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Local Anesthesia Before Intravenous Cannula Insertion: Recommendations for Registered Nurses in Practice

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This DNP scholarly project, directed and approved by the candidate's committee, has been accepted by the School of Nursing and College of Graduate and Professional Studies of Abilene Christian University in partial fulfillment of the requirements for the degree

Doctor of Nursing Practice

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A doctoral project submitted in partial satisfaction

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Doctor of Nursing Practice

by

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Dedication

This doctoral nurse practice capstone project is dedicated to the memory of my parents, the late Walter and Willie Mae Campbell, and my youngest brother, the late James Edward Campbell. You all were taken from this life too soon. I love you.

> Love never fails but whether there be prophecies, they shall fail; whether there be tongues, they shall cease; whether there be knowledge, it shall vanish away. For we know in part, and we prophesy in part. But when that which is perfect is come, then that which is in part shall be done away. When I was a child, I spoke as a child, I understood as a child, I thought as a child: but when I became a man, I put away childish things. For now, we see in a mirror dimly; but then face to face: now I know in part; but then shall I know even as also I am known. And now abides faith, hope, love, these three; but the greatest of these is love. (1st Corinthians 13:8–13, The King James 2000 Bible)

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Abstract

Administering local anesthetics, such as intradermal, should become standard practice for RNs in pretreatments for pain control prior to intravenous insertion. Peripheral venous cannulation has provoked the most fear and anxiety in adult patients about everyday practice in hospitals. Adult patients often state that this procedure causes considerable discomfort. Local anesthesia for cannulation is usually not offered to adult patients who are on general medical units. Evidence has indicated inconsistency in the use of pain management strategies during these procedures. The researcher's goal in this project was to educate RNs about the intradermal pretreatment procedure, provide education on the hospital's current IV therapy pretreatment policy, increase the usage of intradermal local anesthesia for cannulation for patients' comfort level, and utilize low-fidelity simulation for adult learners. Many studies have shown simulation can be an influential tool in helping adult learners; for example, RNs can envision concepts and apply knowledge in a safe, nonthreatening environment. The conceptual framework the researcher chose for this simulation, point of interest capstone project was Knowles's adult learning theory, which describes methods to help adult learners visualize the connectedness of concepts and applications of knowledge to actual life situations.

Keywords: normal saline with preservatives, nursing, pretreatment, psychometrics, registered nurse, simulation

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Chapter 1: Introduction

Intravenous (IV) cannulation is one of the most frequently performed clinical techniques on adult patients by registered nurses (RNs) who provide IV skills. According to Bond et al. (2016), irregularity exists in the use of pain controlling approaches during these techniques. Evidence shows that not all nurses are using pain control, even though the research for it is very positive. This qualitative research was conducted to determine if local anesthetic, such as intradermal, should become standard practice for RNs regarding pretreatment for pain and discomfort control.

Problem of Interest

The problem of interest is that local anesthesia for cannulation is usually not offered to adult patients who are on general medical units. As regularly mentioned by adult patients, peripheral venous cannulation provokes fear and anxiety. Most adult patients often state that this procedure causes considerable discomfort. Nurses note the reason for not providing pretreatment before IV insertion is the lack of IV therapy simulation classes that include education for RNs regarding pretreatment for pain control before insertion of IV cannula. According to Bond et al.'s (2016) research and with consideration to the constraints, several suggestions for nursing practice, education, and investigation could be made. It is imperative for nurses in practice to comprehend that for most adult patients, needles promote anxiety and may be recognized as traumatic and unpleasant (Mclenon & Rogers, 2018). In addition, one of the top displeasure scores that adult patients report during hospitalizations is the pain felt by the insertion of IV catheters (Bond et al., 2016). Bond et al. (2016) indicated that less pain was reported by adult patients when IV sites were pretreated with an intradermal solution than when sites were not

pretreated. However, even though this is the preferred method and included in many hospital policies, a majority of RNs are still not utilizing intradermal localization prior to IV insertion.

Background of Problem of Interest

Peripheral venous cannulation is one of the most fearful procedures adult patients mention regarding everyday practice in hospitals (Bond et al., 2016). In reference to personal professional observations, most adult patients often relate that this procedure causes considerable discomfort and identify venipuncture or IV cannulation placement as a highly stressful event. However, anesthesia pretreatment prior to IV insertion is not generally offered to adult patients on medical units unless the patients are in the preoperative departments (Bond et al., 2016). As a result of RNs not generally offering intradermal anesthesia prior to IV insertion for pain control, adult patients often state the IV insertion procedure causes unnecessary anxiety and future avoidance of obtaining medical care (Bond et al., 2016).

Purpose of the Project

The purpose of this project was to assess if RNs have been properly educated on the policy and if they have been utilizing the hospital's policy for pretreatment for local anesthesia before IV cannula insertion (in a general medical unit).

Significance of Problem of Interest

IV cannulation is one of the frequent, highly intrusive techniques that RNs perform, most often daily, and regardless of what unit, floor, or department they are practicing on (Bond et al., 2016). Adult patients often experience discomfort or pain related to the insertion of IV for medication administration or hydration (Keleekai et al., 2016). IV cannulation is within an RN's scope of practice in the United States. Throughout the United States, intravenous therapy policies vary from institution to institution and department to department. Adult patients have had IV

cannulations started both with and without pretreatment of intradermal injections (Keleekai et al., 2016). In recent years, adult patients have become more informed about pretreatment or numbing of IV sites before IV cannulations. In reference to personal professional observations, RNs often hear adult patients' requests for a pretreatment of intradermal injection for numbing the IV site before IV cannulation or before obtaining blood specimens for laboratory tests. Historical techniques of pain control for IV cannulation include stretching the skin, gradual injection through small needles, squeezing a stress ball, application of cold (cryoanalgesia), intradermal injections of normal saline or 1% lidocaine, and topical anesthetics (Bond et al., 2016).

Nature of Project

I used a mixed methods nonexperimental descriptive survey in this study. I developed an improvement project with an educational program with recommendations for nursing IV therapy practices. My goal was to collect data from a sample size of at least 60 RNs pre- and post-education survey for descriptive analysis. I used the descriptive analysis to identify barriers as to why RNs were not using pretreatment prior to IV insertion. The goal of this project was to make education recommendations for change in practice to include pretreatment prior to IV insertion by using intradermal injection.

PICOT Question

The components of the PICOT question are as follows:

- Population (P): RNs employed by the hospital.
- Intervention (I): An educational session discussing the hospital's IV cannulation policy.
- Comparison (C): The knowledge of the IV cannulation policy as determined by RNs performance on pre- and post-education surveys.

- Outcome (O): Decrease IV cannulation hospital policy knowledge deficit and increase RN usage of pretreatment solution.
- Time (T): After six months' time of data collection.

PICOT Question: Will an educational session discussing the IV cannulation policy decrease the IV cannulation knowledge deficit in RNs employed at the hospital? Will an educational session increase RN usage of pretreatment solution?

Hypothesis

RNs utilizing the hospital's procedures and policy for intradermal pretreatment of IV sites using normal saline with preservatives or 1% lidocaine compared to not utilizing the hospital's procedures and policy for pretreatment of IV sites intradermally will result in an educational program increase in the incidence of nurses offering pretreatment and recommendations of changing RN IV practice after six months.

Theoretical Framework

Adult learning theory offers the groundwork for virtual reality-based education (Wang, 2011). Adults understand differently than adolescents because of life experiences, maturity, and age. Adult learning tends to be more autonomous and self-directed. Knowles (1975) characterized self-directed education as "a process in which individuals take the initiative without the help of others in diagnosing their learning needs, formulating goals, identifying human and material resources, and evaluating learning outcomes" (p. 18).

Conceptual Framework

Knowles (1975) developed andragogy, a conceptual framework for adult learning. According to Wang (2011), Knowles identified six assumptions about adult learners:

1. Adults need to know *why* they need to learn something before undertaking the effort to learn it.
2. Adults have a self-concept biased toward independent and self-directed learning.
3. Adults have acquired a great deal of life experience.
4. Adults value learning that helps them cope with the demands of their everyday life.
5. Adults are more interested in life-centered (also referred to as problem-centered or task-centered) approaches than subject-centered approaches to learning.
6. Adults are more motivated to learning by internal drives than external ones (pp. 670–671).

Centered on these six assumptions, Knowles devised the subsequent seven schemes to accelerate adult education (Wang, 2011):

1. Launch an actual educational climate where adult learners feel comfortable and safe expressing themselves, for example, simulation laboratories.
2. Include learners in the mutual scheduling of program and approaches.
3. Have adult learners recognize their own requirements to encourage internal inspiration.
4. Encourage learners to develop their own learning objectives.
5. Inspire adult learners to classify resources and use those resources to meet their education ideas.
6. Encourage adult learners in carrying out their education strategies.
7. Include adult learners in self-evaluation to encourage and advance skills for serious self-reflection.

Operational Definitions

The operational definitions that will be used throughout this paper are the key terms mentioned to provide clarification regarding this project topic.

Normal saline with preservatives (NSP). Bacteriostatic sodium chloride for injection "is a sterile, nonpyrogenic, isotonic solution of sodium chloride for injection. Each milliliter (mL) contains sodium chloride 9 mg and 0.9% (9 mg/mL) benzyl alcohol added as a bacteriostatic preservative. May contain hydrochloric acid for pH adjustment" (Mountainside-Medical, 2018, para. 1).

Nursing. The American Nurses Association (ANA, 2018) describes nursing as both an art and a science.

Pretreatment. In terms of a reduction of pain, pretreatment is described as a 1% buffered lidocaine reducing pain from IV insertion (McNaughton, Zhou, Robert, Storrow, & Kennedy, 2009).

