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Nursing Perceptions for Utilizing Essential Oil Application in Labor and the Effect of Targeted Education

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This doctoral project, directed and approved by the candidate's committee, has been accepted by the 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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of the requirements for the degree of

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by

Joni R. Beckham, MSN, MBA, RNC-OB

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Dedication

I would like to dedicate this work to my husband, Troy, and my three children, Kyler, Kayla, and Kennedy. Thank you for your love and support. I hope I have made you proud of me.

Acknowledgments

First and most important, I would like to give honor and glory to God. He is the ever-faithful presence in my life because of His grace. I pray that I am using the talents He gave me wisely.

Second, I would like to thank my family. They have supported me every time I said I was going back to school. I am going to try and give it a rest for a little while, okay?

Third, I would like to thank my DNP chair, Dr. Patricia Sunderhaus. She has been right there with me each step of the way with encouragement and support. Thank you for helping me through this process. You made it seem possible, even on days I thought it wasn't.

Lastly, I would like to thank the members of my DNP committee, Dr. Roneisa Matero and Dr. Lynn McClellan, Dr. Andrew Lumpe, and Dr. Catherine Gardner, for your guidance in this process as well. You each played an important part during this process, and your assistance is greatly appreciated.

"Dreamers have tomorrow if today does not come true." I wrote that in my high school yearbook many years ago. I am happy to say tomorrow's dream is finally today!

Abstract

This Doctor of Nursing Practice project was implemented to determine how a nurse's perception of aromatherapy influences their decision to provide aromatherapy for patients during labor and the effect of targeted education on a nurse's perception. The purpose of this project was to determine how nurses view the use of aromatherapy resources at their disposal and the likelihood that they would offer the intervention to their patients. This project provided education to increase nurses' confidence in providing optimal care to patients using a traditional and holistic avenue of aromatherapy while determining if education can positively influence nurses to support essential oil use in labor. This study was a quantitative comparative study designed to determine the perceptions of registered nurses and certified nurse midwives on the use of essential oils in labor. The project's design included a demographic survey, a preinterventional survey, the educational intervention, and the postinterventional survey. The participants in the study were recruited from professional social media groups to solicit data, with 162 respondents who met the inclusion criteria of either practicing as a labor and delivery nurse or as a certified nurse midwife and completed the required education. Data were analyzed initially using the paired *t* test to determine statistical differences between the presurvey and the postsurvey results with a *p*-value of .05. This test indicated that education could positively influence registered nurses and certified nurse midwives to promote essential oil use for their patients. This result supports that education can influence labor and delivery nurses to provide essential oils as an intervention in labor.

Keywords: essential oils, aromatherapy, labor, nurse perception, labor and delivery

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Chapter 1: Introduction

The process of bringing a new life into the world through the act of labor is both exhilarating and intimidating. Labor is painful, extremely stressful, and is often a source of anxiety for the mother. The labor and delivery nurse seeks to provide birth mothers with multiple sources of relief from pain, stress, and anxiety. It is important for the labor nurse to have all needed resources available to assist with labor pains as an avenue to ensure a positive labor experience and increase patient satisfaction for all mothers within the hospital. A thriving labor and delivery unit employs many tools to make this journey both successful and as memorable as possible. One of these tools, implementing a nurse-driven protocol to incorporate the use of aromatherapy, is one way that a labor and delivery nurse can use as an alternative or adjunct to pain relief during labor. However, it is unclear if aromatherapy is a tool that nurses feel confident using to provide fully integrated, culturally based care in the labor and delivery suite.

Statement of the Problem

Not all U.S. nurses can currently incorporate aromatherapy into the clinical setting for pain relief and anxiety reduction during the labor process, either by an individual policy or personal limitations. Interestingly, nurses have noticed that patients are increasingly bringing their personal essential oils into the labor room. A popular publication with expectant women, named *Parents*, encourages mothers to pack essential oils in their hospital bags for labor (Parents, 2014). Doulas are trained in the art of using different essential oils during the labor process (DONA International, 2020). Nursing staff have often expressed that they would like to use this method of noninvasive pain relief while providing labor support; however, they are also unsure of the application process. This Doctor of Nursing Practice (DNP) project analyzed real and perceived barriers nurses face when providing aromatherapy for their patients. Moreover, the

project provided educational interventions to decrease those barriers and reevaluate the nurses' perceptions and use of aromatherapy for women in labor.

Utilizing aromatherapy to harness its natural benefits is an invaluable intervention for labor and delivery nurses in the clinical setting. Evidence-based studies have established that aromatherapy is safe, the intervention is inexpensive, and an effective method to decrease pain and anxiety (Kaviani et al., 2014). Aromatherapy has been used for hundreds of years to aid in numerous ailments and diseases (Gibson, 2018). Aromatherapy is effective because the sense of smell has a direct pathway to the brain (Buckle et al., 2014). When the aroma of certain herbs is inhaled, the smelling receptors transmit impulses to the brain that result in psychological and physical changes that soothe, suppress, or stimulate hormones and neurological substances (LoBisco, 2016).

Background

The nurse at the bedside of a laboring mother can customize labor support in response to the patient's needs and clinical situation. Some labor and delivery units allow for one-on-one nursing care, and the nurse is free to offer more services as the role of the primary labor support. Some labor and delivery units have a two patient per labor nurse assignment, in which the nurse will facilitate different positions for the laboring mother to try. The nurse will then teach a family member or support person to step in and continue the bulk of the coaching. Nurses can also choose to provide therapeutic touch and massage during contractions to decrease the perception of pain.

Another avenue of pain relief option is the use of the large bathtub for hydrotherapy. Patients expressed satisfaction with utilizing the bathtub for pain relief. However, there are extreme drawbacks to using this for pain relief. Typically, the tub is far from emergency

equipment. Nurses must be mindful that the patients are not near delivery when assisting a mother to the tub. The nurse must ensure that the patients have no risk factor that would contradict the patient leaving an area with the emergency equipment nearby. Another drawback of hydrotherapy is the time it requires to prepare the tub for patient use. Most infection control policies require that the tub be filled and jets run for 15 minutes before allowing a patient to use the tub for the first time. This process takes some time to complete. Lastly, if a patient requires continuous fetal monitoring, hydrotherapy is no longer an option due to limitations in monitoring techniques.

Options for pain relief also include the administration of narcotics. However, narcotic administration requires a physician order. The drawback to providing narcotic pain relief is that both the fetus and mother are exposed to the medication. Nurses can only administer narcotics until the patient is eight centimeters dilated, dependent on hospital policy and an obstetrician's standards of care. The hospital policy leaves the patient without narcotic pain medication support during the transition phase of labor. Additional drawbacks are that the medication's effects wear off before the next administration time, nor do not take away labor pain completely.

The final option for pain relief is a catheter placed into the spinal cord's epidural space that gives access to deliver medication that will block the pain impulses. These epidurals are highly effective; however, it does render the mother numb and with impaired motor ability. There are potential side effects, including pruritus, hypotension, decreased uterine contractions, and void inability. More serious but less common side effects include spinal headaches, hematomas, seizures, and cardiac arrest (Mayberry et al., 2002). An epidural requires administration by a medical doctor or certified registered nurse anesthetist and requires a licensed practitioner to be readily accessible in the event of adverse effects.

Aromatherapy is available for nurses to offer to their patients to alleviate pain and anxiety. One of aromatherapy's appealing characteristics is that it can be utilized in any clinical situation with very few contraindications. Minimal contraindications mean that patients receiving additional avenues of pain relief are not prohibited from using aromatherapy for either pain relief or anxiety reduction.

Labor nurses are fully aware that different clinical situations warrant various interventions to assist in the patient's labor process. The field of labor nursing is moving away from the idea of complete pain relief and moving toward assisting a mother to cope with their labor pains. New coping assessments concentrate on how a laboring woman deals with sensations and changes during labor (Fairchild et al., 2017). These assessments allow a nurse the freedom to incorporate essential oil use to assist in labor pain and anxiety relief.

Purpose of the Study

The purpose of this project was to determine how nurses viewed the use of aromatherapy resources at their disposal and the likelihood that they would offer the intervention to their patients. This project also provided education to increase nurses' confidence in providing optimal care to patients using a traditional and holistic avenue of aromatherapy. It is important to evaluate not only the patient's perception of essential oil use but also the nurse's perception of the effectiveness of essential oils. The labor nurse has a vital role in shaping labor progression and influencing the interventions available for a patient. It is reasonable to assess how a nurse's perceptions, knowledge, and personal use influences the availability of essential oil use for patients in labor. Multiple studies evaluated the effectiveness of essential oils for patients in labor. This study was designed to contribute to the scientific work by understanding the nurse's role in essential oil application in relation to the labor and delivery process.

Research Question

The research question investigated by this study was: In labor and delivery nurses (population), how does education (intervention) influence their personal perception and promotion of essential oil use for labor patients (outcome) compared with their current promotion of essential oils for patients in labor (comparison)?

Definition of Key Terms

Aromatherapy. The application of essential oils through inhalation to restore or improve health and well-being (Hanger & Sheppard-Hanger, 2015).

Complementary and alternative medicine. Nonpharmacological and noninvasive treatments to prevent and protect from emotional, physical, and mental ailments (Azima, 2014).

Doula. A designated support person trained in methods to support labor, usually hired specifically for labor support (DONA International, 2020).

Essential oil. Plant compounds extracted from whole plants via various methods and used to modulate immune function and stimulate different nerve conduction pathways (LoBisco, 2016).

Homeopathy. System of medicine that is based on the "law of similars" (Homeopathic Nurses Association, 2020, para. 5). This medical system uses nontoxic, natural remedies to treat emotional, physical, and mental symptoms.

Labor. In this study, the presence of regular and consistent uterine contractions that cause cervical dilation or effacement (Cunningham et al., 2018).

Labor nurse or labor and delivery nurse. In this study, a nurse who is actively employed on a labor and delivery unit, free-standing clinic, or birth center. This nurse is tasked with assisting a laboring woman during the process of childbirth.

Visual analogue scale. In this study, a scale using the numbers from 0–10 to rate either pain or anxiety by the laboring mother (Cunningham et al., 2018).

Scope and Limitations

This project was available to the labor and delivery nurses who are members of the social media sites devoted to labor and delivery nursing issues. The key stakeholders were limited to the project researcher and the professional social community administrators who allowed the survey to be posted on their site for recruitment. Inclusion criteria were nurses who worked with laboring patients. Exclusion criteria were nurses who did not actively support women in labor. The project constraints were buy-in and support from the nurses who chose to participate in the survey.

Chapter Summary

The use of essential oils for numerous ailments is not a new concept. There is evidence that essential oils have been a part of daily lives since the beginning of modern civilization (Gibson, 2018). Incorporating the additional pain relief option that aromatherapy provides to the established protocols on the labor and delivery unit allows the nurses to provide a customized care plan for each patient. Understanding a nurse's motivation for offering, facilitating, or withholding essential oils is a significant area of concern for nursing leadership.

