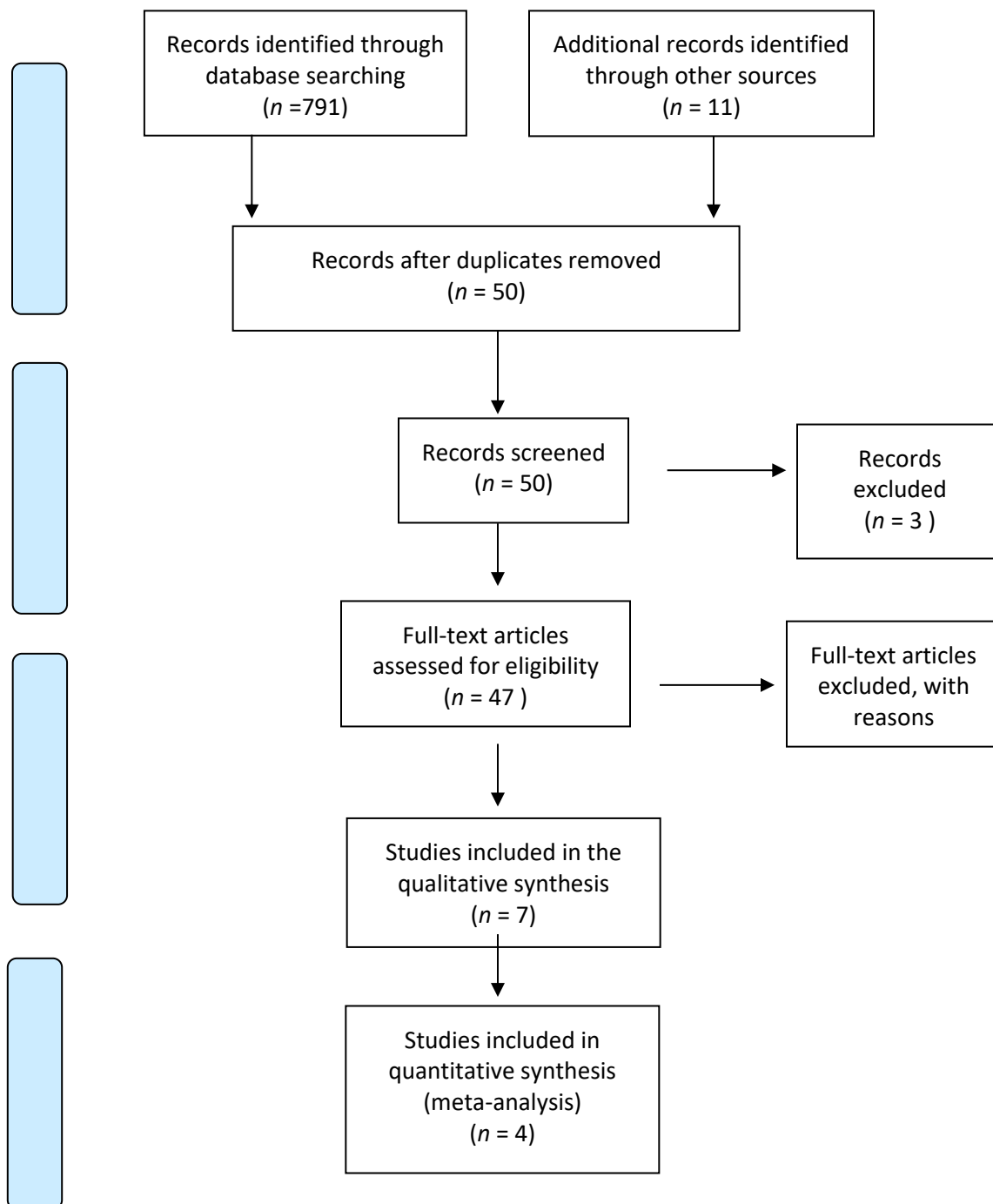
Zadvinskis, I. M., Garvey-Smith, J., & Yen, P. Y. (2018). Nurses' experience with health information technology: Longitudinal qualitative study. *JMIR Medical Informatics*, 6(2), e38. <https://doi.org/10.2196/medinform.8734>