Psychometrics. Psychometrics is the method of psychological dimensions—the use of quantifiable devices for evaluating psychological developments ("Psychometrics," 2018), for example, the quantitative evaluation tools that were used in this capstone project—the self-confidence in learning scale (SCLC) and the simulation design scale (SDS). The objective of the psychometrics field is increasing the amount of skills, expertise, talents, mindsets, character traits, and scholastic achievement (Psychometrics, 2018).

Registered nurse. According to GraduateNursingEDU.org (2018), a registered nurse is a nurse who holds at least a nursing diploma, associate, or bachelor degree in nursing, has passed the NCLEX-RN exam administered by the National Council of State Boards of Nursing, and has met all the other licensing requirements instructed by their state's board of nursing.

Simulation. Simulation is a very valuable teaching approach in nursing education and RN advancement learning settings and is quickly becoming a standard teaching strategy, partly due to the lack of availability of hospital clinical sites. Simulation is appreciated for its ability to provide realistic, perspective-rich, practical learning in a safe environment (National League for Nursing, 2017).

Scope of Project

Based on particpants' pre-education survey results, the scope of this project was to create and instruct an educational program, administer a post-education survey, and review the results to determine if the participants increased their usage of the policy. I developed the improvement project with an educational program and recommended the educational program be added to nursing IV therapy practices for RNs.

Summary

This project enlisted RNs employed on general medical units at two local hospitals. IV insertion is one of the most highly completed clinical methods performed on adult patients by RNs who provide IV skills. I conducted qualitative research to determine if local anesthetic, such as intradermal, should become standard practice for RNs regarding pretreatment for pain and discomfort control. I developed simulations and changes in IV practice educational programs of the intradermal injection procedure for pretreatment using Knowles's adult learning theory.

The operational or research definitions provided intelligibility to this capstone project and proved useful throughout the paper. The operational definitions mentioned throughout this paper included psychometrics assessment tools, such as SCLS, SDS, and the Educational Practices Questionaire (EPQ).

The scope of the research applied to only RN-licensed nursing personnel. The hypothesis remains: RNs utilizing the hospital's procedures and policy for pretreatment of IV sites intradermally with NSP or 1% lidocaine compared to not utilizing the hospital's procedures and policy for pretreatment of IV sites intradermally will result in educational recommendations for a change in the IV practice of RNs in the hospital after six months.

Chapter 2: Literature Review

Purpose

The aim of this literature review is to provide an underpinning and validation that will guide the DNP project's methodical process. There is a much-needed improvement in RN IV therapy practices from the traditional practice of no pretreatment of IV sites prior to IV insertion to a change to pretreatment of sites with evidence-based practices (EBP) for patients who request numbing medicine prior to IV insertion. It is important to note how each of the items in the literature review revealed the need to provide pretreatment to IV insertion to increase patient satisfaction and decrease pain ratings related to the common, daily nursing practice of IV insertion.

The literature review remains important to the PICOT question by revealing the need for increased nursing education regarding pretreatment prior to IV insertion and increased usage of pretreatment intradermal solutions. The PICOT question remains as follows: Will an educational session discussing the IV cannulation policy decrease the IV cannulation knowledge deficit in RNs employed at the hospital? Will an educational session increase RN usage of pretreatment solutions?

Literature Search Methods

Based on both the PICOT question and problem statement, the terms of the project were organized for relevancy to create additional research data. A search was performed utilizing the following search instruments based on the established criteria: Medline, Cochrane, Health Science: Nursing/Academic, CINAHL Complete, and Google Scholar. Cochrane provided few focused searches compared to CINAHL searches. Medline and Health Science: Nursing/Academic search engines offered extensive results. Medline yielded 40 results,

Cochrane yielded 20 results, Health Science: Nursing/Academic yielded 33 results, CINAHL yielded 80 results, and Google Scholar yielded 100 results. Key terms included RNs, simulation, nursing, psychometrics, NSP, and pretreatment.

Theoretical Framework

Adult learning theory as described by Rutherford-Hemming (2012) served as the foundation for this DNP project examining simulation-based training, personal computer training, and video training. I used a combination of teaching strageties, such as video training and practice on a low-fidelty IV manikin arm, in this DNP project. According to Knowles's adult learning theory, adults learn differently than children because of life experiences, maturity, and age. Their learning tends to be more self-directed and independent (Rutherford-Hemming, 2012).

Dr. Malcolm Knowles, known as one of the world's leading scholar-practitioners in the development of adult learning theory, developed a conceptual framework for adult learning that correlates with this educational DNP project, such as teaching the need for change in IV skills practice for RNs (Litster, 2016). Knowles identified five assumptions about adult learners (as cited in Litster, 2016):

1. Self-concept: As a person matures, their self-concept moves from one of being a dependent personality toward one of being a self-directed human being.
2. Role of experience: As a person matures, they accumulate a growing reservoir of experience that becomes an increasing resource for learning.
3. Readiness to learn: As a person matures, their readiness to learn becomes oriented increasingly to the developmental tasks of their social roles.
4. Orientation to learning: As a person matures, their time perspective changes from one of postponed application of knowledge to immediacy of application, and accordingly, their

orientation toward learning shifts from one of subject-centeredness to one of problem-centeredness.

5. Motivation to learn: As a person matures the motivation to learn is internal. (p. 3)

Based on these five assumptions, Knowles formulated the following seven strategies to facilitate adult learning (Litster, 2016):

1. Launch an actual educational climate where adult learners feel comfortable and safe expressing themselves, for example, simulation laboratories.
2. Include learners in the mutual scheduling of program and approaches.
3. Have adult learners recognize their own requirements to encourage internal inspiration.
4. Encourage learners to develop their own learning objectives.
5. Inspire adult learners to classify resources and use those resources to meet their education ideas.
6. Encourage adult learners in carrying out their education strategies.
7. Include adult learners in self-evaluation to encourage and advance skills for serious self-reflection.

Historical Overview

Many adult hospital inpatients and outpatients need an IV for either fluid replacement to prevent and correct problems with their electrolyte status or a means to administer medications or contrast, as with imaging for radiology procedures (National Institute for Health and Care Excellence, 2013). The dependent variable in this project was patient satisfaction or pain rating scores and was directly measurable in historical research studies. The independent variable was

the type of intradermal solutions, such as NS, NSP, or 1% or 2% lidocaine. Several researchers explored discomfort alleviation for IV insertion procedures or the practice of pretreatment of IV sites before cannulation of adults, but few researchers have recommended needed change in practice outside of surgical suites (Bond et al., 2016; Mclenon & Rogers, 2018; Oman et al., 2014). According to Emanuelson (2019), more people are searching the internet before they are admitted to the hospital on how they can request numbing medicine before an IV or a needle is inserted. A change is needed in nursing IV education and practices to attain a higher standard of offering patients pretreatment of sites, either with intradermal solutions of 1% lidocaine, 2% lidocaine, NSP, or NS.

Current and Historical Research Findings

Several researchers explored the effectiveness of local anesthetics related to IV use. Bond et al. (2016) conducted a systematic review and network meta-analysis to determine the most effective local anesthetic for adult peripheral venous cannulation and to compare the pain levels of local anesthetic application with that of no application of a local anesthetic. Bond et al. searched 12 databases, including Medline and Embase, for articles published from 1990 to August 2015. The study design focused on randomized controlled trials (RCTs), and the primary outcome was self-reported pain as measured on a 100-mm visual analogue scale. Bond et al. focused their literature search on 37 studies, 27 of which were included for meta-analysis, along with two random-effects meta-analyses. They found that any local anesthetic prior to insertion for IV cannulation resulted in less pain than unattenuated IV sites. Although 17 studies did not decide which anesthetic was most effective when compared to others (e.g., NS or NSP compared to 1% lidocaine), 2% lidocaine local anesthetic was the most effective anesthetic studied in this research. Bond et al. (2016) concluded the following: IV sites can be successfully treated, and

the pain level is less when pretreatment of any local anesthetic is applied compared to no application of local anesthetic. This suggests that local anesthetic pretreatment of IV sites before the insertion IV cannulation should become normal practice and an indicator of high-quality IV therapy care.

Recommendations for Change in Nursing IV Therapy Practices

Several researchers investigated pretreatment preferences. In a study by Levitt and Ziemba-Davis (2013), 30 patients were asked their preference of pretreatment before IV cannulation—intradermal lidocaine, guided imagery (ultrasound guided), or no pain control. Of the 30 patients, four chose not to receive any pretreatment measures. Levitt and Ziemba-Davis found that 86.6% of the patients desired a pain control approach. The mean pain ratings on IV insertion were very low for all three groups (intradermal lidocaine, ultrasound guided, or no pain control approach). The pain rating was significantly lower in the patient group who received the intradermal lidocaine pretreatment. Levitt and Ziemba-Davis concluded that patients preferred pretreatment before IV insertion for pain control and that patients should be involved in decisions about their pain management.