Applying essential oils during labor can contribute to the patient's satisfaction with the overall labor experience. Nursing staff cannot offer traditional means of labor pain relief independently, such as labor epidurals and narcotic medication. However, nurses can independently provide aromatherapy applications and be empowered by all available means to provide these essential oil services to their clients.

Chapter 2: Literature Review

Criteria for inclusion in the literature review included peer-reviewed articles published in peer-reviewed journals in the last 10 years. Multiple online databases were utilized for this literary search, including the Abilene Christian University online library, the Wiley online library, and the ProQuest database. Several searches based on the PICO question were searched and included these search phrases: *aromatherapy in labor*, *aromatherapy and pain relief*, *essential oils and labor*, *essential oil and nursing and perspectives*, and *aromatherapy and safety*. Twenty-one separate articles were chosen, reviewed, and analyzed for inclusion to support this project's foundations. The articles reviewed support aromatherapy use for pain relief and reduction of anxiety during the labor process. Additional research support suggested that essential oil and aromatherapy use has multiple applications for numerous ailments and conditions.

Best Practices Identified

Out of the 50 articles reviewed, three best practices emerged from the evidence. The best practices identified were:

- Aromatherapy significantly reduces pain in labor.
- Aromatherapy significantly reduces anxiety in labor.
- Aromatherapy can be used safely.

Additionally, one study was found that specifically addressed the perceptions of clinicians administering aromatherapy to patients.

Aromatherapy and Pain Relief

Tabatabaeichehr and Mortazavi (2020) conducted a systematic review that concluded aromatherapy might be a viable complementary intervention to decrease pain and anxiety in

labor. They reviewed 33 studies conducted in various countries, predominantly Iran, that discussed the use of aromatherapy in multiple forms, including inhalation and massage. Out of the 33 studies, 29 articles found that aromatherapy significantly decreased either pain or anxiety or both. The four studies that did not indicate a significant effect on labor pain or anxiety may be attributed to inadequate sample sizes, inadequate follow-up, or short duration. The authors noted that women viewed aromatherapy intervention positively, which contributed to their labor experience (Tabatabaeichehr & Mortazavi, 2020). It is important to note that none of the articles reviewed indicated any severe side effects of aromatherapy during the labor to either the mother or the infant.

Makvandi et al. (2016) published a systematic review of studies that specifically singled out the use of lavender essential oil. The authors included three articles in this review for comparison. The authors concluded that lavender essential oil was effective on a woman's perception of pain during labor in response to the three articles' conclusions. All three research studies indicated a significant decrease in "labor pain by the order of -0.476 [-0.718–0.235], p = 0.000" (Makvandi et al., 2016, p. 45). The authors recommended that more evidence-based research should be conducted to validate the results.

Dhany et al. (2012) conducted a retrospective review of clients in a labor and delivery unit that averaged 3,000 births each year. Medical records were obtained and analyzed for the use of aromatherapy and massage intrapartum service (AMIS). The study was designed to evaluate the impact of introducing the AMIS and its effect on other forms of analgesia. The study was conducted by reviewing the medical records and a survey from those that received the AMIS as the experimental group and examining an equal number of randomly selected medical records of women who did not utilize the AMIS as the control group. Dhany et al. (2012)

concluded that having the AMIS positively affected anesthesia rates during labor. The study looked at how women used aromatherapy in labor and found that bergamot, frankincense, and lavender oils were the most commonly used oils. Women used these oils, along with a carrier oil, for massage via a taper method (whereas the oil is dropped onto a tissue paper and secured on a garment near the nose) and diffused in a bathtub. Aromatherapy and massage intrapartum service was chosen to help achieve relaxation and calmness, provide a naturalistic option for pain relief, and help enhance contractions (Dhany et al., 2012).

Alavi et al. (2014) conducted a randomized controlled study on the efficacy of lavender essential oil for labor-related pain relief. Both groups received a cotton pad with liquid placed on the pad. The control group received 2 ml of distilled water placed on a cotton pad, while the experimental group received 1 ml of lavender essential oil on the cotton pad. This study measured the effect of lavender oil on the patient's perception of labor pain, the patient's feelings of contentment during labor, the duration of labor, and the fetus's outcome as determined by the Apgar score. The study's conclusion showed a significant reduction in labor pain and increased levels of contentment while inhaling the lavender oil. This study also showed no statistical difference in the duration of labor or the infant Apgar scores. The authors strongly recommended including lavender oil in health centers to reduce pain perceptions (Alavi et al., 2014).

Janula and Mahipal (2015) conducted a randomized control study of the effects of aromatherapy and biofeedback on primigravida birthers. This study involved one control group plus two experimental groups, the aromatherapy group and the biofeedback group, for which routine intrapartum care was given. The aromatherapy group received lavender oil applied via massage during the first stage of labor. The biofeedback group was taught the skill of biofeedback relaxation techniques. Measurements of pain were evaluated using the visual pain

analog scale. The study concluded that the aromatherapy group had a lower mean pain score than the biofeedback and control groups. The study also found that those in the aromatherapy group had a shorter first stage of labor. Another interesting observation was that participants in the aromatherapy and biofeedback groups did not experience a postpartum hemorrhage. The study concluded that "the use of aromatherapy and biofeedback as an effective method of reducing pain perception and duration of labor" (Janula & Mahipal, 2015, p. 4).

Pirak and Yazdkhasti (2016) studied the effects of lavender on pain levels and labor duration in primiparous women. This randomized control study was a considerably larger study involving 120 women. This study's findings support the claims by previously mentioned studies that lavender oil does significantly reduce labor pain. The application of lavender was achieved by direct inhalation. The study results showed that participants in the experimental group reduced labor pain 30 minutes following inhalation (Pirak & Yazdkhasti, 2016).

Kaviani et al. (2014) explored two additional essential oils in their randomized control trial. They looked at the effects of Jasminum officinale and Salvia officinale on women's pain in labor. Kaviani et al. (2014) found that an incense mask application of salvia had the most significant pain relief during labor. Neither of the essential oils influenced the infant's Apgar scores, supporting the claims that aromatherapy is safe.

Aromatherapy and Its Effects on Anxiety

Five randomized control study articles and one systematic review supported the evidence that aromatherapy effectively reduces anxiety in labor. Haghani et al. (2014) discussed the negative effects of anxiety on labor, such as vasoconstriction, increased muscle tone, decreased uterine blood flow, and slowing of labor progression.

Ghiasi et al. (2019) conducted a systematic review of the effects of essential oils on anxiety during labor. This review included 16 different studies conducted mainly in Iran that determined that aromatherapy had a positive effect on reducing anxiety in the first stage of labor. However, due to the study designs and the inability to reduce performance and detection bias, the authors recommended further studies to verify these results. However, with no recognized side effects in any study, the method of aromatherapy is generally considered safe for use in labor for anxiety.

Haghani et al. (2014) used rose oil and diffused the oil into a warm footbath, with a second experimental group receiving only warm water in the footbath and the control group receiving standard care. The result of this study showed that those with the rose oil additive had a significant anxiety reduction. This study demonstrated that rose oil should be considered in the protocol for anxiety reduction. However, rose oil is costly. It may be prudent to evaluate other essential oils for cost-efficiency.

Fakari et al. (2015) looked at anxiety levels when exposed to the inhalation of geranium essential oil. The results of this randomized controlled study demonstrated that geranium did reduce anxiety subjectively but also with an objective measure of a decreased diastolic blood pressure.

Rashidi-Fakari et al. (2015) and Akbari et al. (2014) studied the effect of orange essential oil on anxiety in labor using direct inhalation. Each of these studies showed that orange essential oil has the desired effect of reducing anxiety. Orange oil will also be considered in the protocol. Orange essential oil is very cost-effective and has a pleasant scent.

Igarashi (2013) also studied the effects of aromatherapy on anxiety with similar results in which the essential oils had a positive effect of reducing anxiety in pregnancy. The difference in

this study was that Igarashi (2013) designed the study so that participants could choose their essential oil within a family of oils that have the same properties containing linalool and linalyl acetate. A limitation of this study was that it was harder to pinpoint a direct recommendation related to the small study size of 13 participants and the participant's ability to choose different oils. However, it did support the conclusion that essential oils helped reduce anxiety.

Safety of Aromatherapy

Hanger and Sheppard-Hanger (2015) highlighted the principle that essential oils are highly concentrated and must be used cautiously. Safety is an important component of aromatherapy application, and care must be taken to include these potent oils in a clinical setting. Diluting the essential oils in carrier oils ensures their safety and efficiency. Smith (2012) included a recommendation to use the essential oil for an hour, taking a break from the use for an additional hour. These authors provided excellent recommendations for the proper application of essential oils, and their principles should be considered while developing the protocol.

Buckle et al. (2014) and Smith (2012) each stressed the importance of training, as essential oils are highly concentrated, and some are contraindicated in labor. It is recommended that all nurses who wish to use aromatherapy participate in clinical training designed to promote safety in essential oil use (Buckle et al., 2014). Smith (2012) discussed the importance of using the lowest possible dose. In the case of aromatherapy, more is not better!

Buckle (2015) discussed the propensity of aromas to associate with memories. This is an important consideration for women in labor. If a certain aroma is associated with the feelings of accomplishment and satisfaction that a successful labor can provide, the reintroduction of that scent can reignite those feelings of accomplishment and satisfaction. Buckle (2015) also noted that no adverse events had been associated with the use of aromatherapy.

Safety considerations that Gibson (2018) advocated in an expert opinion review stressed that allergies of both the patient and the staff need to be assessed before applying the oils. Irritation of the patient's skin from applying essential oils can be avoided by diluting the oil in a carrier oil and testing a small amount of the diluted oil onto the patient's skin before full application. Another safety consideration is ensuring that the essential oil will not interfere with prescribed or over-the-counter medications that a patient may be consuming.

Perceptions of Caregivers

Pearson et al. (2019) conducted a study to determine the insights of various healthcare providers on their personal use, knowledge, and opinions on the use of aromatherapy. This study is the only research available that reflects how the caregivers' experiences influence aromatherapy in the healthcare environment. The participants of this survey were clinicians who were attending an integrative medicine conference in 2017. The majority of the participants, 57 out of the 105, were advanced practice nurses or physician assistants. There were only two registered nurses who responded to the survey. The survey responses indicated that clinicians overall agreed with the benefits of essential oils, with only 2% reporting that essential oils were never beneficial. Seventy-four percent of respondents reported that they would like to offer essential oils to their patients. Yet, only 21% of the survey participants said they were confident in their ability to counsel patients on the proper use of essential oils. The authors' recommendations included more research in determining the national use of essential oils in healthcare.