Zhang, X. Y., & Zhang, P. (2016). Telemedicine in the clinical setting. *Experimental and Therapeutic Medicine*, 12(4), 2405–2407. <https://doi.org/10.3892/etm.2016.3656>

Appendix A: Search Terms

Key Databases	Search Term Combination
CINAHL, PubMed, Google Scholar	nurses AND telemedicine
CINAHL, PubMed, Google Scholar	Educational intervention AND telemedicine
CINAHL, PubMed, Google Scholar	Telemedicine OR Intervention

Appendix B: PRISMA Flow Chart



Appendix C: The Literature Matrix for Archival and Operational Data

Author/ Date	Theoretical/ Conceptual Framework	Research Question(s)/ Hypotheses	Metho- dology	Analysis & Results	Conclusions	Implications for Future research	Implications for practice
Ayisha Bashir & Bastola Dhundy, April-June 2018	The study determined the nurse's perspective s towards telehealth quality and the efficacy of health care: A pilot study	Do telehealth and telemedicine technology impacts perceive the internal quality service delivery by nurses within the healthcare system?	The data utilized in the study was collected from the nurses who belonged to the home care urgency inquiring about their inhibitors and facilitators to telemedicine care and the education intervention involved	The perceptions of the nurses were analyzed based on the Wilcoxon signed-rank test using P- value tests for values of 0.35	The nurses generally depicted satisfaction with telehealth nursing service implying their competitiveness in telehealthcare and telemedicine		
Wakefield Bonnie, Melody Scherubel, Annette Ray & John	The study sought to investigate the nursing intervention s in the telemonitoring program.	Do nurses depict competitiveness in interventions involving telemonitoring ?	Data used in the study was drawn from the clinical trials evaluating telemonitoring and then coded	Most nurses depicted competence in nursing intervention involving telemonitoring	The telemonitoring intervention was best utilized by the nurses		

Holman (2013).							
Carter Bernie, Karen Whittaker & Caroline Sanders	Investigation and evaluation of telehealth intervention that involved urinalysis monitoring in children suffering from neurogenic bladder	Do nurses and other health care providers have adequate education intervention and knowledge on telehealthcare in urinalysis monitoring?	Data collection utilized mixed methods and soft systems methodology tools using observation, interviews, and e-surveys	Most parents and nurses depicted minimal telemedicine intervention and utilization in urinalysis care	Parents depicted confidence in the types of telehealth intervention provided by the nurses while the nurses depicted relatively high confidence in the provision of telehealthcare services for urinalysis		
Johanna Taylor, Elizabeth Coates, Liz Brewster, Mountain Gail, Bridgette Wessels & Mark	The study was conducted to examine the use of telehealth in community nursing for the identification	Do nursing staff demonstrate frontline acceptance of telehealth in healthcare provision?	Thematic analysis was utilized using qualitative interviews	The attitudes of nursing staff towards telemedicine care ranged from resistance to enthusiasm with most staff depicting	Several barriers underpinned the use of telemedicine and telehealth intervention by the nurses during healthcare provision		

Hawley (2014).	n of the factors that affected frontline staff acceptance and telehealth adoption			high levels of resistance			
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Appendix D: Demographic Questionnaire

Demographic Questionnaire:

1. Age (in years):
2. Gender: Male Female
3. Number of Years as a Nurse:
4. Number of Years in Current Position:
5. Highest Level of Education:

 AA / Diploma

 Bachelor's of Science

 Masters of Science

 Doctoral Degree

Appendix E: Pretest and Posttest Questionnaire

Telemedicine Pretest & Posttest

1. Unique Identifier	
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Using a scale of 1 to 5 with:

- 1 = Very Weak
- 2 = Weak
- 3 = Neutral
- 4 = Strong
- 5 = Very Strong

Please answer the following statements to the best of your ability.