Rüsch, Koch, Spies, and Eberhart (2017) investigated pretreatment preferences combined with the size of the cannula. The researchers found that the assessment level of pain upon insertion of an IV cannula is closely related to size of the cannula after the application of local anesthesia. Rüsch et al. (2017) noted results from the clinical trial of 450 patients completed as to the efficacy of local anesthesia in comparison to the size of the cannula and of no pretreatment. Rüsch et al. (2017) conducted their study by using a randomized, controlled trial to evaluate pain ratings during venipuncture after local anesthesia of intradermally injected lidocaine or with a vapocoolant spray in comparison to placebo (traditional IV nursing practice). The researchers

used a standardized protocol with the patients to provide the greatest amount of blinding. Rüsch et al. (2017) used the vein of the dorsum of the hand and assessed pain level using a numerical rating scale from 0 (no pain) to 10 (greatest level of pain) and recorded the rate of unsuccessful puncture. Rüsch et al. (2017) revealed the pain ratings were strongly related to the size of the IV catheter and whether pretreatment of vapocoolant spray and/or intradermal lidocaine was used. Pain ratings of 2.6 to 3.5 were noted with pretreatment compared to pain ratings of 5.0 with no pretreatment. Rüsch et al. (2017) concluded that local anesthesia can be recommended before venipuncture only if a large cannula is used, such as 17 gauge, and the vapocoolant spray may be equally useful as intradermal lidocaine with smaller gauge cannula, such as 20 gauge, and is associated with a decreased rate of unsuccessful puncture.

Lidocaine Versus Normal Saline With Preservatives

Several studies revealed lidocaine as more effective than NSP when given intradermally as pretreatment prior to IV insertion. Oman et al. (2014) revealed which intradermal solution/injections yielded the best relief from potential pain upon IV cannula insertion. The researchers analyzed 13 randomized controlled trials on the effect of lidocaine or NSP in reducing pain upon IV cannula insertion in adults. Oman et al. (2014) queried the following databases: PubMed, Embase, CINAHL, and ProQuest Dissertation and Theses and revealed that lidocaine was more effective than NSP in providing pain relief ($p < .001$). Oman et al. (2014) concluded that cost benefit issues and lidocaine drug shortages should be considered before making definitive IV therapy practice recommendations.

Additional studies revealed lidocaine as more effective than NSP when given intradermally as pretreatment prior to IV insertion. Santana (2015) conducted a randomized, double-blind, controlled clinical trial that included 24 patients who were scheduled for surgery.

The nurses used either intradermal 2% lidocaine or NS prior to insertion of IV cannula and assessed pain ratings on a 0 to 10 scale. Based on the results of the study, Santana recommended the use of 2% lidocaine in daily nursing IV therapy practices to avoid the pain associated with venipunctures thereby improving patient's comfort and pain levels. Santana noted the catheter size did not have any relationship with the pain-level ratings.

Winfield et al. (2013) researched 1% lidocaine, NSP, and NS to determine which solution provided optimal patient comfort. The researchers found that 1% lidocaine local anesthesia provided the least painful IV insertion. Another finding Winfield et al. (2013) noted was the process or method on how a nurse inserted the IV had a close relationship with the pain level or discomfort.

Patient Pain and Anxiety Level

In a study regarding patient's pain and anxiety levels, Dwyer and Rutkowski (2013) surveyed 235 patients regarding their pain and anxiety levels after insertion of IV with pretreatment of lidocaine intradermally. The results of the study led Dwyer and Rutkowski to change practice at a hospital in Illinois. The results revealed that 186 patients rated zero pain, 46 patients rated minimum pain, and two patients had some pain. Moreover, 160 patients stated their anxiety was less, 75 patients reported little to no anxiety, and 231 patients rated the nurses' IV skills as very good.

One major correlation noted between this DNP project and the literature review was the conclusions from the Dwyer and Rutkowski (2013) study. The conclusions encouraged Dwyer and Rutkowski to change their IV practices in the same-day surgery department to offer patients intradermal lidocaine prior to IV insertion. The researchers gained approval from the hospital

administration in educating the hospital nurses, and currently, all hospital nurses are using intradermal lidocaine prior to IV insertion unless contraindicated (allergies to lidocaine).

In another study comparing NSP and 1% lidocaine, Deguzman et al. (2012) used NSP and 1% lidocaine intradermally prior to IV insertion for pain control in a double-blind experimental design with 376 patients randomly assigned to either the NSP group or the 1% lidocaine group to note the pain level of IV insertion. The researchers asked patients to rate the pain level of either the intradermal solution needle or the IV needle stick. Deguzman et al. (2012) revealed a statistical difference in the pain scores; the patients who received the 1% lidocaine intradermally reported less pain than those who received NSP. No significant difference was found in the intradermal pain scores; however, the female patients reported more increased pain scores than male patients with the 1% lidocaine. Overall, Deguzman et al. (2012) revealed that intradermally, 1% lidocaine was more effective compared to NSP prior to IV insertion in decreasing pain.

Non-Pharmacological Methods and Non-Invasive Techniques as Pretreatment

Researchers continue to search for pretreatments in an effort to provide patients with nonpharmacological and noninvasive methods for pain control associated with IV insertion. The efforts in searching for an EBP is evidence that an improvement in IV therapy is needed and further supports this DNP project in theory and practice.

Yılmaz and Güneş (2018) studied the effect on pain by using three different nonpharmacological methods prior to IV cannulation in adults. The three nonpharmacological methods used were coughing, blowing into a spirometer, and squeezing a stress ball. The design was a single-blind, randomized control study, and the sample size consisted of 120 adult males who participated in a blood drive. The participants were divided into four groups: coughing,

blowing into a spirometer, squeezing a stress ball, and a control group. The pain levels from each group were assessed using a visual analog scale by a nurse who was blinded to the study. The mean pain level of the coughing male adult group was 19.5 mm (*SD* = 13.6), the spirometer male adult group was 28.3 mm (*SD* = 20.2), the stress ball male adult group was 32.1 mm (*SD* = 23.8), and the control male adult group was 45.5 mm (*SD* = 19.5). Statistical analysis showed a significant difference between the mean pain scores of adult males in all four groups. According to Yılmaz and Güneş (2018), the potential mechanism of the Valsalva maneuver or diverting attention are effective techniques in reducing pain during an IV insertion procedure. The researchers concluded that nurses should add the procedure to their practice given the proven effects that nonpharmacological methods reduced pain and patient discomfort during IV insertion.

In another study, researchers used numbing spray as a noninvasive technique for pretreatment prior to IV insertion. In a quasi-experimental study, Falotico and Ryan (2017) researched whether a numbing spray would be an effective technique for pain control prior to IV insertion. The study included 50 patients who were given no pretreatment (traditional IV practice) and 50 patients who were given a numbing spray according to the manufacturer's recommendations prior to the IV insertion. Falotico and Ryan (2017) concluded that numbing spray is an effective technique when anesthetizing an IV site prior to cannulation. Both groups of patients stated they would try a numbing spray with future IV insertion procedures, and the participants stated they would prefer a numbing spray versus a numbing injection. The researchers noted that overall, the patients wanted a less invasive technique than intradermal lidocaine to pretreat IV sites.

Recommendations: Increase Nursing Education and Change IV Therapy Practices

Additional studies were completed regarding needle fear when a patient is undergoing IV insertion. Mclenon and Rogers (2018) completed a systematic review and meta-analysis of 119 original research articles which revealed the following: needle fear decreased with increasing age, needle fear and needle phobia were more predominant in females than in males, and needle fear was common when venipuncture is needed for IV therapy, blood donation, and for patients requiring frequent injections for treatment and control of chronic health conditions. In conclusion, Mclenon and Rogers (2018) recommended increased nursing education, a change of IV therapy practices, and more emphasis on using EBP interventions, which will lessen patients' fear of needles, such as with the insertion of IV cannulas.

The literature review, both current and historical, revealed numerous IV site pretreatment methods that correlated to the need for this DNP project to establish recommendations for a change in nursing IV pretreatment therapy practices. The literature review covered IV pretreatments prior to IV insertions, such as no pain control approach, nonpharmacological and noninvasive techniques, topical numbing spray approach, ultrasound guided insertion of IV catheters, size of IV catheters, and pretreatment with NSP and 1% lidocaine intradermally.

Need for Improving IV Skills

Garner et al. (2018) revealed continuing nursing education is needed for practicing RNs to increase safety and skill accuracy in IV therapy, such as IV insertion and pretreatment of IV sites. In a pre- and post-test study design, Garner et al. (2018) evaluated IV therapy simulation education and skill accuracy among 180 nurses in India using low-fidelity simulation (manikin IV arm). Garner et al. (2018) found a statistically significant advance in knowledge regarding IV skill access, IV maintenance ($p < .001$), and 95% of RNs successfully simulated IV access

accurately after the simulation education intervention. The findings support the need for continuing nursing simulation education to improve IV access and maintenance knowledge and skill among nurses (Garner et al., 2018).

Conclusion

Results of the literature review recommended that nursing practices include pretreatment of IV sites as a marker of high-quality IV therapy nursing care. A compelling amount of the literature review recommendations were to educate RNs so as to change their traditional IV practices. One example of the recommendations RNs can use is a simulation-based, blended in-service education learning program regarding pretreatment prior to IV insertions (Garner et al., 2018).

Summary

The studies reviewed involved one of the following solutions intradermally as a pretreatment prior to IV insertion: 1% lidocaine, 2% lidocaine, or NSP. More studies recommended lidocaine as the solution that provided less pain when compared to NSP or NS. All of the literature reviewed agreed that patient pain ratings were higher with no pretreatment or when traditional IV nursing therapy was administered. A change is needed in nursing IV education and practices to reach the higher standard of offering patients pretreatment of sites with intradermal solutions. A strong recommendation to educate RNs to change their traditional IV practices was in all of the literature sources reviewed and supported this DNP project and theory.

Chapter 3: Research Method

In this DNP project, I used a mixed methods nonexperimental design. The data were pre- and post-education survey responses from 48 RNs indicating a descriptive analysis. The descriptive analysis identified barriers as to why RNs were not using pretreatment prior to IV insertion. I developed and recommended an educational program to improve nursing IV therapy practices for RNs consisting of an educational video on how to preform intradermal pretreatment to an IV site prior to IV insertion and utilization of a manikin IV arm for simulation practice. The hospital's IV pretreatment policy was also reviewed with the participants (see Appendix A). The goal of this project was to make education recommendations for a change in practice to include pretreatment for IV insertion via intradermal injection.