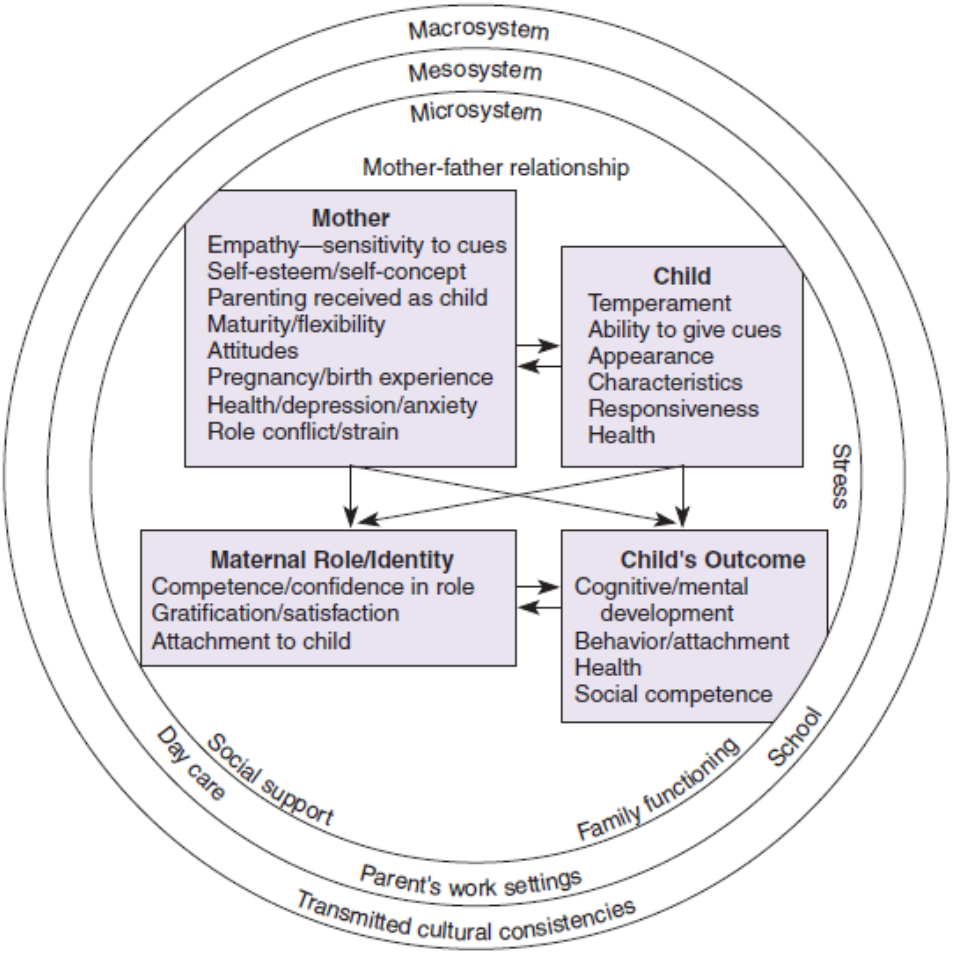
Theoretical Framework

Theoretical frameworks are important to create a guiding formula to direct the study to support or disprove the hypothesis stated in the PICOT question. The theoretical framework for

this project was based on maternal role attainment (see Figure 1). A successful birth experience is essential for our patient's self-determination and maternal role attainment. Ramona Mercer developed a midrange nursing theory that details what a mother must take to form a bond with her new infant. The maternal role attainment theory guides nurses to develop interventions that help create the maternal-infant bond (Meighan, 2010). A mother's labor experience may influence their ability to start the bonding process after the infant is born. Mercer (2004) outlined four stages in becoming a mother: anticipatory, informal, formal, and personal. A mother passes through these stages during her pregnancy. Shortly after the infant is born, as a woman clarifies her position as a mother, nurses present at the birth can help a mother internalize her experience and facilitate the process.

Figure 1

Maternal Role Attainment



Note. Image illustrates how the maternal role or identity interacts between the mother, child, and child's outcome within defined microsystems, mesosystems, and macrosystems. Reprinted from "Ramona T. Mercer: Maternal Role Attainment–Becoming a Mother," by M. Meighan, 2010, p. 434, In M. R. Alligood & A. M. Tomey (Eds.), *Nursing theorists and their work* (7th ed., pp. 432–446). Copyright 2020 by Mosby Elsevier. Reprinted with permission.

Another nursing theory, the obstetrical comfort theory, introduced by Durnell-Schuiling and Sampselle (as cited in Charles et al., 2016), proposes that pain and comfort can exist in the

same person at the same time. They suggested that pain in labor has both a complex physiological and complex psychological component (Charles et al., 2016). Utilizing aromatherapy application has great potential to help patients achieve comfort in labor and start those feelings of worth and success as a mother.

Chapter Summary

The use of aromatherapy in the process of labor is becoming an increasingly more recognized intervention. There is substantial evidence-based research that supports the use of different essential oils for both pain and anxiety in labor (Azima, 2014; Dhany et al., 2012; Fakari et al., 2015; Ghiasi et al., 2019; Haghani et al., 2014; Igarashi, 2013; Janula & Mahipal, 2015; Kaviani et al., 2014; Makvandi et al., 2016; Pirak & Yazdkhasti, 2016; Tabatabaeichehr & Mortazavi, 2020). The literature also supports that essential oils can be used safely and effectively in a controlled environment with little to no adverse effects (Buckle, 2015; Buckle et al., 2014; Gibson, 2018; Hanger & Sheppard-Hanger, 2015; Smith, 2012).

Chapter 3: Research Method

Project Purpose

This project evaluated nurses' attitudes and beliefs across the country on essential oil for labor patients. This study evaluated nursing staff's barriers and provided recommendations for interventions to increase engagement with aromatherapy use. Evidence showed that engaging in a program to provide essential oils to laboring patients is a viable option. Johnson et al. (2016) specifically studied the effects of nurse-administered aromatherapy. The available research supported that the use of aromatherapy, in addition to routine medical care, provided patients with statistically significant decreases in both pain and anxiety (Johnson et al., 2016). Based on the literature review findings, this project has considerable support in recommending essential oil use and evaluating the nursing staff's perceptions of aromatherapy.

Project Design

This evidence-based project utilized a quantitative comparative design with convenience sampling using questionnaires over two months. The initial questionnaire examined the participant's knowledge, perceptions, acceptability, and the frequency with which nurses advocated for the use of aromatherapy in their hospital's labor and delivery unit. The project provided an educational intervention to mitigate barriers to nurses' acceptance of essential oil use. Immediately following the educational activity, another questionnaire evaluated the education's effectiveness on nurses' perceptions and knowledge of essential oil use in labor.

Recruitment and Selection

Participants' recruitment was conducted by posting a call to action for participation in two professional online community groups specifically designed for labor and delivery nurses (see Appendix A). Two professional online community group administrators permitted this

project to solicit participants from their groups (see Appendix B and Appendix C). Social media is an increasingly popular avenue for informal education for labor and delivery nurses. Typical discussions included positions for labor support, informal surveys of procedural steps, and advice on labor support. Participation in the project was strictly voluntary. The participant was informed before the questionnaire that the survey submission would imply consent to participate in the study. The project researcher screened all participants for exclusion criteria before inclusion in the project based on information received in the demographic portion of the survey questions.

Intervention

The active data collection period was open from May 24, 2021, until July 24, 2021. All participants were provided the informed consent and instructed that submitting the questionnaire implied consent to participate in the study. The study was conducted using Google Forms and a private YouTube account. After informing the participants of the study objectives and consent information, a link to the Google Form was provided for the baseline survey. The study participant completed the demographic survey, the preinterventional survey questions. Embedded in the Google Form document was the link that directed the participant to the educational materials (see Appendix D) using a private YouTube link. The posttest survey was incorporated into the Google Form to measure the effectiveness of the education and document any change in perceptions or willingness to integrate aromatherapy into the participant's nursing practice for laboring patients.

Project Timeline

The project was conducted over 17 months, starting in May 2020 and concluding in November 2021. Significant dates are shown in Table 1 and Appendix E.

Table 1

Timeline of Project

Date	Task
May 2020	Initial project development
June 2020	Project design with DNP chair
August 2020	Mini proposal accepted
October 2020	Formation of DNP committee
October 2020	Permission to use survey tool received
December 2020	Project design with DNP chair
January 2021	Chapters 1–3 completed
January 2021	Permission for survey recruitment obtained
February 2021	Proposal defense
March 2021	Project survey Google form created
March 2021	Educational intervention material completed
April 2021	IRB submitted and exempt approval received
May 2021	Recruitment of participants and data collection started
July 2021	Recruitment of participants and data collection ceased
August 2021	Data analysis completed
September 2021	Chapters 4–5 completed
October 2021	Final defense
November 2021	Paper submitted for publication

Methodology Appropriateness

Once a nurse participant had been enrolled in the project, they were given an informed consent information page with a description of the process to ensure confidentiality and privacy. There was no monetary compensation for persons involved in this project. Informed consent was indicated from each subject by their willingness to proceed with the survey questions. Participants could close out of the survey and education at any time during the process, and that

survey was excluded for incomplete data collection. If participants wanted to rejoin the project, they would need to start from the initial consent information screen and proceed from the beginning entry point once again.

Feasibility and Appropriateness

This project was conducted in conjunction with the administrators of two professional online community groups with active labor and delivery nurse participation. This project sought to understand how a nurse's feelings, attitudes, and beliefs about essential oil use contributed to or hindered aromatherapy availability for laboring patients. The benefit of partnering with the professional online community groups allowed a national representative sample of labor nurses to be presented with an opportunity to participate in the project.

Institutional Review Board Approval and Process

Any research demands a responsible and adequate ethical base. All compliance training advised by Abilene Christian University (ACU) was completed. An institutional review board (IRB) was consulted, and approval was received from Abilene Christian University (see Appendix F) before the start of the project. This approval ensured that all ethical concerns were addressed properly. The project researcher asked and received an expedited ruling on the study design. This project is minimal risk and involves noninvasive data collection. The ACU IRB was determined to be sufficient for this project.

Interprofessional Collaboration

Interprofessional relationships were an important consideration in the development of this study's aromatherapy questionnaire. Leaders in the field of essential oil used at the Mayo Clinic were instrumental in developing the correct survey questions to elicit appropriate information from the nursing body. Relationships with numerous key stakeholders included administrators of

the professional online community groups and the nurses who participated in the questionnaire and educational activity.

Practice Setting for Evidence-Based Practice

The practice setting for this evidence-based project was a professional community group of labor and delivery nurses found on social media. Social media professional groups are a vibrant source of information for the professional labor and delivery nurse. The social medical community provides education, evidenced-based research, and support for nurses who care for women in labor. The professional community group is screened for inclusion by the group's administrators. A nurse must attest that they are actively employed in an obstetric-based setting to gain acceptance into the group by the administrators.

Target Population

The target population was nurses who have worked in a labor and delivery unit who might have also had the potential to work with essential oils in practice. The study included registered nurses and advanced practice registered nurses who wished to participate in the survey and worked with laboring patients. Exclusions to the study included nurses who did not actively work with laboring patients at the survey time. Additional exclusion criteria were surveys with incomplete data or participants who did not complete the education along with the postintervention survey.

Risks

There were minimal to no risks to participants who participated in this study. One potential risk to participants would be the loss of confidentiality. However, this risk was minimized by collecting only general demographic data and no identifying information. All data collected were stored according to Abilene Christian University's procedures for research data.

Benefits

The benefits to participants in this project included the personal satisfaction and assurance that evidence-based practices are being offered to assist patients in coping with pain in labor, the potential for patient relaxation, and general air purification (Gibson, 2018). The results from this project were posted in the professional nurse community for general education and synthesis.

