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# Effects of Comfort Education on Maternal Comfort and Labor Pain

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Effects of Comfort Education on Maternal Comfort and Labor Pain

by

Abby E. Garlock

A capstone project submitted to the faculty of  
Gardner-Webb University Hunt School of Nursing  
in partial fulfillment of the requirements for the degree of  
Doctorate of Nursing Practice

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2015

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## Abstract

A lack of understanding regarding the relationship between comfort education and maternal comfort experienced during labor exists within current literature. This project examined the effects of providing education regarding comfort and comfort options available in the hospital setting on level of maternal comfort during labor. A quasi-experimental pretest/posttest comparison group design was used for this project, in which a convenience sample of 80 participants was randomly assigned into a standard care control group or an educational intervention group. Providing comfort education during admission to the labor and delivery unit did not increase comfort scores or decrease pain scores in the educational intervention group. Providing comfort education did result in change for plans to maintain comfort during labor ( $p = .000$ ), an increased use of comfort measures during labor ( $p = .000$ ), and an increased probability of continuation with original plans for pain control during labor. Educating women about available options for maintaining comfort during labor can allow the nurse to provide care that better supports maternal preferences for labor.

*Keywords:* comfort, labor, childbirth education

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## **CHAPTER I**

### **Introduction**

In an effort to provide enhanced care, nurses in the hospital setting may need to shift the focus of labor support from pain relief to comfort promotion. Current literature infers maternal satisfaction is dependent upon more than creating a painless labor, and rather is contingent upon multiple factors including maternal control and support of maternal preferences for labor and birth (Bryanton, Gagnon, Johnston, & Hatem, 2008; Carlton, Callister, & Stoneman, 2005; Goodman, Mackey, & Tavakoli, 2004; Hardin & Buckner, 2004). Educating women about available options for maintaining comfort during labor in the hospital setting can allow the nurse to reduce pain, improve comfort, and to provide care that better supports maternal preferences for labor.

### **Problem Statement**

There is a limited understanding of the effects of childbirth education on perceptions of pain and comfort during labor and childbirth. There is also limited literature reporting the effects of providing education on comfort options available in the hospital setting to women during labor. Determining the correlation between providing comfort education and perceived comfort during labor will provide valuable information for guiding current obstetrical practice.

### **Justification of Project**

Women within the United States may lack access to comfort-promoting measures during labor and may not be aware that options for promoting comfort exist within the hospital setting (Rooks, 2012). In one study, 62% of women planned to use non-pharmacologic methods of pain control; however only 9% of women were successful in

utilizing non-pharmacologic methods of pain control during labor (Peart, 2008). This low success rate may be related to the lack of maternal awareness regarding comfort measures for use during labor in the hospital setting. At the hospital where the project was conducted, many women reported not being aware of comfort options available in the hospital setting, or discovering the available options only during childbirth education classes. In comparison to the total number of deliveries at the research site, only a few women attend childbirth education classes; thus many women may be unaware of comfort options available in the hospital setting. Education regarding comfort measures that exist in the hospital setting should be available to all women in labor. Providing education regarding options to maintain comfort in the hospital setting may improve pain and comfort scores for women during labor by providing options to maintain comfort. The need for availability and utilization of methods to promote comfort is paramount since the satisfaction a woman experiences with childbirth is directly related to how her birthing preferences are supported during labor and her sense of control during labor (Carlton et al., 2005, Meyer, 2012; Stevens, Wallston, & Hamilton, 2011). Although many healthcare providers may believe that comfort-promoting methods are not as effective or as safe in reducing pain as pharmacologic methods, which is most likely related to the lack of knowledge regarding such comfort-promoting methods, many women find these methods promote comfort by increasing personal control and empowerment during labor (Ventola, 2010). Comfort measures can decrease pain during labor and may shorten the length of labor (Chuntharapat, Petpichetchian, & Hatthakit, 2007; Mollamahmutoglu et al., 2012). The amount of control a woman perceives she maintains during labor is a predictor for increased maternal satisfaction (Goodman et al.,

2004). Also, childbirth is an influential experience that has long-term physical, cognitive, and emotional consequences for the woman giving birth (Carlton et al., 2005).

Therefore, it is important to promote maternal satisfaction with the experience and support maternal birthing preferences by providing education on options available for comfort.

### **Purpose**

The purpose of this project was to determine if, during admission to the labor and delivery unit, providing education on comfort and comfort options available in the hospital setting increases level of comfort during labor. This study was proposed because there is limited use of alternative methods of pain control in the hospital setting for labor. The aim of this study was to determine if providing laboring women with a comfort education brochure and discussing alternative options for maintaining comfort in the hospital setting would be effective in promoting comfort and decreasing pain.