The plan for the principal project was explained to the participants to ensure project performance according to scholarly values (Adu, 2016). The mixed methods project included the following points: how the project was implemented, the PICOT question, the project design, the participants, the procedure, how I processed the data, the hypothesis development, the protocol development, the outcome analysis, how I evaluated the hypothesis, and how I disseminated and assured the quality of the results.

Purpose of the Project

The DNP project's purpose was twofold. The first purpose was to determine the percentage of RNs who pretreated IV sites before cannulation. Second, to determine the percentage of RNs who did not pretreat IV sites before cannulation and the barriers that led to non-pretreatment. It was determined a need existed to change common daily IV practices in a rural Midwest hospital to include a pretreatment for IV insertion as indicated by other

researchers (Bond et al., 2016; Dwyer & Rutkowski, 2013; Levitt & Ziemba-Davis, 2013; Mclenon & Rogers, 2018; Oman et al., 2014; Santana 2015).

Conceptual Framework

The conceptual framework from Knowles's adult learning theory continued to guide this project throughout the methodological process. Knowles identified five assumptions about adult learners and these were incorporated in the study:

1. Self-concept—the participants of this project revealed a sense of self-concept.
2. Role of experience—the participants of this project expressed diverse years of IV skill experience.
3. Readiness to learn—the participants were eager to learn how to perform intradermal pretreatment of IV sites.
4. Orientation to learning—the participants were oriented to the learning of the purpose of the project.
5. Motivation to learn—the participants demonstrated motivation to learn how to perform intradermal pretreatment of IV sites (Litster, 2016).

All of these assumptions supported this DNP project.

Project Design

Project plan and sample size. The recruitment of RN participants took place at a rural hospital. Mixed methods data were used for this descriptive project. The sample size depended on the number of RNs recruited. According to Sim, Saunders, Waterfield and Kingstone (2018), a sample size of at least 20–30 RNs was needed for qualitative studies. According to Burmeister and Aitken (2012), in quantitative studies for small populations (under 1,000), a sample size of 30% is needed, so approximately 60 RNs would be needed for a population of 200 RNs. If the

quantitative sample size was less than 60 on the initial recruitment, additional recruitment through other nursing units that provided IV therapy was utilized. The initial quantitative sample size was less than 60 for this DNP project, therefore, I recruited additional participants through Same Day Recovery, Radiology, Pain Clinic and the Nurse Residency nursing units.

Practice setting. The primary practice setting for this evidence-based project took place in a rural hospital in the Midwest after obtaining permission to utilize their location as a clinical practice site. The volunteer participants included RN personnel. The specific responsibility of the RNs was to care for medical and/or surgery patients on an inpatient or outpatient basis.

Participant Demographics

The DNP project did pursue inclusion of a diverse participant population in the following areas: marital status, lifestyle preferences, religion, socioeconomic status, political associations, and physical capabilities. The only exclusion criteria were nursing personnel not fluent in written and oral English communication, and non-nursing personnel, as the project pertained to IV skilled RNs who were employed on a medical or surgery floor or unit. There was no compensation paid to any participant in this project. Any participant had the right to withdraw from the DNP project at any time.

Important Qualitative and Quantitative Tools

The pre- (see Appendix B) and post- (see Appendix C) education surveys entailed questions for the recruited RNs who practiced with IV skills and who utilized the hospital's procedures and policy for pretreatment of IV sites, such as intradermal with 1% lidocaine or NSP. I compared their survey responses to recruited RNs who did not utilize the hospital's procedures and policy for pretreatment of IV sites.

Data Collection, Management, and Analysis

Data collection. Paper forms had no identifying personal information of the nurse participants and were collected after I obtained informed consents (see Appendix D). Data collection entailed paper qualitative questionnaires using closed-end questions and quantitative descriptive data. Data were collected from only the nurse participants.

Management. The data collected from the nurse participants were kept confidential, and paper documents were kept in a secured, locked document box. The measures to protect this DNP project data were employed for the entire duration of the project and will be for the next 10 years. After 2029, the data will be deleted from this project. No patient demographic data were collected.

Analysis. After completion of the DNP project data collection, a professional statistician, who did not have access to any of the nurse participants' identifying personal information, was consulted to complete a mixed methods analysis. The following statistical test was used to analyze the descriptive results—a paired *t* test assessed differences in RNs' ratings of IV insertion skill and offering of pretreatment. Conclusions were articulated regarding the results or relationships revealed among variables (nurses who pretreated IV sites; nurses who did not pretreat IV sites; nurses who had knowledge of the hospital's pretreatment policy; and nurses who did not have knowledge of the hospital's pretreatment policy).

Data Analysis

I used the following statistical test to analyze the descriptive results—a paired *t* test to assess for differences in RNs' ratings of IV insertion skill and offers of pretreatment. I described the results as a narrative and in descriptive terms and provided a list of recommendations.

Project Plan Activities

The DNP project manager assumed responsibility for this DNP project's routine activities, which included reviewing the hospital's policy titled "Intravenous Therapy and Continuous Infusion of IV Fluids" (see Appendix A). Additional training included simulation by using a low-fidelity simulator, such as an intravenous insertion arm manikin. According to Munshi, Lababid, and Alyousef (2015), level-four (SF4) low fidelity, is meant to demonstrate a simple skill; for example, intradermal injections on an IV manikin arm.

Methodology

After agreement for student clinical experience was granted (see Appendix E), Institutional Review Board (IRB) approval and DNP chair endorsement, I completed a literature review and created pre- and post-education surveys. I submitted a formal application and a research proposal for approval to the Institutional Review Committee of the hospital where I conducted the project and to the Committee on Human Research and Institutional Review Board, College of Graduate and Professional Studies, Abilene Christian University (see Appendix F).

The DNP project manager informed each RN participant of the procedure, benefits, and risks. The participants were asked to give informed consent and were given a copy of the informed consent prior to initiation of the project. The informed consent contained the purpose of the project, rationally conceivable risks to the participants (none anticipated), explanation of the benefits of the project, alternatives to the project protocol, explanation that all participant activities are on a voluntary basis, and the contact information of the principal DNP investigator. The participants were able to withdraw at any time without penalty.

The methodology included recruitment of nurse participants and explaining the purpose of the DNP project. No patient consent was needed. Additional procedures included obtaining

the informed consent of nurse participant volunteers before any review of the hospital's policy and procedure regarding IV therapy pretreatment of IV sites, showing of a short educational video demonstration of pretreatment of IV sites before IV insertion, and a low-fidelity simulation on an IV manikin arm.

The nurse participants received a pre-education survey before reviewing the methodology procedure and post-education survey before the project was concluded; approximately two to six months later. The final results and data collected were disseminated in November 2019 for EBP for the IV practicing skilled nurses, nursing research, and education recommendations for change in IV therapy practice to the specific Midwest hospital.

IRB Approval and Process

The ACU's IRB and a hospital in the Midwest were utilized for the approval procedure that granted permission to conduct the DNP project. The principal DNP investigator was managed by an ACU faculty counselor (chairperson of the DNP project committee). The planning and execution of the DNP project occurred off campus. The facility that was utilized is a rural hospital in the Midwest. The DNP project manager obtained additional IRB approval from the Midwest hospital.

Interprofessional Collaboration

I consulted the DNP project committee chairperson and two ACU faculty committees to assist with the narrative recommendations. A statistician was consulted to ensure accuracy in the description of the participants' data. The collective collaboration of the established hospital nurse participants was confirmed by the sustainability of the DNP project.

Timeline

The anticipated time of implementation of the project was a timeline of six months. The timeline was for the review of the procedure of pretreatment, showing of an educational video, explanation of methodology, collection of data, its analysis, and interpretation of the results. The timeline also included the dissemination of the results as well as nursing implications for change in IV-skilled nursing practice, nursing education, and incorporation into daily IV practice. The timeline of the complete developments and implementation of the DNP project from start was September 2017 until end of project in September 2019 (see Appendix G).

Chapter Summary

The proposal methodology exemplified the process involved in the implementation of the research. The participants were RNs. All RNs who were employed on the medical and/or surgery units qualified for the inclusive participant status. Exclusion criteria included non-nursing personnel. The DNP project design utilized the collection of mixed method data that supported the study methodology. All requirements were met for IRB approval. Resources were utilized through interprofessional collaboration. The primary site for the project took place in a rural Midwest hospital. The estimated timeline for completion was six months.

Chapter 4: Results

This project's results revealed it is common practice in this rural Midwest hospital to not perform intradermal pretreatment prior to IV insertion for pain or discomfort control. This project's results revealed not all RNs were using intradermal pretreatment, even though the research for it was encouraging. I conducted this mixed methods project and determined that future education and training was needed and that it should become standard practice for RNs to perform intradermal pretreatment for pain and discomfort control.

PICOT Questions

A total of 60 RNs completed the pre-education survey. Data from the sample of RNs who completed the entire project (pre-education survey and post-education survey; $N = 48$) are reported in this chapter. The data were entered into the Statistical Program for Social Services (SPSS) to facilitate answering the PICOT questions:

Will an educational session that discusses the IV cannulation policy increase knowledge of IV cannulation in RNs employed at the hospital? Will an educational session increase RN usage of pretreatment solutions?