Instrument and Measurement Tools

The project utilized a previously validated survey created by Pearson et al. (2019) from the Mayo Clinic, with permission granted from the authors for its use in this project (see Appendix G). The survey questions were formulated by Pearson et al. (2019) to determine a clinician's attitudes, beliefs, and views on essential oil use both professionally and for their own personal consumption. The survey included demographical questions to determine participants' age, sex, race, practice location, and any previous education on aromatherapy use. Additional questions were added to the survey to understand the nurse's ability to offer aromatherapy in the clinical labor setting. See Appendix H for the complete survey presented to the participants.

Data Collection and Management

Confidentiality was maintained throughout the project by the minimal collection of personal demographics, and all information was stored in an encrypted computer database. All information obtained was anonymous, with no identifying information included. De-identified data collected during this project was stored in a secure university drive under the project researcher's name. Data are owned by the university if access is needed at a future date. This storage system is provided by the online graduate school for doctoral student research data and

supported by the university's information technology (IT) department for security purposes. All documents will be kept for the minimum required time according to IRB guidelines.

Analysis Plan

The proposed analysis plan was to utilize a chi-test and either a two independent samples *t* test or a Wilcoxon-Mann-Whitney test to validate and compare the preintervention survey results and the postintervention survey results. The determining factor for the usage of the two-sample *t* test versus the Wilcoxon-Mann-Whitney test was the presence of a normal distributed dependent variable. The first statistical test was conducted to determine the standard deviations for the preintervention questionnaire compared to the postintervention questionnaire. Since these results were similar, the two independent samples *t* test was utilized. The correct statistical analysis would have been the Wilcoxon-Mann-Whitney test if those results were not distributed normally. The Statistical Package for the Social Sciences (SPSS) version 25 will be utilized for the statistical analysis (IBM Corporation, 2017).

Chapter Summary

This project employs an evidence-based assessment project design intended to measure a nurse's perception of the use of essential oils in labor. All research protocols from Abilene Christian University were followed. Permissions and approvals were obtained from all key stakeholders. Informed consent information was presented to potential participants, and all participants who proceeded with the survey questions were given implied consent. Potential participants were screened for inclusion and exclusion criteria. All project-related materials were stored properly when not in active use and were only accessible by the project researcher.

Chapter 4: Results

This DNP project was implemented to determine how a nurse's perception of aromatherapy influences their decision to provide aromatherapy for patients during labor and the effect of targeted education on a nurse's perception. Understanding the nurses' level of understanding, willingness to use essential oils, and how targeted education can influence the use of aromatherapy is important to identify barriers to essential oil use. Pearson et al. (2019) cited a prominent barrier to aromatherapy use was the lack of education for healthcare providers. A targeted educational intervention presented the rationale, proper use of aromatherapy, and safety considerations. The participants were surveyed before intervention and following the educational intervention to determine if the education was effective in increasing the confidence and willingness of nurses to provide aromatherapy to their patients.

Introduction

The survey was offered to professional labor and delivery nurses on two professional social media groups open to labor and delivery nurses and certified nurse midwives. These professional social media groups were "Labor and Delivery Nurses Rock!" and "Labor and Delivery Nurses Rock!!" The open call for research participants resulted in 162 respondents who met the inclusion criteria of either practicing as a labor and delivery nurse or certified nurse midwife. Of the 162 respondents, two respondents were removed from the study for not completing the educational activity and follow-up survey questions. This resulted in 160 surveys available for analysis and inclusion in the project.

Purpose of the Project

The purpose of this DNP project was to gain an understanding of factors that influence nurses to promote and offer the evidence-based intervention of aromatherapy to relieve pain and

anxiety in labor. Potential bias in the perception of the effectiveness of essential oils may positively affect a patient's acceptance and benefit with aromatherapy, or it may have the opposite effect. A negative perception may harm a patient's experience with using essential oils during labor. Understanding how that potential bias with perception is important to identify barriers to essential oil use. The research question identifies a potential intervention that could mitigate any preconceived biases for essential oil use.

Demographics

The survey material was introduced by including six basic demographic questions to identify the participants' characteristics (see Table 2).

Table 2

Study Population Demographics

Characteristic	*n* (%)
Age	
< 24	7 (4.4%)
25–34	71 (44.4%)
35–44	59 (36.9%)
45–54	15 (9.4%)
55–64	8 (5.0%)
Gender	
Female	101 (63.1%)
Male	59 (36.9%)
Race	
African American/Black	8 (5.0%)
American Indian or Alaska Native	23 (14.4%)
Asian	9 (5.6%)
Biracial/Multiracial	13 (8.1%)
Caucasian/White	93 (58.1%)
Hispanic/Latino	8 (5.0%)
Native Hawaiian or Pacific Islander	5 (3.1%)
Other	1 (0.6%)
Practice Location	
Rural	7 (4.4%)
Small City	29 (18.1%)
Suburban	41 (25.6%)
Urban	83 (51.9%)
Primary Work Location	
Acute Care Hospital	75 (46.9%)
Free-Standing Birth Center	65 (40.6%)
Government Facility	15 (9.4%)
Medical Center or Institution	5 (3.1%)

Discussion of the Demographics

Of the 160 respondents, most were between 25 and 34 years old (44.4%), female (63.1%), and Caucasian/White (58.1%). Half of the participants worked in an urban setting (51.9%), predominately in acute care (46.9%) or free-standing birth hospital (40.6%) settings (see Table 2).

Data Analysis

Statistical analysis was carried out using SPSS version 25 (IBM Corporation, 2017). Results are reported as a number (percentage). Categorical nominal variables were numerically coded to carry out further analysis on pre- and postintervention responses. A paired *t* test was used to evaluate differences in pre- and postresponses. The level of statistical significance was determined by a *p*-value of .05.

The preintervention survey questions (see Table 3) identified the nurse's self-perceived knowledge of essential oil use, their experience with essential oils from their practice site, their involvement with developing essential oil policies for their practice site, and their personal essential oil use. Figure 2 demonstrates the results of the survey question of "Have you used essential oils for yourself or your family." This question is significant because it represents that registered nurses (RNs) and certified nurse midwives (CNMs) use the essential oils in their personal lives and have experienced the products themselves.

Table 3

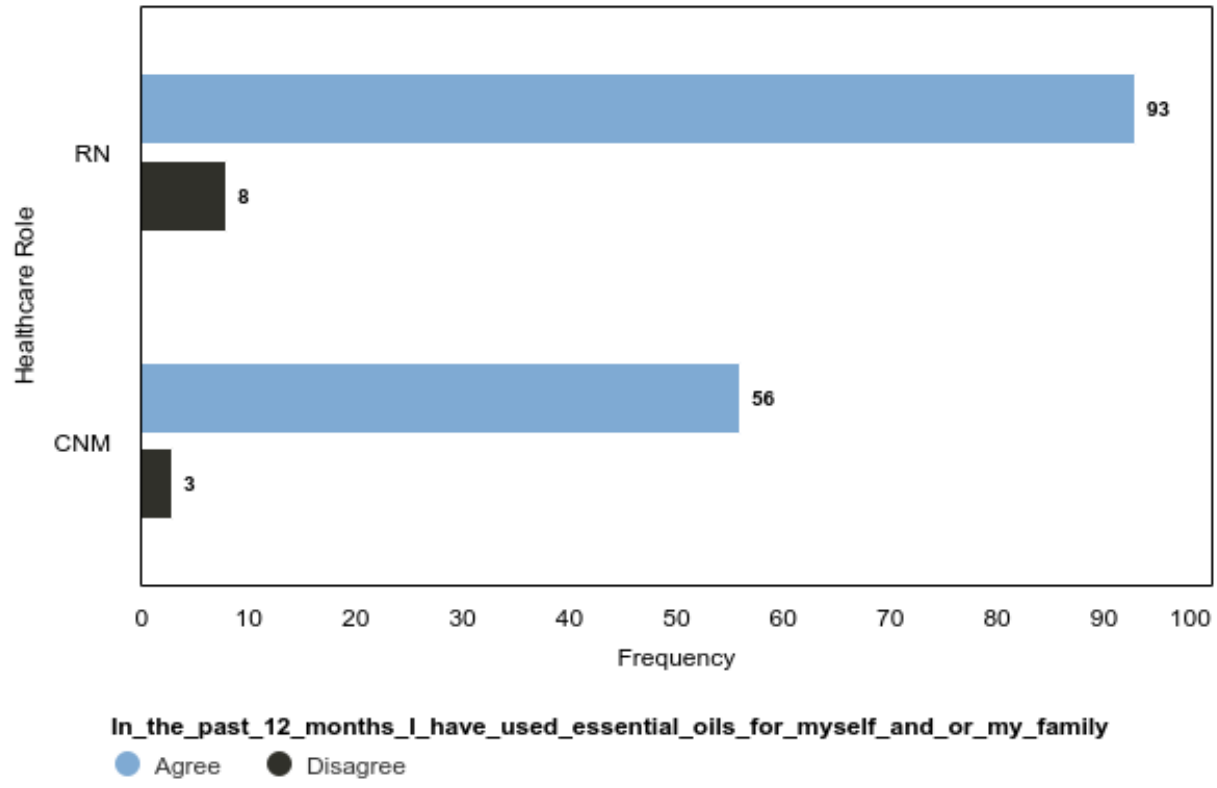
Preintervention Study Questions

Survey question	*n* (%)
Have you ever received education on the use of essential oils or aromatherapy?	
No	3 (1.9%)
Yes, as part of a hospital essential oil policy education	59 (36.9%)
Yes, through programs designed for community members	13 (8.1%)
Yes, through programs designed for healthcare workers	67 (41.9%)
Yes, through self-study	18 (11.3%)
Have you ever undergone a formal training course to become a certified clinical aromatherapist?	51 (31.9%)
No	109 (68.1%)
Yes	
Does your practice site offer essential oils for patients in labor?	
No	15 (9.4%)
Yes, no formal policy	49 (30.6%)
Yes, with a formal policy	96 (60.0%)
Have you ever developed or considered championing a formal essential oil program for your practice site?	
No	13 (8.1%)
Yes	128 (80.0%)
Maybe	19 (11.9%)
In the last 12 months, at least one of my patients has asked me about the use of essential oils for therapeutic purposes.	
Agree	147 (91.9%)
Disagree	13 (8.1%)
My patients who use essential oils typically use them …	
For wellness and relaxation purposes	77 (48.1%)
For the treatment of disease	29 (18.1%)
Both	49 (30.6%)
I do not have patients that use essential oils	5 (3.1%)
I believe that there is a need for increased clinician training in the use of essential oils.	
Agree	144 (90.0%)
Disagree	10 (6.3%)
Unsure	6 (3.7%)

Survey question	*n* (%)
I would like to undergo training to become certified in clinical aromatherapy.	
Agree	125 (78.1%)
Already certified	14 (8.8%)
Disagree	10 (6.2%)
Unsure	11 (6.9%)
In the past 12 months, I have used essential oils for myself or my family.	
Agree	149 (93.1%)
Disagree	11 (6.9%)

Figure 2

Graph of the Personal Use of Essential Oils by Healthcare Role Type



Four survey questions were queried in the preeducational and posteducational survey (see Table 4). Two survey questions were of statistical significance based on pre- and poststatus differences. Fewer respondents felt confident in their ability to educate patients on the safe use of essential oils for therapeutic purposes after the educational intervention (88.8% pre versus 61.3% post; $p = .00$). However, roughly a third of participants did feel more confident after the educational intervention but desired more education (35.6%). Regarding recommending essential oils to patients, more respondents agreed that they did want to offer essential oils postintervention compared to preintervention (95.0% post versus 88.1% preintervention; $p = .004$; see Table 4).