	1	2	3	4	5
2. Your knowledge of telemedicine benefits.					
3. Your knowledge of telemedicine delivery models.					
4. Your knowledge of telemedicine terminology.					
5. Your knowledge of telemedicine peripherals devices.					
6. Your knowledge of telemedicine etiquette.					
7. Your knowledge of telemedicine HIPAA.					
8. Your knowledge of initiating telemedicine's digital stethoscope.					
9. Your knowledge of initiating telemedicine's digital otoscope.					

On a scale of 1 to 7 with:

- 1= Not at all Confident. 4= Confident 7= Extremely Confident
- 2= Only Slightly Confident. 5= Moderately Confident
- 3= Somewhat Confident. 6= Very Confident.

Please answer the following question.

	1	2	3	4	5	6	7
10. How Confident is your use of Telemedicine							

Appendix F: Doctor of Nursing Practice Project Directions



Thank you for agreeing to participate in this DNP project! The purpose of this DNP project is to assess the knowledge and confidence level of telemedicine among RNs and LPNs practicing in a rural acute care center. Given that you responded to this email and expressed interest in participating in this project, this email will provide you:

- A description of the project;
- Directions for the project;
- A link to the pretest;
- A link to the educational program; and,
- A link to the post-test.

The **purpose of this DNP project** is to assess the knowledge and confidence level of telemedicine among RNs and LPNs practicing in a rural acute care center. You will receive no direct benefit from participation in this project. However, your participation may help the project coordinator determine if an educational intervention geared towards telemedicine can increase knowledge and confidence among RNs and LPNs. There are no risks to you by participating in this study. You will not be asked any personal questions and all information asked will be reported in the aggregate. If you decide not to answer a specific question or to withdraw from the project, your request will be granted right without any adverse consequences. You will receive no benefits from participating in this project.

Directions for Participating in the Survey: To begin participation in the project, first click on the link below. This link will take you to a survey that will ask you five demographic questions. It will also ask you to create a unique identifier that ONLY you will know so that your responses of the pre-test may be matched may be matched with your responses of the post-test. No identifying information will be asked and all information will be collected and reported in the aggregate. Overall, it should take you no more than 35 minutes to complete the educational PowerPoint and the online surveys.

To begin participation: Click here: (Link to demographic survey)

1. <https://www.surveymonkey.com/r/VCXBGYB> The survey should take you between 5 to 10 minutes
2. Once you have completed the demographic survey, please click here to complete the
3. pre-test: <https://www.surveymonkey.com/r/WMMMFS2> The post-test should take you
4. between 5 to 10 minutes.
5. Once you have completed steps #1 (demographic survey) and #2 (pre-test), please review the attached PowerPoint slide presentation: Opens the link: [DNP EDUCATIONAL INTERVENTION1.pptx](#) regarding telehealth. The review should take you no more than 20 minutes to complete.
6. Once you have reviewed the PowerPoint presentation, please click on the link to the post-test <https://www.surveymonkey.com/r/WXK6L8T> .

Thank you again for participating in this DNP project. Your time and effort is greatly appreciated. No additional information will be required from you. Thank you again for your participation.

Appendix G: Expert Content Validity

	Expert 1	Expert 2	Expert 3	Expert 4	# Agreement	I-CVI
Education al Session	4	4	4	3	4	1
Item						
2	4	4	4	4	4	1
3	4	4	4	4	4	1
4	4	4	4	4	4	1
5	4	4	4	4	4	1
6	4	4	4	4	4	1
7	4	4	4	4	4	1
8	4	4	4	4	4	1
9	4	4	4	4	4	1
						Mean I-CVI = 1
						S-CVI/Ave = 1
Proportion Relevant	1	1	1	1		Mean Expert Proport = 1