Participants

To understand the opinions and skills of the RN participants used for the project, I used pre- and post-education surveys containing identical questions. Hospital units included were Neurology/Medical and Orthopedic/Surgical. There were 76 nurses on the Neurology/Medical unit and 44 nurses on the Orthopedic/Surgical units. Of these four units, a total of 18 completed both the pre- and post-education surveys. Additional RNs were needed in the project to meet the minimum of at least 64 to qualify for the project. The number of participants was less than 60 on the initial recruitment, so additional recruitment through other nursing units that provided IV

therapy were added to the project, such as Nurse Residency, Same Day Surgery, Radiology, and Pain Clinic that provided IV therapy were added to the project. Thirty participants from the additional units completed both the pre- and post-education surveys. Because 64 RNs did not complete the project, I used a census sampling.

Descriptive Statistical Analysis

The mean number of IV insertion per week (post-education) was 7.90 (see Table 1). The mean rankings of self-description of IV skills were 18.75 = excellent, 25 = very good, 37.50 = good, and 18.75 = fair (see Table 2). To further understand the qualitative data of the RN participants used for the project, I used a questionnaire. The following survey questions were asked in order to determine if they:

- offered pretreatment before IV insertion;
- if yes, how did they inform the patients;
- did the RN see advantages to using a pretreatment; if so what were they; and if not, what were the reasons;
- did you have problems or concerns with using pretreatment; what were they; and, was there anything that would make the use of a pretreatment easier for you?

Table 1

IVs per Week

	Post-Education (%)	Pre-Education (%)
Minimum	1.00	1.00
Mdn	3.00	3.00
M	7.90	7.25
Maximum	40.00	40.00
SD	11.42271	10.47489

Table 2

RNs' Rating of IV Insertion Skills

Ratings	Post-Education (%)	Pre-Education (%)
Excellent	18.75	20.83
Very Good	25.00	22.92
Good	37.50	43.75
Fair	18.75	12.50

Eight out of 48 participants answered that they informed the patient about pretreatment after confirming no allergies to lidocaine prior to the IV insertion procedure. The majority of the participants, 38 out of 48, saw advantages to using a pretreatment. The participants' responses were, for example, "less pain and discomfort for the patients," "decreased anxiety," "increased patient satisfaction and compliance during IV insertion procedure." Six out of 48 participants did not see any advantages to using pretreatment. The following responses were given for not seeing any advantages to pretreat: "Pretreatment medication not readily available," "nurse managers did not tell me I could use pretreatment," "never heard of intradermal pretreatment until today," "forgot to pretreat," and "sometimes intradermal pretreatment makes it difficult to see the vein." The participants were also asked if they were aware of the hospital's intradermal pretreatment policy. Forty out of 48 stated, "No" (see Table 3).

Table 3

RNs' Awareness of Hospital's Intradermal Pretreatment Policy

Answer	Post-Education		Pre-Education	
	Number	%	Number	%
No	0	0.00	40	83.33
Yes	48	100.00	8	16.67
Total	48	100.00	48	100.00

The following responses were given to the survey question about concerns with using pretreatment: eight out of 48 participants stated they did not like the reasoning for "two [needle] sticks." Other concerns with using pretreatment were "difficulty seeing the vein," "pain with lidocaine intradermally," and "lack of time." The responses were overwhelming to the question, "Is there anything that would make the use of a pretreatment easier for you?" Thirty-two out of 48 participants responded with "the need for education and training hospital-wide on intradermal pretreatment" and "I wished I was aware of this hospital policy before today" (see Table 4).

Table 4

Number of RNs Who Trained to Perform Intradermal Pretreatment

Answer	Post-Education		Pre-Education	
	Number	%	Number	%
No	0	0.00	37	77.08
Yes	48	100.00	11	22.92
Total	48	100.00	48	100.00

Fourteen out of 48 participants responded they would have used intradermal pretreatment if it had been easily available or accessible on their respective nursing units. This response correlated with the statistical data regarding the percentage of the participants who offered pretreatment to their patients (see Table 5).

Table 5

RNs Who Offered Intradermal Pretreatment Before IV Insertion

Answer	Post-Education		Pre-Education	
	Number	%	Number	%
Always	6	12.50	5	10.42
Never	33	68.75	37	77.08
Sometimes	9	18.75	6	12.50
Total	48	100.00	48	100.00

Additional responses included: “I would prefer to use a cream if it was available for adults prior to IV insertion,” “if they could mix Bicarb with the lidocaine the lidocaine would not burn,” and “I need more experience with how to do intradermal pretreatment.”

Forty-eight RNs completed the entire project (pre- and post-education surveys). The post-education survey was given two weeks after the initial methodology procedure. The total number of sampling census participants (from all eight units) accounted for 40% of the RNs on the initial inpatient Neurology/Medical and Orthopedic/Surgical units. A total of 12 RNs out of 60 did not complete the project after multiple post-education survey visits by the investigator. No specific reasons were given.

Strengths and Weaknesses

A major strength noted from this DNP project was the receptiveness of the RNs to learn about the intradermal pretreatment procedure. Another strength noted was that this rural Midwest hospital had an EBP intradermal pretreatment IV policy. Some of the weaknesses of this project were the inability to perform one or two educational programs about the pretreatment IV therapies available, the hospital RNs were very busy and unable to leave their units to attend an in-service as a consequence of time, and the investigator did not use any psychometrics evaluations.

I conducted personal one-on-one in-services regarding the project due to the inability of RNs to attend the in-service in large groups. The in-service for each RN took approximately 30–45 minutes, counting my wait time before the nurse attended. I visited each unit and waited until the RN was able to come to the in-service at the nurses’ station. The RNs were allowed to view the demonstration video on intradermal pretreatment before starting an IV, received and viewed a copy of their hospital’s pretreatment policy before I started developing an IV education program;

practiced pretreatment with an IV low-fidelity arm manikin; and completed the pre-education survey. I answered all participants' questions if any were asked.

Results

The RNs had zero (or less than one year) to 40 years of IV therapy experience with an average of 13.43 years. The approximate number of IV insertions they performed each week ranged from one to 40, with an average number of 7.25 (pre-education) and 7.896 (post-education; see Table 1). Their perception of their skills with IV insertion were summarized in Table 2.

Prior to the DNP project, the majority of the participants (83.33%) were not aware of the hospital's IV pretreatment policy of intradermal anesthesia with lidocaine before IV insertion. Two of the participants stated they knew of the current pretreatment policy but were told by nurse managers not to use the policy for intradermal pretreatment for IV insertions. The percentage of RNs' offers regarding lidocaine usage fell into three categories: always, sometimes, or never offered this intervention to patients (see Table 5). Only 10.42% of the RN participants (n = 5; pre-education) stated they always offered intradermal lidocaine before an IV insertion. The advantages they cited were that "it decreased pain at the insertion site" and "the patient appeared to experience less fear and anxiety during the IV procedure." Another 12.50% of the RN participants (n = 6; pre-education) stated they sometimes offered intradermal lidocaine before an IV insertion for a variety of reasons cited, including "if the patient appeared fearful or anxious."

The majority (77.08%) of the RN participants (n = 37; pre-education) stated they never offered or used intradermal lidocaine before IV insertions. Numerous reasons were cited for not offering or not using lidocaine as an intradermal injection for pretreatment. Many of the

participants felt that "it was not reasonable to tell the patient that they would be stuck twice," or they "would use the intradermal injection pretreatment before an IV insertion if it was readily available on their unit."

Implications for Nursing Practice

The anticipation of increased nursing knowledge for the RNs of pretreatment of IV sites before cannulation added to the body of nursing research. The RNs offered intradermal pretreatment if their patient was not allergic to the medication. The RNs served as mentors to new staff (RNs) and disseminated the benefits in the change of practice for IV therapy. The hospital added to the body of knowledge and nursing research, thereby increasing the nursing IV therapy standard of care for all patients requiring IV therapy.

Recommendations for the Future

Results of the current DNP project formed the basis for the following recommendations for future projects:

- The project should be replicated to increase the number of RNs who have knowledge of evidence-based studies that support the need to change clinical practice and increase a higher standard of IV care for all patients.
- The project supports the need for education and training for the intradermal pretreatment procedure for RNs with IV skills that practice on all nursing units.

Chapter Summary

The DNP project identified several barriers that can be resolved, therefore increasing RNs' IV therapy pretreatment knowledge and providing a higher standard of nursing care for patients. The number one barrier that was identified was the lack of awareness of the hospital's policy on IV intradermal pretreatment. The second barrier identified was the quest for education

and training on how to perform intradermal pretreatment prior to IV insertion. Another barrier the participants voiced was the inaccessibility of the pretreatment medication on their respective nursing units. In addition, but importantly, a barrier or concern voiced by participants was the lack of some managerial nursing support in using intradermal pretreatment procedure on their units. This DNP project results expressed that intradermal pretreatment should become a higher standard of practice for RNs regarding pretreatment for pain or discomfort control.

Chapter 5: Discussion, Conclusions, and Recommendations

Change is common in the nursing profession. EBP changes are especially difficult for nurses when changing clinical practice. For a change to happen with nursing clinical practice or for a practice to be accepted, it has to be reasonable, effective and convenient for nurses to make the change (Ginex, 2018). According to Ginex (2018), once a practice change is determined to be essential, the next phase is to integrate that evidence with clinical expertise, patient preferences, and standards. Ginex (2018) explained that the last phase in EBP is to assess the outcomes and disseminate the results. The various statements from the nurses who participated in the study revealed that changing clinical practice was not easy. I noted that during changes in clinical practice, nurses were often faced with barriers that made change equally difficult, even with a relevant policy in place.