Table 4

Pre- Versus Posteducational Intervention Using a Paired t *Test*

Survey question	*n* (%)	*p* (pre vs. post)
I consider essential oils to be generally safe when used appropriately.	*Pre:* 157 Agree (98.1%) 3 Disagree (1.9%) *Post:* 154 Agree (96.3%) 5 Disagree (3.1%) 1 Unsure (0.6%)	.16
I feel confident in my ability to educate patients on the safe use of essential oils for therapeutic purposes.	*Pre:* 142 Agree (88.8%) 18 Disagree (11.2%) *Post:* 98 Agree (61.3%) 5 Disagree (3.1%) 57 More confident than before, but would like more education (35.6%)	.00
I believe the use of essential oils may be beneficial …	*Pre:* 17 for wellness and relaxation (46.9%) 29 for the treatment of disease (18.1%) 56 both (35.0%) *Post:* 70 for wellness and relaxation (43.8%) 30 for the treatment of disease (18.8%) 60 both (37.5%)	.31
I would like to offer essential oil recommendations or therapies to my patients.	*Pre:* 141 Agree (88.1%) 8 Disagree (5.0%) 11 Unsure (6.9%) *Post:* 152 Agree (95.0%) 3 Disagree (1.9%) 5 Unsure (3.1%)	.004

The postintervention questions (see Table 5) sought to understand if the educational intervention effectively increased interest in the use of essential oils during labor. This section

was kept succinct as the goal was to determine if the education successfully created or sustained interest in essential oil use, and they did not have a correlating preintervention survey question.

Table 5

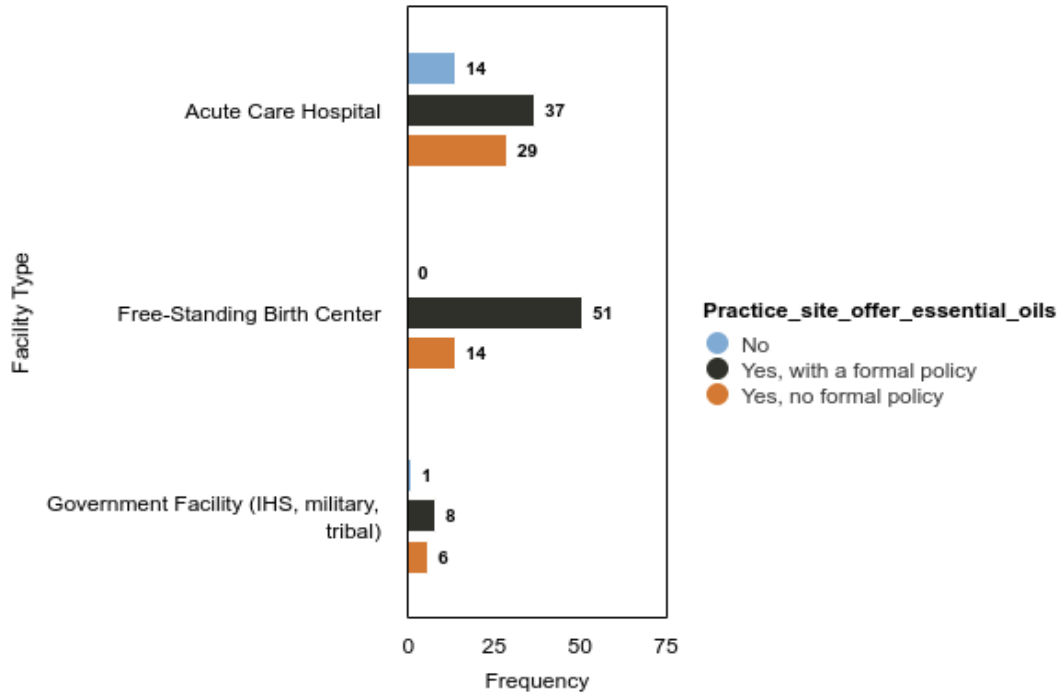
Postintervention Study Responses

Survey question	*n* (%)
I am more interested in learning about how essential oils can be used in labor.	
Agree	149 (93.1%)
Disagree	7 (4.4%)
Unsure	4 (2.5%)
I would like to implement a policy or procedure to utilize essential oils for patients in labor at my facility.	
Agree	125 (78.1%)
Disagree	7 (4.4%)
My facility already has policies or procedures in place for essential oil use in labor	16 (10.0%)
Unsure	12 (7.5%)

Additional information that can be relevant to identifying how nurses' perceptions of aromatherapy affect how patients experience aromatherapy can also be extracted from the results of this DNP project. One of those factors is the availability of essential oils at the practice location (see Figure 3). A chi-square test of independence was conducted to examine whether facility type and practice site offering essential oils were independent. There were three levels in facility type: acute care hospital, free-standing birth center, and government facility (Indian health service [IHS], military, tribal). There were three levels in the practice site offering essential oils: *no*, *yes*, *with a formal policy*, and *yes*, *with no formal policy*.

Figure 3

Bar Plot of Facility Type and Status of Essential Oil Availability



Assumptions

The assumption of adequate cell size was assessed, which requires all cells to have expected values greater than zero and 80% of cells to have expected values of at least five (McHugh, 2013). All cells had expected values greater than zero, indicating the first condition was met. A total of 77.78% of the cells had expected frequencies of at least five, indicating the second condition was violated. When the assumptions of the chi-square test are violated, Fisher's exact test can be used to produce more reliable results with small sample sizes. Since the assumptions of the chi-test were violated, a Fisher's exact test was performed as well.

The results of the chi-square test were significant based on an alpha value of .05, $\chi^2(4) = 21.18$, $p < .001$, suggesting that facility type and practice site offering essential oils are related to one another. Table 6 presents the results of the chi-square test.

Table 6

Observed and Expected Frequencies: Chi-Square Test

	Practice site offering essential oils					
Facility type	No	Yes, with a formal policy	Yes, no formal policy	χ^2	*df*	*p*
Acute Care Hospital	14[7.50]	37[48.00]	29[24.50]	21.18	4	< .001
Free-Standing Birth Center	0[6.09]	51[39.00]	14[19.91]			
Government Facility (IHS, military, tribal)	1[1.41]	8 [9.00]	6 [4.59]			

Note. Values formatted as Observed [Expected].

Fisher's Exact Test

A Fisher's exact test was conducted to examine whether facility type and practice sites offering essential oils were independent using the same input values of the chi-square test. The results of the Fisher exact test were significant based on an alpha value of .05, $p < .001$, suggesting that facility type and practice sites offering essential oils are related to one another. Table 7 presents the results of Fisher's exact test.

Table 7

Observed and Expected Frequencies: Fisher's Exact Test

Practice site offering essential oils	Facility type			*p*
	Acute care hospital	Free-standing birth center	Government facility (IHS, military, tribal)	
No	14 [7.50]	0 [6.09]	1[1.41]	< .001
Yes, with a formal policy	37[48.00]	51[39.00]	8[9.00]	
Yes, no formal policy	29[24.50]	14[19.91]	6[4.59]	

Note. Values formatted as Observed [Expected].

Question Guiding the Inquiry

The research question that guided the analysis of this data was formatted using the PICO method. The PICO question identifies the population, the intervention, a comparison, and the potential outcome. For this DNP project, the PICO question was: In labor and delivery nurses (population), how does education (intervention) influence their personal perception and promotion of essential oil use for labor patients (outcome) compared with their current promotion of essential oils for patients in labor (comparison)?

Data were analyzed initially using the paired *t* test to determine statistical differences between the presurvey and postsurvey results with a *p*-value of .05. This test indicated that education could positively influence registered nurses and certified nurse midwives to promote essential oil use for their patients. This result supports that education can influence labor and delivery nurses to provide essential oils as an intervention in labor.

Reliability and Validity

The study questions were adapted with permission from Pearson et al. (2019). Pearson et al. (2019) created the survey questions and validated the results from various complementary and alternative survey materials. Additional questions were supplemented to tailor the results for labor and delivery nurses and the aims of this DNP project.

Limitations to this study were the potential biases of the participants. The study used a voluntary survey that was estimated to take 30 to 45 minutes of their time. The potential for participants who already had a positive perception of essential oil was a concern of the limitation of the results. Ninety-three percent of respondents stated they used essential oils in their personal life. While that result was encouraging to support essential oil use for patients in labor, it may reflect a selection bias for the opinions of those who chose to participate in the DNP project research. Another limitation was the design of the survey questions. The lack of substantial ordinal and scale variables for analysis was a limitation in the data analysis.

Conclusion

This study was a quantitative comparative study designed to determine the perceptions of registered nurses and certified nurse midwives on the use of essential oils in labor. The study participants were recruited from professional social media groups to solicit data from various practice sites to achieve a wider body of data points. The participants were actively practicing registered nurses or certified nurse practitioners in labor and delivery practice sites. Participants were asked to click on a link, taking them to a Google Form with the informed consent, initial inclusion criteria questions, demographic information, preintervention questions, the educational intervention, and the postintervention questions. The data were collected in the Google Form with no identifying information attached to the results. The data were analyzed utilizing

descriptive statistics, paired *t*-test analysis, chi-squared tests, and Fisher's exact test as applicable. The results supported that the educational intervention significantly influenced the nurses' desire to provide essential oils to their patients in labor.

Chapter 5: Discussion, Conclusions, and Recommendations

Essential oils have been shown to be effective in providing women in labor relief from pain and anxiety (Azima, 2014; Dhany et al., 2012; Fakari et al., 2015; Ghiasi et al., 2019; Haghani et al., 2014; Igarashi, 2013; Janula & Mahipal, 2015; Kaviani et al., 2014; Makvandi et al., 2016; Pirak & Yazdkhasti, 2016; Tabatabaeichehr & Mortazavi, 2020). However, patients need to be taught how to effectively use the oils in labor, which oils are effective and safe in labor, and when to start applying them. Nurses are in the ideal position to educate, support, and supply essential oils to patients in labor in the inpatient acute hospital and birthing center settings. Nurses should be educated and supplied with essential oils and the policies to offer to their patients in labor.

Interpretation and Inference of the Findings

The research question answered in this project reflected the potential barrier of limited education for nurses who wish to utilize essential oils for their patients in labor. The study sought to answer if an educational intervention could positively influence nursing perceptions of essential oils' effectiveness. One-hundred and sixty (160) participants met the inclusion criteria and completed all research project activities. The results of this study were statistically significant in favor that the educational intervention could positively influence registered nurses and certified nurse midwives to promote essential oil use for their patients. This finding supports that essential oils should be made available to patients to use during their labor. The most remarkable property of essential oils used in an inhalation form is that the intervention can be removed at any time without negative effects. Essential oils are also low-cost and a noninvasive intervention that can be used safely in labor (Gibson, 2018).

One of the important questions presented in this survey was, “Have you used essential oils for yourself or your family in the last 12 months?” This question reflects how a nurse’s perception may or may not influence their motivation to offer essential oils to their patients. This question was answered positively by 149 (93%) of the participants, with only 11 participants responding *no* to the question. Out of the 11 that responded negatively, all respondents answered that “I feel confident in my ability to educate patients on the safe use of essential oils for therapeutic purposes” with either an *agree* (3) or *more confident than before but would still like more education* (8) responses. The negative respondents also answered the question, “I would like to offer essential oil recommendations or therapies to my patients,” after the educational intervention with an *agree* (8). Only three respondents who did not use essential oils for themselves were unsure that they would offer essential oils to their patients following the educational intervention.

Of the 149 respondents that reported that they used essential oils for themselves or their family in the last 12 months, 144 agreed that they would like to offer essential oils to their patients in labor. Only five participants responded that they used essential oils for themselves or their family and endorsed that they *disagreed* (3) or were *unsure* (2) about offering essential oils to their patients in labor. This supports the idea that a nurse’s favorable perception of essential oil use correlates with an increased desire to offer essential oils to their laboring patients. Kramlich (2014) reported that healthcare workers were more likely to use all forms of complementary and alternative medicine. These findings could reflect that phenomenon. McDowell and Burman (2004) discussed that nurses specifically used complementary and alternative treatment for themselves, but they did not necessarily recommend them or support patient use. The findings of this study did not agree with those findings.

When examining the demographics of the survey participants, 85% (137) were under the age of 44. This is an interesting finding and could support additional research to examine why such a large percentage of nurse participants are younger. Only seven of the respondents under the age of 44 reported that they would not like to offer essential oils to their patients in labor.

The survey respondents disclosed their race as part of the demographic questionnaire. There were 23 (14.4%) respondents that identified as American Indian/Alaskan Native. This is a higher response rate for the minority racial group. Interestingly, 22 of the 23 respondents who identified as American Indian/Alaskan Native reported using essential oils for themselves or their families in the last 12 months. After the educational intervention, only one respondent stated that they would not recommend essential oils to their patients.

Another interesting finding that was not expected was the high number of respondents that identified as male. Fifty-nine participants (36.9%) identified as male in the demographic questionnaire. Labor and delivery nurses and certified nurse midwives are predominantly female.

Implications of Analysis for Leaders

Nurse leaders can ensure that policies are in place for nurse-driven protocols for essential oil use in the labor and delivery units. Nurse educators should be empowered to supply education to the nursing staff so that frontline nurses can confidently apply and educate patients on essential oils. Ensuring that essential oils are used safely is an important educational component for nurse leaders to capture in the interventions' policies and procedures.

Another avenue for nurse leaders to pursue because of these study findings is advocating essential oils for their nursing staff and their effects on reducing anxiety and stress in labor. Zamanifar et al. (2020) found that the application of chamomile-lavender essential oils decreased anxiety in nurses in the clinical setting, which was significant compared to the control group. As

nurses begin to utilize essential oils for themselves, they are more apt to recommend essential oils for their patients' use as well.

Evidence-Based Practice Findings and Relationships to DNP Essentials

The doctorate degree in nursing practice is structured and formatted by the American Association of Colleges of Nursing (2006) Essentials of Doctoral Education for Advanced Nursing Practice. These essentials encompass eight key areas that the advanced nurse must prove competency to complete the requirements of the DNP degree program. This research work set out to meet those objectives in the following examples.

Essential I: Scientific Underpinnings for Practice

The importance of evidence-based research in the field of nursing is paramount to advancing the nursing profession. This DNP project demonstrated a theoretical basis in Ramona Mercer's midrange nursing theory, the maternal role attainment theory (Mercer, 2004). Understanding the patient experience during labor is important to a labor room nurse, especially when pain and anxiety combine to increase suffering during intense contractions. Nurses who understand how increased pain and anxiety contribute to a negative or traumatic birthing experience and how that negative response affects the mother in the maternal role attainment process can better understand what interventions can counteract that negative feedback cycle. This DNP project sought to inform the DNP researcher of barriers that may inhibit the application of evidence-based interventions of a homeopathic nature that may be seen as frivolous or intimidating to practicing nurses.

Essential II: Organizational and System Leadership

Doctor of Nursing Practice-prepared nurses are equipped with the knowledge and skill to affect change and positive outcomes for various patient populations using contemporary nursing

research and innovative care strategies. This DNP project reflects this essential component by promoting the use of holistic strategies that meet the needs of the pregnant patient population. Patients in labor are dependent on the skills, expertise, and application of stress and anxiety-reducing interventions that nurses can perform or suggest for their patients.

This DNP project focused on expanding how targeted education on aromatherapy techniques and safety can help encourage holistic interventions that are not always commonplace in the nursing environment. The results of this project were encouraging, as 78.1% of the participants reported that they would like to implement a policy or procedure for essential oil use in their practice site.

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

The application of evidence-based research is fundamental to advancing the nursing profession. The doctorate-prepared nurse must gather, analyze, and summarize scholarly work to apply those concepts to existing nursing science.

This scholarly work included a literature review of the current research that supported the DNP project work. The evidence supports the use of aromatherapy interventions in labor care. This DNP project applied the concepts from the clinical scholarship evidence and evaluated potential barriers to applying the recommended science into clinical practice. This project utilized a methodological approach to ensure that appropriate information was collected from various nurse participants from differing clinical backgrounds.

Essential IV: Information Systems and Technology and Patient Care Technology for the Improvement and Transformation of Healthcare

The use of technology in the field of nursing is evolving every day. Nurses with advanced practice and leadership skills have learned to incorporate information technology to enhance

their individual practice and encourage improving patient outcomes. Numerous technological advances allow for increased communication among care providers, including evaluating how healthcare providers practice in vastly differing care scenarios.

This project utilized a national social media platform to reach a diverse audience that would not have been possible in a single clinical site. Gathering a cross-section of nursing input is an important component in furthering nursing diversity and scholarly knowledge. This project also utilized existing computerized platforms to gather data from the participants. Google Forms was an accessible format to present and gather the demographic information, present the preintervention survey questions, provide the educational format, and follow up with the postinterventional survey questions in one easy-to-understand link for participants. This format was instrumental in ensuring that only two participants were lost to incomplete data. Additionally, the data was analyzed with the use of the SPSS software. The successful utilization of information technology was paramount in the completion of this project.

Essential V: Healthcare Policy for Advocacy

The creation of policies in healthcare is done on many levels, from the microlevel of hospital policies to the macrolevel of federal and global mandates and standards of care. The DNP-prepared nurse is an integral part of creating, advocating, and changing those policies to reflect best practices and evidence-based research. Healthcare policies assist clinicians in ensuring that patients are properly cared for when they may not have a voice. People are most likely in a vulnerable position when they are in the medical system. They rely on the skills, expertise, knowledge, and advocacy of healthcare providers in that system. Healthcare policies can ensure that patients are treated fairly and equitably when they are in a vulnerable position.

This project sought to understand barriers that would prevent patients from receiving the homeopathic interventions of aromatherapy. This information enabled nurse leaders to inform the creation of nurse-driven policies for aromatherapy to be used successfully on labor units. This is a microlevel contribution to healthcare policy. This DNP project also provided the educational foundation for successful policy development. The postintervention survey addressed the participants' interest in promoting policies for the use of aromatherapy at their practice sites with the question, "I would like to implement a policy or procedure to utilize essential oils for patients in labor at my facility." Of the respondents, 78.1% agreed with that statement, which is highly encouraging to influence policies across many facilities.

Essential VI: Interprofessional Collaboration

Nurses do not work in a silo. They must work with members of an interprofessional team to achieve health objectives for their patients and community. While this project represented a nursing base, it is important to bring information about essential oils and interventions to all medical team members. A recommendation for follow-up would be offering the educational intervention provided in this project to interested medical doctors, respiratory therapists, and nursing assistants. Successful implementation of an essential oil use policy will need the input of multiple key stakeholders.

Essential VII: Clinical Prevention and Population Health

In reference to population health, the DNP-prepared nurse must translate and transform health issues that affect entire populations and communities. This includes researching, developing, implementing, and analyzing interventions related to cultural diversity, psychosocial, and socioeconomic avenues of health (American Association of Colleges of Nursing [AACN], 2006). This project sought to incorporate cultural dynamics and holistic health

into mainstream medical use. The Food and Drug Administration (FDA) does not regulate essential oils and aromatherapy products. This leaves healthcare providers the onus to educate themselves on the proper and safe way to use and recommend essential oils for their patients (Manion & Widder, 2017).

Essential VIII: Advanced Practice Nursing

Nurses who focus on advanced practice are responsible for enhancing the profession in several key areas encompassed in the DNP essentials. However, the vast number of specialties within the nursing profession inhibits the ability to master all areas of nursing (AACN, 2006). The foundation of advanced practice nursing is applying the nursing process of assessment, diagnoses, interventions, and outcomes assessment in various situations (Leoni-Scheiber et al., 2019). The nursing process is traditionally applied in a single patient situation; however, advanced practice nurses can utilize the format to advance population, organizational, and community health in policies and procedures. This scholarly work intends to further evidence-based interventions gathered from the systematic literature review by identifying and offering solutions to common barriers for essential oils used during labor. This objective met Essential VIII by applying advanced nursing practices in several formats to advance the nursing profession and add to the body of nursing research.

Recommendations for Future Research

This study represented the beginnings of clinical research on how a nurse's perception can influence their advocacy and willingness to support a patient using essential oil during labor. Exploring the nursing acceptance of essential oils is a relatively new concept in the current research literature. There are limited studies that have been conducted and published that evaluate how a healthcare provider's personal views on the effectiveness of essential oils

influence their acceptance as a complementary intervention in a hospital setting. Therefore, there is ample opportunity to explore how a healthcare provider's feelings toward essential oils affect the patient's experience.

Recommendations for future research going forward would be to examine the relationship of personal essential oils use and how the frequency of use correlates with the introduction of essential oils in the hospital setting. Personal accounts gleaned from speaking about this DNP project with nurse colleagues suggest that those who use essential oils in their personal life are more frequently introducing essential oils interventions early in the labor process to benefit their patients' labor experience. This would be an interesting research question to explore further, considering the initial results of this DNP project's conclusions.

Another avenue for exploring this topic would be using an ethnographic, quantitative study to explore motivations for nurses who support essential oils and champion the intervention in a hospital setting and the motivations for nurses who opposed the use of essential oils as a hospital-based intervention. While researching this topic and gathering informal information to create a research plan, one theme continued to present as a barrier to application. This barrier was the presence of intolerances for aromatherapy and certain scents by staff members (Gibson, 2018). While most people were open-minded about aromatherapy intervention, there was strong opposition by a small minority of people, citing extreme allergies and intolerances. A study that looked at barriers from nurses who oppose the intervention would also be an insightful addition to the body of nursing knowledge related to aromatherapy and essential oils use.