Interpretation and Inferences about the Findings

The participants in this study explained why they were not utilizing the hospital's IV policy and pretreating with intradermal anesthesia before IV insertions. The number one barrier stated often was that "I was not aware of this policy until you [the investigator] informed me." Other barriers listed were managerial staff discouraging nurses from using the intradermal injection of lidocaine pretreatment policy on their units. Other barriers listed were as follows: "I would like clinical education on how to complete this skill, "if the medication, lidocaine, was readily available on the unit or convenient, I would be more inclined to use it," "I do not want to stick my patient twice," "because we've always started IVs without any pretreatment of intradermal injections," and "I do not have the time."

All of the barriers cited by the participants have hindered the process to implementing EBP; therefore, the hospital's policy on IV therapy—pretreatment with intradermal injection

prior to IV insertion—has not been followed by all participants with IV therapy skills. The majority of the participants voiced that administration support was needed before they could feel comfortable in utilizing the IV therapy policy, therefore ensuring an EBP environment that could lead to improved outcomes for patients.

A small number of participants (10.42%) indicated on the pre-education survey that they had always offered lidocaine intradermal injection prior to IV injection and believed this procedure decreased discomfort at the site and patients' anxiety and fear. This number of participants (12.50%) was slightly higher after the education program was given (see Table 5).

A slightly larger number of participants (12.50%) indicated on the pre-education survey that they offered lidocaine intradermally prior to IV injection only in specific circumstances, for example, if the patient requested the pretreatment or if the patient appeared anxious or fearful. This number of participants (18.75%) increased after the education program was given (see Table 5).

The remaining participants who reported not offering or using the pretreatment before IV insertion policy listed the major reason as not being aware of the hospital's policy and therefore, were not offering the pretreatment for patients who asked for it. The percentage of these participants slightly decreased in never giving pretreatment after the education program from 77.08% (pre-education) to 68.75% (post-education; see Table 5).

Limitations of the Study

This study involved a relatively small sample of RNs from a rural Midwest hospital. The participants who only offered the pretreatment for certain reasons did not indicate the reasons for withholding pretreatment from other patients. The chi square calculation could not be determined because some of the cells had frequencies of less than five for the following survey questions:

RN's ratings of IV insertion skill and offering of intradermal pretreatment to patients, and RN's personal experience with IV insertion for intradermal pretreatment to patients. The paired *t* test revealed the following: $t = 0.45887$, $df = 47$, and $p = 0.6484$. Finally, the investigator of this study was a novice researcher.

Implications for Research, Nursing, Analysis for Leaders and Recommendations

I conducted the mixed methods project to determine if local anesthetics, such as intradermal injections, should become standard practice for RNs in pretreatment for pain or discomfort control. Implications for research, nursing, analysis for leaders and future recommendations are enforcement of the following:

- a policy change from traditional pretreatment (no pretreatment) to intradermal pretreatment offered to patients requiring IV insertions;
- the addition of intradermal pretreatment policies for hospitals that do not presently have a policy in place;
- the compliance of RNs with current hospital intradermal pretreatment policies;
- the addition of hospital in-service educational and training programs to develop the skills RNs need to be successful in performing intradermal pretreatment prior to IV insertion;
- the usage of an educational tool, such as simulation or low-fidelity, for example, IV manikin arm activities to enhance IV intradermal pretreatment skills;
- nursing administrative and managerial support and encouragement for hospital RNs to perform intradermal pretreatment before IV insertion procedures.

Next, I discuss the eight essentials of the DNP program (AACN, 2016) that describe how the findings from this project are related to and supported in the implications for improved hospital clinical practice.

EBP Findings and Relationship to DNP Essentials (I-VIII)

Essential I: Scientific underpinnings for practice. This DNP project was based on the importance of using science-based evidence to support the use of the intradermal procedure. The usage of the intradermal procedure has improved patient care outcomes and increased satisfaction scores (Bond et al., 2016).

Essential II: Organizational and systems leadership for quality improvement. The investigator of the DNP project emphasized the role in disseminating the research of EBP findings and supported the need for change in the participants' IV skills to providing intradermal pretreatment.

Essential III: Clinical scholarship and analytical methods for evidence-based practice. I explained the importance of needed change for intradermal pretreatment with the rural Midwest hospital's IRB committee based upon EBP references. This DNP project manager facilitated the need for hospital-wide nursing education, not just for patients in pre-op surgery departments.

Essential IV: Information systems/technology and patient care technology for the improvement and transformation of health care. This DNP project manager emphasized the need to use technology in identifying a patient's history of allergies before preforming intradermal pretreatment of, for example, lidocaine. The DNP project manager also asked pharmacy professionals to possibly use technology innovation with making the medications, such as 1% lidocaine and NSP prefilled syringes, easily accessible for RNs.

Essential V: Health care policy for advocacy in health care. This DNP project manager will outline the barriers revealed from the results of this project with the hospital's IRB committee during the autumn of 2019. The majority of this rural Midwest hospital's RNs were

unaware of the hospital's current EBP intradermal pretreatment policy. In response to this and other issues, this DNP project manager will advocate for improvement of pretreatment intradermal IV nursing and patient care.

Essential VI: Interprofessional collaboration for improving patient and population health outcomes. This DNP project manager will collaborate with the rural Midwest hospital pharmacy and make recommendations for the interprofessional teams to increase their level of care by making the intradermal medication accessible for floor nurses.

Essential VII: Clinical prevention and population health for improving the nation's health. This DNP project manager's aim is to promote education of RNs to offer intradermal pretreatment for patients using the hospital's current IV pretreatment policy. The number one response from the nurses, as noted on the pre-education survey, was that pretreatment should be offered to patients who are anxious about IV catheters or needles. Needle fear is real for many patients (Emanuelson, 2019).

Essential VIII: Advanced nursing practice. The DNP investigator's primary goal of improving patient outcomes, as pertaining to intradermal pretreatment prior to IV insertion, is based on the project results. The DNP project manager demonstrated the need for delivery of evidence-based care by informing each RN participant of the hospital's policy on intradermal pretreatment prior to IV insertion and providing education programs (written policy, video and simulation education program).

Conclusions and Summary

This study provided an important overview of the barriers to change in clinical practice for RNs with IV skills. The major changes needed are the enforcement of the hospital's policy and encouragement from administration. To facilitate the education process of the hospital's IV

policy, the participants will be required to attend mini in-services regarding the clinical skill set to successfully perform intradermal injections and complete competency demonstration of this procedure. The results of this DNP project will be disseminated by peer-reviewed nursing journals and a presentation to the rural Midwest hospital's IRB committee. Once support by RNs providing intradermal pretreatment and by the hospital's nursing administration and managerial staff has been established, the IV skill of performing intradermal pretreatment on all adult units could be implemented at the rural Midwest hospital. Intradermal pretreatment policies could be enforced to include new educational and training programs for all IV-skilled practicing RNs.

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Appendix A: Hospital Policy

[redacted] Medical Center Policy and Procedures

Section: Patient Care Services	Originating Department: Patient Care Services	Effective Date: 04/20/1995
Title: INTRAVENOUS THERAPY AND CONTINUOUS INFUSION OF IV FLUIDS		Executive Approval: [redacted]
Date of Med. Exec. Committee Approval (If Applicable):	Originator:	

POLICY:

Intravenous therapy treatment administration is the responsibility of the Registered Nurse. The Registered Nurse may delegate IV therapy to an LPN who has successfully completed the LPN IV Therapy Course and has been trained on the use of [redacted] Medical Center equipment. IV certified License Practical Nurses may administer IV therapy according to medical center policy/procedure as defined by the [redacted] Nursing Practice Act as indicated below.

Note: When a patient is admitted from home with IV infusion, the medical center becomes responsible for the treatments. The patient CANNOT remain on their home IV pump and IV fluids. Fluids and equipment will be provided by the Medical Center with physician order.

The LPN will be responsible for the following:

1. Calculating the rate of IV infusions
2. Discontinuing of IV treatment - peripheral and central
3. Adding parenteral solution to existing patent IV lines including central lines
4. Changing IV tubings and dressings.
5. Initiating peripheral IV access only, and only with devices which do not exceed three (3) inches in length
6. Adding to existing patent IV lines, *designated pre-mixed medications, via IVPB, either by continuous or intermittent methods, includes central lines
7. Maintaining the patency of Saline / Heparin locks, triple lumens, external venous devices (i.e. Hickman, Groshong, RAAF), and internal venous devices, (i.e. mediports)
8. Administer parenteral IV infusions including total parenteral and peripheral nutrition through established, patent peripheral venous and central lines.
9. Administer amino glycosides and mannitol
10. May initiate and titrate the rates of anticoagulants and theophylline.
11. Draw blood from CV lines.
12. Monitor blood transfusions.

*LPNs may not perform the following functions:

1. Administer IV therapy involving neonates / pediatrics
2. Initiating or adding anti-neoplastic agents
3. Initiating or adding blood/blood components, including albumin
4. Monitoring hemodynamic readings and interpretation
5. Access the port reservoir of a central / venous implantable vascular access device
6. Administer drugs IV push. The LPN is responsible to inform the RN when IV push drugs are required.
7. Cannot remove intravenous line 3 inches or longer, this includes midline catheters, PICC lines, and central lines
8. Perform any intravenous admixture in which a syringe / needle is used to add drug(s) to parenteral fluid container.
9. Administer per pump (IV or syringe) any medication ordered to be given IVP.