This study's findings showed that a younger population of labor nurses and certified nurse midwives were interested in using essential oils for themselves and their patients. There was also a significant response from nurses practicing in a hospital setting. Avenues for

additional research could be examining the acceptance of essential oils in a hospital setting and how that correlates with increased consumer demand from a younger population of women exposed to alternative therapies. The industry of essential oils is expected to be over $22 billion by next year (Ackerman & Chopik, 2020). This may represent an increased consumer demand for essential oils to be present in the labor room.

Conclusion

In conclusion, the goal of this project was to identify how a nurse perceives the complementary and alternative medicine application of essential oils for their patients in labor and to identify if education could address potential barriers for nurses who wish to utilize essential oils. Several studies identified that the lack of education was a significant barrier to nurses feeling comfortable promoting essential oils and aromatherapy for their patients (Manion & Widder, 2017; Pearson et al., 2019; Vitale & Jenner, 2018). This project sought to determine if an educational intervention would enhance a nurse's acceptability of essential oils. The systematic review of literature supported the intervention of essential oils in labor with three best practices: aromatherapy significantly reduces pain in labor, aromatherapy significantly reduces anxiety in labor, and aromatherapy can be used safely in labor. The project was designed to recruit participants who worked in multiple healthcare settings that provide labor and delivery services to gather a larger body of experiences and perceptions. One-hundred and sixty (160) participants responded and completed the requirements for inclusion in the study. The research question that this project sought to answer was: In labor and delivery nurses, does their personal perception of the effectiveness of essential oils increase with education. This project answered that question with a statistically significant finding that education can positively influence registered nurses and certified nurse midwives to promote essential oil use for their patients. The

project demonstrated the eight essentials for DNP graduates by applying advanced nursing practices in the research project's research, development, and implementation. Nurse leaders can utilize the information and implications of this research to develop and support policies and procedures to make essential oils available for laboring patients while focusing on ensuring that nurses have the proper education to support these interventions.

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Appendix A: Social Media Post to Solicit Research Participants

Hello, my name is Joni Beckham, and I am conducting research for my doctoral degree at Abilene Christian University. I am studying nursing perceptions about essential oil use in labor. I would like to invite you to participate in my research.

Inclusions

- Registered Nurses (RN) who care for patients in labor.
- Certified Nurse Midwives (CNM) who care for patients in labor.

Exclusions

- Anyone who does not manage patients in labor.
- Anyone who does not hold an RN or CNM degree.

If you participate in this research, you will be asked to

- Complete an 11 question demographics questionnaire in which you will be asked about inclusion criteria, age range, gender identification, racial identification, practice location and type of facility, and exposure to essential oils.
- Complete a 10 question presurvey about your views on essential oil or aromatherapy use.
- Complete a 20-minute educational activity on essential oil use for women in labor.
- Complete a 10 question postsurvey about your views on essential oil or aromatherapy use after the educational activity.

If you choose to participate and complete the four parts of this study, you will be entered into a drawing for a $50 Amazon gift card at the end of the activity.

If you have any questions for me, you can reach me at xxxxx@acu.edu

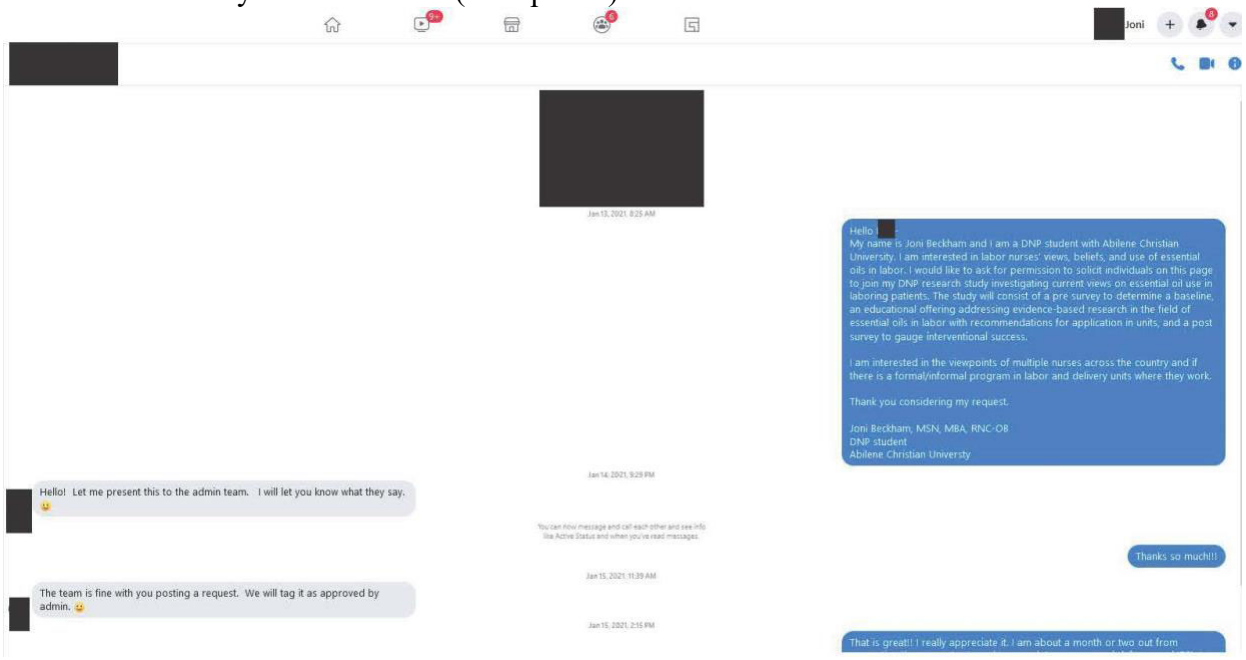
If you would like to participate, please click on this link to be taken to the research project. https://xxxxxxxxxxxxxxxxxxx

Figure A1

Image to Accompany Written Information

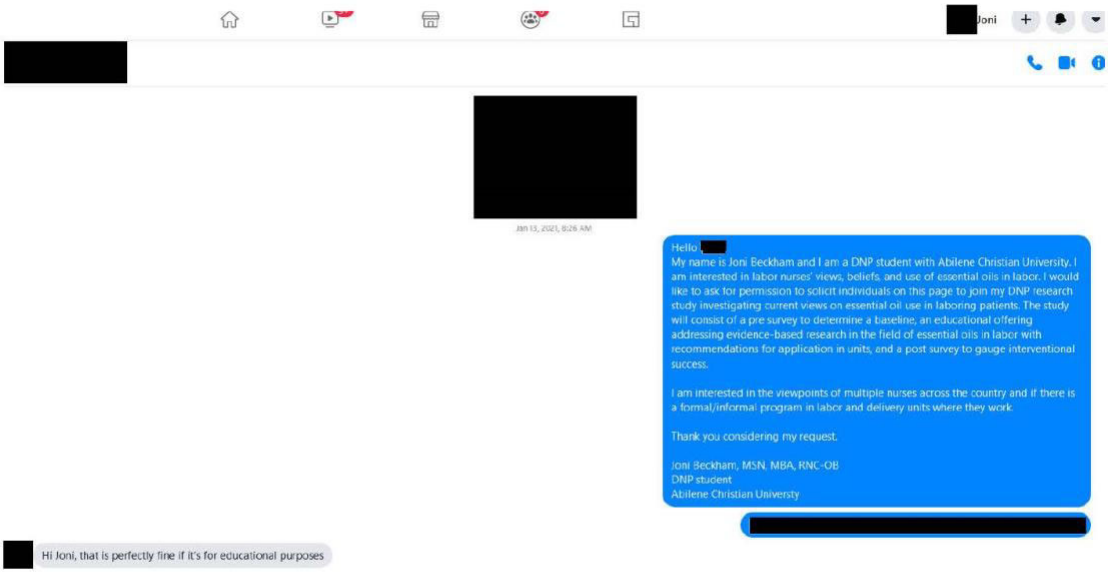
Appendix B: Approval to Solicit Participants From Social Media Professional Group

Labor and Delivery Nurses Rock!! (Group One)



Appendix C: Approval to Solicit Participants From Social Media Professional Group

Labor and Delivery Nurses Rock! (Group Two)



Appendix D: Educational Intervention Slides

Essential Oils in Labor

What nurses need to know

Joni Beckham, MSN, MBA, RNC-OB
Abilene Christian University

Objectives:

- Define essential oil therapy and rationale for its use in labor
- Identify 3 common essential oils used during labor and their effectiveness
- Obtain a basic understanding of the safety considerations when utilizing essential oils
- List potential strategies to incorporate the use of essential oils for patients in labor

What are essential oils?

- Essential oils are plant compounds that are extracted from plants that are shown to have benefitable properties.
- Essential oils are highly concentrated
  - Inhaling the concentrated aroma of plants or herbs initiates impulses that have various effects on the mind and body
    - Simulates hormones
    - Simulates and/or soothes neurological substances (LoBisco, 2016)
  - Sense of smell has a direct pathway to the brain (Buckle et al., 2014)
- Used for hundreds of years for ailments and diseases (Gibson, 2018)
- Utilized across all cultures
- Essential oils can be inhaled– aromatherapy, or used topically in massage or used in bathing water

Making the case for essential oils in the labor room

Do essential oils belong in the labor room?

The National Center for Complementary and Integrative Health (NCCIH) defines complementary as a "non-mainstream practice that is used **together** with conventional medicine" (NCCIH, 2021, pg 1).

All essential oils used in conjunction with direct medical supervision during labor can be considered complementary.

Birthers are increasingly bringing essential oils with them to the hospital – especially if they know they are not provided.

Birth plans can highlight the patient's desire to use essential oils, both as primary pain support and as an adjunct to conventional methods of pain relief.

5

Theoretical Framework

- Mercer's Maternal Role Attainment is the guiding theory that supports this project.
- Women move through stages in the development of their position in the world as mothers (Mercer, 2004).
- The birth experience is a pivotable point in that psychological development that can either facilitate the maternal child bond or harm the maternal child bond (Meighan, 2010).

Figure 1. Image illustrates how the maternal role/identity interacts between the mother, child, and child's outcome within defined microsystems, mesosystems, and macrosystems (Mercer, 2004).

6

Therapeutic effects of essential oils

Decreased pain and anxiety

What does the evidence say?

Aromatherapy reduces pain in labor

- A systematic review conducted byTabatabaeicher and Mortazavi (2020) concluded that aromatherapy might be a viable complementary intervention to decrease both pain and anxiety in labor. The authors noted that women viewed aromatherapy intervention positively and contributed to their labor experience.
- Pirak and Yazdkhasti (2016) found that participants in an experimental group using lavender essential oil had a significant reduction in labor pain thirty minutes following inhalation.
- Makvandiet al. (2017) published a systematic review of studies that specifically singled out the use of lavender essential oil. Three articles were able to indicate a significant decrease in labor pain by the order of0.476[-0.718--0.235], p=0.000.