10. Initiating or adding the following categories of drugs:
    - A. Antihypertensives
    - B. Vasopressors
    - C. Antiarrhythmics
    - D. Oxytocics
    - E. Anesthetic agents
    - F. Experimental drugs
    - G. Barbiturates
    - H. Immunosuppressive drugs
    - I. Enzymes
    - J. Insulin
    - K. Electrolyte (K+, Mg+) bolus infusions

DISPOSAL OF IV BOTTLES / BAGS

The label on the IV container has protected health information and MUST be disposed of properly. When disposing of bottles / bags, either strip the label off and discard in a black bag container or mark out completely ALL protected health information to include patient name, medical record number and account number. Discard bottles and bags in standard trash containers.

STARTING AND INFUSING PERIPHERAL IV

PROCEDURE:

1. Verify order for intravenous infusion.
2. Confirm correct patient. Verify the patient's statement of their name and date of birth, and compare stated information against the patient ID band information. If the patient is unable to communicate, refer to the Performance Improvement policy, "Patient Identification Procedures".
3. Perform hand hygiene and don Personal Protective Equipment (PPE), as appropriate
4. Explain procedure to patient.
5. Gather equipment and supplies.
6. Ensure the 5 Rights of Medication Safety System to ensure medication administration safety. Scan fluids. NOTE: For emergencies, scanner does not need to be used.
7. Connect tubing to IV fluids and label tubing with date.
8. Follow directions on solution administration set.
9. Select the appropriate gauge and length to accommodate and manage prescribed therapy.
10. Assess extremities for appropriate placement and identify contraindications for insertion. Patient should be identified with "Limb Alert Bracelet."

Contraindications:

A. dialysis access site
B. history of mastectomy
C. history of trauma or impaired venous drainage
D. prior history of IV complication

11. IVs are not to be started in the foot or lower leg without a physician order. Diabetics should not have an IV in the foot or lower leg at any time.

12. Xylocaine or Bacteriostatic Sodium Chloride may be used to ease the discomfort and the pain associated with the insertion of an infusion catheter. No physician order is needed.

An intradermal injection of 0.1ml of Bacteriostatic Sodium Chloride or Xylocaine 1% may be used. Xylocaine will have to be obtained from Pharmacy or Accudose. The injection should be intradermal with the bleb formed to be effective. Inject the Xylocaine or Bacteriostatic Sodium Chloride to the side of the site to be used with a tuberculin syringe. Emla Cream may be used for pediatric patients. Have in place 1 to 1 1/2 hours, if patient condition allows, before attempting initiation.

13. Remove hair from the area if necessary by shaving or clipping hair with scissors.

14. Scrub site for injection in a circular motion with antimicrobial scrub. Allow to dry.

15. Insert catheter.

16. The finished dressing should provide direct visualization of the catheter insertion site. The date of insertion, gauge of catheter and nurse's initials is to be written on the dressing.

17. Adjust rate of flow according to doctor's orders. To ensure safe and accurate administration of IVs and IV medications, administer through an IV pump as soon as possible.

18. Mark bag with date, time and initials. Compare pharmacy label to bag to ensure correct fluid and circle solution on pharmacy label to indicate comparison was completed. On OB, apply medication label to bag that denotes drug, time additives and RN' name. IV solution taken from stock must be labeled using a red label or patient sticker (exception to this is in the Operating Room). All other areas of the hospital must apply a label to the bag. The patient sticker may be used on the label for patient information. The solution rate must be filled in and the patient's name and date of birth must be compared to the information on the label. Avoid writing directly on the IV bag or bottle with marking pen. Write only on the label. A red label must be used for any additives.

19. Subsequent IV bags will be marked and charted. In addition, the previous IV will need to be ended and bottle discarded as appropriate. The pump will be cleared of volume infused at least every twelve (12) hours, or whenever the IV is discontinued or new bag hung. The volume will be recorded on the I&O when pump is cleared.

20. Program the IV pump for the unit or department. Prime and date tubing. For safety, the pump must be programmed using the drug library. Start infusion.

Appendix B: Pre-Education Survey

Pretreatment Use Questionnaire

Hospital unit: _____
Years of practice: _____
Approximate number of IV insertions per week? _____
How would you describe your IV insertion skills, circle which one:
Excellent/Very Good/Good/Fair

Do you offer pretreatment before IV insertion starts? _____

If yes…How do you tell the patient about this option? _____
_____
_____
_____
If you see advantages to using a pretreatment, what are they? _____
_____
_____
_____
If no…What is it about it about using a pretreatment that you choose not to have as part of starting IVs? _____
_____
_____
If you have problems or concerns with using pretreatment, what are they? _____
_____
_____
Is there anything that would make the use of a pretreatment easier for you? _____
_____
_____
Have you ever had an IV? _____
Have you ever received intradermal pretreatment before an IV start? _____

Pretreatment Use Questionnaire (Brown, 2002)

There will be a sign in sheet for the educational session that has de-identified information.

Appendix C: Post-Education Survey

Pretreatment Use Questionnaire

Hospital unit: _____
Years of practice: _____
Approximate number of IV insertions per week? _____
How would you describe your IV insertion skills, circle which one:
Excellent/Very Good/Good/Fair

Do you offer pretreatment before IV insertion starts? _____

If yes…How do you tell the patient about this option? _____
_____
_____
_____
If you see advantages to using a pretreatment, what are they? _____
_____
_____
_____
If no…What is it about it about using a pretreatment that you choose not to have as part of starting IVs? _____
_____
_____
If you have problems or concerns with using pretreatment, what are they? _____
_____
_____
Is there anything that would make the use of a pretreatment easier for you? _____
_____
_____
Have you ever had an IV? _____
Have you ever received intradermal pretreatment before an IV start? _____

Pretreatment Use Questionnaire (Brown, 2002)

Appendix D: DNP IRB Cover Letter Consent

February 2019

Dear Participant:

My name is Vera Campbell-Jones and I am a doctoral nursing student at Abilene Christian University. For my final project, I am examining RNs who are practicing nurses with I.V. skills who do utilize the hospital's procedure/policy for IV therapy. Because you are RNs who insert IV cannulation, I am inviting you to participate in this research study by completing the attached surveys.

The following questionnaire will require approximately ten minutes to complete. There is no compensation for responding nor is there any known risk. In order to ensure that all information will remain confidential, please do not include your name. Copies of the project will be provided to my Abilene Christian University instructor, director and to DNP committee. If you choose to participate in this project, please answer all questions as honestly as possible and return the completed questionnaires promptly in the provided sealed envelope. Participation is strictly voluntary, and you may refuse to participate at any time.

Thank you for taking the time to assist me in my educational endeavors. The data collected will provide useful information regarding a narrative of recommendations will be provided at the conclusion of this quantitative and qualitative study. If you would like a summary copy of this study, please complete and detach the Request for Information Form and return it to me in a separate envelope. Completion and return of the questionnaire will indicate your willingness to participate in this study. If you require additional information or have questions, please contact me at the number listed below.

If you are not satisfied with the manner in which this study is being conducted, you may report (anonymously if you so choose) any complaints to [redacted] Medical Center, I.R.B. department, [redacted]

Sincerely,

Vera Campbell-Jones
[redacted] and/or XXXXXX@acu.edu or [redacted]
DNP Committee Chairperson: Dr. Tina Sinatra-Wilhelm
[redacted] and/or XXXXXX@acu.edu

Detach here
****

Request for Information
Please send a copy of the study results to the address listed below.
Name:
Address:
Please do not return this form with your survey. Return to: me (Vera Campbell-Jones), in a separate envelope; or email me at: XXXXXX@acu.edu or [redacted]

Appendix E: Clinical Experience Agreement

AGREEMENT FOR STUDENT
CLINICAL EXPERIENCE BETWEEN
VERA Campbell-Jones, MSN, RN, RN-BC
AND [redacted] MEDICAL CENTER

This agreement between Abilene Christian (University/School) and [redacted] Healthcare System will be effective for the one year period beginning 2-1-19, and will automatically be renewed for additional terms of one year each subject to modification after annual review. Either party must give one hundred eighty days written notice of intent to cancel if the agreement is to be terminated.

The Medical Center and the University/School hereby mutually agree with each other to the following:

1. **PERIOD OF INSTRUCTION**

A maximum of ONE students registered in the D.N.P. program at the
Name of program
University/School may be assigned D.N.P. Student
Position
education/clinical experiences at Medical Center. The exact number of students and the days and hours of clinical experience are to be agreed to by a representative of the University/School and a representative of the Medical Center.

2. **SPECIFIC RESPONSIBILITIES OF THE MEDICAL CENTER**

Medical Center shall:

2.1 Provide opportunities for clinical experience or observation within the appropriate departments of the Medical Center.

2.2 Participate with University/School in the coordination of student clinical learning experience through the designated office/individual in the Medical Center.

2.3 Retain the full authority and responsibility over client care, and retain the authority to deny access to the clients and Medical Center by any student or University/School representative if deemed by the Medical Center to be in the best interests of client care.

2.4 Secure and maintain comprehensive general and professional liability insurance or self-insurance covering itself and its employees providing minimum limits of liability of $1 million per occurrence with an annual aggregate of $3 million.

2.5 Complete and promptly return any student evaluations requested by School/University.

2.6 Provide Personal Protective Equipment ("PPE") to students, which is intended to keep blood and other potentially infectious material ("OPIM") from being transmitted. The PPE shall be available and accessible on each unit and service area.

3. **SPECIFIC RESPONSIBILITIES OF THE UNIVERSITY/SCHOOL**

University/School shall:

3.1 Coordinate with the appropriate personnel of the Medical Center plans for student observations and/or clinical experience.

3.2 Have final responsibility for selection, supervision, and evaluation of appropriate learning experiences unless, in specific instances, other provisions are made.

3.3 Abide by the existing rules and regulations of the Medical Center and its licensing, regulatory and accrediting bodies.

3.4 Secure and maintain, during the term of this agreement, comprehensive general and professional liability insurance and/or self-insurance covering itself and each student and faculty member assigned to Medical Center providing minimum limits of liability of $1 million per occurrence with an annual aggregate of $3 million.

3.5 Assume responsibility for cost of equipment that is broken or damaged due to the negligence of University/School faculty, staff, or students.

3.6 Advise students to provide to Medical Center written evidence that each student must have a health history on file, annual TB testing by PPD, Q Gold/T Spot or chest x-ray (if + PPD or Q Gold, must provide proof of evaluation by physician, treatment plan and one negative chest x-ray), annual seasonal flu vaccination (season runs October 1st-March 31st), initial MMR vaccination X2, Varicella vaccination X2 (if documented varicella disease, vaccine not required), up to date TDP vaccination (last vaccination has to be as an adult as well as within the past 10 years).

3.6.1 If an outbreak or suspect infectious disease occurs, the Medical Center may restrict students if advised by State, CDC regulations or by Infectious Disease consult. Infection Control will implement controls and lift them when possible. If the state, CDC or infectious disease recommends additional testing, testing will be provided at the cost of the school/student.

3.7 Be responsible for providing students with the protections of the OSHA Bloodborne Pathogen Rule (28 CFR 1910.1030), including but not limited to the following:

3.7.1 Advising each student of the Hepatitis B Vaccination series and that they must document one of the following:
A.) The student has received the vaccination series.
B.) The student is immune to the Hepatitis B Virus
C.) The vaccine is contraindicated for medical reasons
D.) The student has declined to receive the vaccination and has signed an appropriate declination form.

3.7.2 Ensure that each student has received the training required by the Bloodborne Pathogen Rule and documented such training.

3.7.3 Provide the Medical Center, upon request, all records required to be kept by the University under the Bloodborne Pathogen Rule.

3.8 Ensure that students maintain confidentiality of patients and their medical information. It is the responsibility of the University/School to provide HIPAA Awareness training for its students.

3.9 Provide a clinical coordinator as necessary for the supervision and instruction of students.

3.10 Be responsible for all clerical work and record keeping on students.

3.11 Assign clinical experiences only to those students who have received the appropriate educational training and experience and demonstrate that they can safely and properly provide the necessary clinical services to clients.

3.12 Perform a relevant criminal background check on all students in the state they reside, recently resided, or both, completed before beginning clinicals at Medical Center. If any check proves positive for a felony conviction, the University/School shall forward that information to the Medical Center's Director of Human Resources.

4. MUTUAL RESPONSIBILITIES

4.1 University/School will not discriminate against any student in its assignments to Medical Center because of race, color, religion, sex, nationality origin, handicap, or status as a veteran. The Medical Center will not discriminate against any student in its acceptance of students because of race, color, religion, sex, sexual orientation, nationality origin, handicap, or status as a veteran. Medical Center will terminate a student's delivery of services to any recipient who engages in any such discrimination toward student, including the reasonable belief as to the existence of a hostile environment based upon the foregoing considerations.

4.2 Both parties agree to cooperate with each other and share information in the event

that any investigation is conducted with respect to a student's experience or performance at the Medical Center. Students may be asked to sign a form granting University/School and Medical Center permission to share information relevant to his or her experience or performance.

5. **MISCELLANEOUS MATTERS**

5.1 Costs related to the provision of services and costs related to the utilization of the Medical Center will be waived by both parties to this agreement because of the mutual benefits derived from the agreement. Such benefits include training, instruction, and clinical experience for the students and supplemental recipient care is provided to the Medical Center.

5.2 Both parties recognize that they are bound to comply with the Family Educational Rights and Privacy Act in the handling of educational records of students enrolled in their programs. It is also understood and recognized that employees and agents of each party will need to have access to the educational records maintained by the other party in properly administering their duties and obligations under this agreement and to the individual students. It is also agreed that each party shall thoroughly orient their employees and agents of their obligations under the Family Educational Right and Privacy Act and shall maintain their practices in strict accordance with the requirements of that Act. Neither party shall be permitted to authorize any further disclosure of educational records of students of the other party to persons or entities not a party to this Agreement without first having received permission of the other party and having obtained assurances that the other party has fully complied with the provisions of the Family Educational Rights and Privacy Act. Any permitted disclosure to persons or entities not a party to this Agreement shall be under the conditions that no further disclosure by such parties shall be permitted.

5.3 The Education department of the Medical Center and the faculty of the Doctor of Nursing Practice Program at the University/School will cooperate in the concurrent and terminal evaluation of the clinical experience(s) provided pursuant to this Agreement.

6. **STUDENT RESPONSIBILITIES**

University/School shall inform each student that he/she is responsible:

6.1 To provide their own transportation to clinical experience
6.2 For meals during a clinical experience
6.3 To abide by all rules and regulations of Medical Center and the directions of Medical Center personnel.
6.4 For all medical expenses for their treatment for any injury or exposure during a clinical experience. (Students are not employees of [redacted] Medical Center and they are not covered under Worker's Compensation and are not entitled to

free medical services from [redacted] Medical Center).

Julie Woodruff, RN, BSN, MBA
Chief Nursing Officer
[redacted] Healthcare System

10-2-18
Date

JLC
JLC

Stephen Johnson (Sep 27, 2018)

Stephen Johnson, Th.D.
Vice President & Chief Administrator, Dallas
Abilene Christian University

Sep 27, 2018
Date

Date

Signature:

Appendix F: Authorization Agreement

Version Date: 01/01/2018

Institutional Review Board (IRB) Authorization Agreement

Name of Institution Providing IRB Review (Institution A):
[redacted] **Medical Center**
IRB 00003840 **FWA** A00005786

Name of Institution Relying on the Designated IRB (Institution B):
Abilene Christian University
IRB 00009869 FWA00025095

The Officials signing below agree that Ms. Vera Campbell-Jones may rely on the designated IRB for review and continuing oversight of its human subjects research described below: (*check one*)

☐ This agreement applies to all human subjects research covered by Institution B's FWA.

X This agreement is limited to the following specific protocol(s):
Name of Research Project: **Local Anesthesia before Intravenous Cannula Insertion: Recommendations for Registered Nurses in Practice**
Name of Principal Investigator: Vera Campbell-Jones
Sponsor or Funding Agency:
☐ Other (*describe*):_____

The review performed by the designated IRB will meet the human subject protection requirements of Institution A's OHRP-approved FWA. The IRB at Institution A will follow written procedures for reporting its findings and actions to appropriate officials at Institution B. Relevant minutes of IRB meetings will be made available to Institution B upon request. Institution B remains responsible for ensuring compliance with the IRB's determinations and with the Terms of its OHRP-approved FWA. This document must be kept on file by both parties and provided to OHRP upon request.
Any further designation of roles and responsibilities for Institutions A and/or B are as follows:

Signature of Signatory Official (Institution/Organization A): _____ Date: 2-14-19

Print Full Name: *Julie Woodruff* Institutional Title: [redacted] *Chief Nursing Officer*

Signature of Signatory Official (Institution B):

_____ Date: _____

Print Full Name: *Susan Lewis* Institutional Title: *Abilene Christian University Vice Provost*

Signature:

Email: xxxxxxxxxxxxxxx

Appendix G: DNP Project Timeline

Month	**Task**
October 2017	Completed IRB training; certificate uploaded to NURS 755 module - Done
November 2017	Secured DNP Committee Development and finalization of POI and project PICO questions; finalized theoretical framework & concept analysis paper - Done
December 2017	Researched measurement tool (survey) to be used for project - Done
January – April 2018	First meeting with chair via email, text, phone, to discuss project and work on initial components of paper (background, significance, etc.) Worked with chair to complete chapter 1 and 2 of DNP paper Secured facility agreement of support and permission for DNP student to complete project on official hospital's contract letterhead (placed as an appendix in final paper) - Done
May – August 2018	Mid program reviewed with chair regarding paper chapters 1–3, submitted copy to chair for revisions Clinical log (DNP project related clinical hours) reviewed and signed by chair – Done Ensured all forms uploaded to e-portfolio (NURS 755) /reviewed for accuracy and completion - Done Started process of preparing for proposal defense
September 2018	Retrieved letter for permission to use measurement tool – referenced author's survey per project chair request – Done Secured facility agreement – signed by both facility and ACU (placed as an Appendix in DNP paper) - Done
October 2018	Prepared proposal defense PowerPoint slides which included brief summary; reviewed by chair and committee members for content

	Submitted proposal defense form emailed to committee for signatures and program director and was submitted in Canvas -Done Completed initial component of paper and provide copy for chair and committee to review - Done
November 2018	Proposal defense completed-11/9/19 Done
December 2018	Worked on facility's IRB application
January 2019	Completed consent form for DNP project with guidance from Dr. Lumpe - Done
February 2019	Secured IRB approval from facility and ACU – 2/14/19 - Done
March - May 2019	Began implementation of DNP project
June – August 2019	Completed implementation of project Statisticians secured to analysis project data Started work on chapters 4-5 (results and discussion of project)
September – October 2019	Submitted DNP project paper (all five chapters) for review and input by chair/committee members; completed revisions as directed by chair; submitted final project defense form – Done 9/9/19. Preparing for final defense (scheduled for 9/25/19), submitted DNP Final Defense PowerPoint and DNP paper to chair and committee members – Done 9/9/19. Preparing for final end of program review with chair and submission of DNP paper in correct form for mechanical and editorial review; preparing for December graduation
November 2019	Scheduled to meet with facility's IRB committee for presentation regrading DNP project's results on 11/14/19.
December 2019	Continued preparation for December 13th, 2019 graduation.