Aromatherapy reduces anxiety in labor

- Ghiasi et al. (2019) conducted a systematic review of the effects of essential oils on anxiety during labor. Sixteen articles were included which determined that aromatherapy had a positive effect on reducing anxiety in the first stage of labor.
- Mortazavi et al. (2015) and Akbari et al. (2014) both studied the effect of orange essential oil on anxiety in labor using direct inhalation. Each of these studies showed that orange essential oil has the desired effect of reducing anxiety.
- Fakariet al. (2015) conducted a randomized controlled study which demonstrated that geranium did reduce anxiety subjectively, but also with an objective measure of a decreased diastolic blood pressure.

Aromatherapy can be utilized safely

- Hanger and SheppardHanger (2015) highlights the principle that essential oils are highly concentrated and must be used in a cautious manner. Safety is an important component of the application of aromatherapy and care must be taken to include these potent oils in a clinical setting.
- Diluting the essential oils in carrier oils ensure the safety and efficiency of the oils. Smith (2012) included a recommendation to use the essential oil for an hour, taking a break from the use for an additional hour.
- Safety considerations that Gibson (2018) advocates in an expert opinion review stresses that allergies of both the patient and the staff need to be assessed before applying the oils.

8

Common essential oils found in the labor room

Lavender Oil

- Very commonly used
- Encourages relaxation
- Decreases Anxiety
- Decreases perception of pain

Peppermint Oil

- Decreases nausea
- Decreases anxiety
- Can help give a boost of energy during labor
- Can decrease headaches
- Simulates bladder function

Orange Oil

- Decreases anxiety
- Comforting, familiar scent
- Encourages relaxation

9

Safety Considerations when using oils

- Essential oils are concentrated and must be used in a cautious manner (Hanger and Sheppard-Hanger, 2015)
- Do NOT ingest essential oils
- Aromatherapy application is preferred
  - Less is more!!
    - One to two drops is sufficient
- Assess for allergies and intolerance before initiation of aromatherapy or topical application
- Topical application
  - Dilute with carrier oil NEVER apply essential oil topically without diluting first
- Turn off any diffusers and/or remove them from the room at the start of second stage
- Remove any cloth or 2x2 gauze from chest before skin to skin or laying infant on mother's gown

10

Application Suggestions

- Aromatherapy application
  - Diffuse three to four drops in water via an electronic diffuser
  - Passive diffusion using a reed diffuser
  - Apply one to two drops on 2x2 gauze square and allow birther to inhale during contractions as needed
  - Apply one to two drops on 2x2 gauze square and pin to front of gown
- Topical application
  - Dilute one drop in 30ml – 60ml of carrier oil and apply via massage
  - One to two drops in bathwater
    - Ensure that membranes are not ruptured if this option is chosen
  - One to two drops in foot bath

11

What can nurses do to incorporate essential oils in the labor room?

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Self-Disclosures

The presenter has no conflict of interests to disclose. The presenter has no financial relationships with pharmaceutical companies, biomedical device manufacturers, and other healthcare-related for-profit entities. The presenter has no financial relationships with any distributors of essential oil products.

For Questions or Comments – please contact:
Joni Beckham, MSN, MBA, RNC-OB
[redacted]

Appendix E: Project Timeline Graphic

Figure E1

Project Timeline Graphic

Appendix F: IRB Approval With Wavier of Consent Approval

ABILENE CHRISTIAN UNIVERSITY
Educating Students for Christian Service and Leadership Throughout the World

Office of Research and Sponsored Programs
320 Hardin Administration Building, ACU Box 29103, Abilene, Texas 79699-9103
325-674-2885

April 29, 2021

Joni Beckham
Departments of Nursing/Graduate and Professional Studies
Abilene Christian University

Dear Joni,

On behalf of the Institutional Review Board, I am pleased to inform you that your project titled "Nursing Perceptions for Utilizing Essential Oil Application in Labor and the Effect of Targeted Education",

(IRB# 21-054)is exempt from review under Federal Policy for the Protection of Human Subjects.

If at any time the details of this project change, please resubmit to the IRB so the committee can determine whether or not the exempt status is still applicable.

I wish you well with your work.

Sincerely,

Megan Roth

Megan Roth, Ph.D.
Director of Research and Sponsored Programs

Additional Approvals/Instructions:

WAIVER OF DOCUMENTATION OF CONSENT, based on the following justification:

* The research presents no more than minimal risk of harm to subjects, and involves no procedures for which written consent is normally required outside of the research context.

The following are all responsibilities of the Primary Investigator (PI). Violation of these responsibilities may result in suspension or termination of research by the Institutional Review Board. If the Primary Investigator is a student and fails to fulfil any of these responsibilities, the Faculty Advisor then becomes responsible for completing or upholding any and all of the following:

- If there are any changes in the research (including but not limited to change in location, members of the research team, research procedures, number of participants, target population of participants, compensation, or risk), these changes **must be approved by the IRB prior to implementation**.
- Report any protocol deviations or unanticipated problems to the IRB promptly according to IRB policy.
- Should the research continue past the expiration date, submit a Continuing Review Form, along with a copy of the current consent form and a *new* Signature Assurance Form approximately 30 days before the expiration date.
- When the research is completed, inform the Office of Research and Sponsored Programs. If your study is Expedited or Full Board, submit an Inactivation Request Form and a *new* Signature Assurance Form. If your study is Exempt, Non-Research, or Non-Human Research, email orsp@acu.edu to indicate that the research has finished.
- According to ACU policy, research data must be stored on ACU campus (or electronically) for 3 years from inactivation of the study, in a manner that is secure but accessible should the IRB request access.
- It is the Investigator's responsibility to maintain a general environment of safety for all research participants and all members of the research team. All risks to physical, mental, and emotional well-being as well as any risks to confidentiality should be minimized.

For additional information on the policies and procedures above, please visit the IRB website http://www.acu.edu/community/offices/academic/orsp/human-research/overview.html

or email orsp@acu.edu with your questions.

Appendix G: Permission to Use Survey Tool

Permission to Use Inbox ×

Joni Beckham [redacted]
to Amy Pearson

Sun, Jan 31, 8:25 PM

Permission to Use Survey/Questionnaire Tool

January 31, 2021

Dear Ms. Pearson:

I am a doctoral student from Abilene Christian University writing my capstone entitled *Nursing Perceptions for Utilizing Essential Oil Application in Labor and the Effect of Targeted Education*, , under the direction of my capstone committee chaired by Dr. Patricia Sunderhaus, who can be reached at [redacted]

I would like your permission to use the survey instrument found in the study of perspectives on clinican's use of aromatherapy in my capstone project. I would like to use your survey in either print or electronic format under the following conditions:

- I will use the surveys only for my capstone project and will not sell or use it for compensation
- I will include the copyright statement on all copies of the instrument if needed.
- I will send a copy of my completed capstone paper to your attention upon completion of the study, if desired

If these are acceptable terms and conditions, please indicate so by replying to me through e-mail: [redacted]

Sincerely,

Joni Beckham, MSN, MBA, RNC-OB
Doctoral Candidate
Abilene Christian University

Pearson, Amy C [redacted]
to me

Mon, Feb 1, 4:40 PM

Hi Ms. Beckham,

This seems like a reasonable plan. I think as long as you cite the questionnaire in your paper, that would work. Thank you for taking interest in my work, and I would be happy to receive a copy of your project.

Sincerely,

A. Pearson, MD
Assistant Professor
University of Iowa Carver College of Medicine

Appendix H: Survey Questions

Part 1—Demographic Questionnaire:

Do you work directly with laboring patients?

Yes
No * Will be thanked and directed out of the survey

Are you an RN or CNM?

RN
CNM
Neither * Will be thanked and directed out of the survey

What is your age?

A) Under 24
B) 25–35
C) 36–44
D) 45–54
E) 55–64
F) > 65

With what gender do you identify?

Male
Female
Prefer not to say
Other

What is your race?

A) African American/Black
B) American Indian or Alaska Native
C) Asian
D) Biracial/Multiracial
E) Caucasian/White
F) Hispanic/Latino
G) Native Hawaiian or Pacific Islander
H) Other
I) Prefer not to answer

What is your practice location?

A) Urban
B) Suburban
C) Small City
D) Rural

In what type of facility do you primarily work?

A) Acute Care Hospital

B) Free-Standing Birth Center
C) Government Facility (IHS, military, tribal)
D) Other

Have you ever received education on the use of essential oils or aromatherapy?
Yes, as part of a hospital essential oil policy education
Yes, through programs designed for healthcare workers
Yes, through programs designed for community members
Yes, through self-study
No

Have you ever undergone a formal training course to become a certified clinical aromatherapist?
Yes
No

Does your practice site offer essential oils for patients in labor?
Yes, with a formal policy
Yes, no formal policy
No

Have you ever developed or considered championing a formal essential oil program for your practice site?
Yes
No
Maybe

Part 2—Preeducation Survey Questions

Please answer the following questions based on your personal experience and opinions.

In the last 12 months, at least one of my patients has asked me about the use of essential oils for therapeutic purposes.
Agree
Disagree

I feel confident in my ability to educate patients on the safe use of essential oils for therapeutic purposes.
Agree
Disagree

I consider essential oils to be generally safe when used appropriately.
Agree
Disagree
Unsure

My patients who use essential oils typically use them …

A) For wellness and relaxation purposes
B) For the treatment of disease
Both A and B
I do not have patients that use essential oils
Unsure

I believe the use of essential oils may be beneficial …
A) For wellness and relaxation purposes
B) For the treatment of disease
Both A and B
Never

I believe that there is a need for increased clinician training in the use of essential oils.
Agree
Disagree
Unsure

I believe that there is a need for more research on the use of essential oils during labor.
Agree
Disagree
Unsure

I would like to offer essential oil recommendations or therapies to my patients.
Agree
Disagree
Unsure

I would like to undergo training to become certified in clinical aromatherapy.
Agree
Disagree
Already Certified
Unsure

In the last 12 months, I have used essential oils for myself or my family.
Agree
Disagree

Part 3—Educational Activity

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Part 4—Posteducational Survey

I feel confident in my ability to educate patients on the safe use of essential oils for therapeutic purposes.

Agree
Disagree
More confident than before but would still like more education

I consider essential oils to be generally safe when used appropriately.
Agree
Disagree
Unsure

I believe the use of essential oils may be beneficial …
A) For wellness and relaxation purposes
B) For the treatment of disease
Both A and B
Never

I would like to offer essential oil recommendations or therapies to my patients.
Agree
Disagree
Unsure

I am more interested in learning about how essential oils can be used in labor.
Agree
Disagree
Unsure

I would like to implement a policy or procedure to utilize essential oils for patients in labor at my facility.
Agree
Disagree
Unsure
My facility already has a policy or procedure in place for essential oil use in labor.

End of activity
Link included to obtain email address for random appreciation drawing. This is an additional Google Form that is not linked to the answers provided in the research study.

https://xxxxxxxxxxxxxxxxxxxxxx

Question:
Please enter your email address