### **Project Question**

Does the introduction of comfort education during admission to the labor and delivery unit increase comfort levels during labor? It was hypothesized that women who receive comfort education regarding the role comfort can have during labor, and understands available options for enhancing comfort in the hospital setting will maintain higher levels of comfort during labor. Current research suggested that a patient's satisfaction related to pain control is more dependent upon the perception that everything possible was done to control the pain, than the actual level of perceived pain (Bryanton et al., 2008; Carlton et al., 2005; Goodman et al., 2004; Hanna, González-Fernández, Barrett, Williams, & Pronovost, 2012). Women who receive the comfort education may

feel that more options are available to control pain, and that healthcare providers are concerned with promoting comfort during labor. Although comfort and pain relief are similar, yet distinct concepts, focusing on educating women about available comfort-promoting options during labor may have implications for improving pain levels and comfort levels.

### **Definition of Terms**

The following terms are defined to prevent confusion and further illuminate the purpose of this proposed study: (a) comfort; (b) pain; (c) comfort brochure; (d) mode of delivery; and (e) comfort methods/alternative methods of pain control. The term comfort implies a positive state of relief, ease, or transcendence (Kolcaba & DiMarco, 2005). Pain is defined as a physical discomfort influenced by sensory, cognitive, and affective components (Melzack, 1993). The comfort brochure refers to a brochure providing the woman in labor with a summary of comfort measures available in the hospital setting that are appropriate and effective for use during labor. Within the scope of this study, the expression mode of delivery is defined as the method of delivery, vaginal, or cesarean. The phrase comfort methods/alternative methods of pain control indicates methods used to relieve pain and provide comfort, which include complementary medicine, biopsychosocial techniques, and psychological/psychosocial techniques (Menefee-Pujol & Wang, 2007).

### **Summary**

Studying the effects of comfort education on maternal comfort and labor pain is necessary to provide information relevant to influencing maternal birth outcomes and maternal satisfaction with the childbirth experience. The results of this study may

determine if education on comfort measures increases level of comfort during labor and decreases level of pain during labor. The information obtained regarding the influence of comfort education on perception of comfort and pain may provide significant evidence regarding emotional influences on physical outcomes.



## CHAPTER II

### Research Based Evidence

Although current literature suggested maternal satisfaction with the childbirth experience is reliant not merely on the absence of pain, a lack of understanding regarding the relationship between education and comfort persists (Bryanton et al., 2008; Carlton et al., 2005; Goodman et al., 2004). The purpose of this project was to determine if providing education upon hospitalization regarding comfort and comfort options available in the hospital setting increases level of comfort during labor. Determining the effect that comfort has during childbirth can illuminate nursing interventions that support maternal preferences, such as providing education on available options within the hospital setting to enhance comfort.

### Review of Literature

A literature search was conducted utilizing the Cochrane and Cumulative Index to Nursing and Allied Health Literature (CINAHL), Ovid, PubMed, Area Health Education Center (AHEC) digital library, and the search engine Google. Using the terms “comfort,” “comfort theory,” “Kolcaba,” “labor,” “childbirth,” “maternal satisfaction,” “birth outcome,” “education,” and “pain” revealed four current qualitative studies and 17 current quantitative studies ranging from the year 2004 to 2014. No studies were found that related childbirth education to maternal comfort during the childbirth experience. No specific research articles were found that used Kolcaba’s Theory of Comfort for evaluating the degree of comfort for women during labor. Eleven of the studies were conducted within the United States, three studies in Canada, two studies in Australia, one study in Jordan, one study in Scotland, one study in Sweden, one study in Thailand, and

one study in Turkey. This literature review identified the relationship between comfort measures and labor outcomes, the relationship between comfort methods and maternal perception, and the effects of childbirth education on perceptions of labor. This literature review also illustrated predictors of maternal satisfaction or reports of comfort during childbirth.

### **General Comfort**

Apostolo and Kolcaba (2009) utilized a quasi-experimental design to examine the effects of guided imagery on comfort, anxiety, depression, and stress of psychiatric patients. A sample group of 60 short-term inpatient psychiatric patients with depressive disorders was utilized for this study. Comfort scores were collected using the Psychiatric Inpatient Comfort Scale, which demonstrated a Cronbach's  $\alpha$  from .87 to .93.

Depression, anxiety, and stress scores were measured using the Depression, Anxiety, and Stress Scales, which demonstrated a Cronbach's  $\alpha$  from .93 to .95. Apostolo and

Kolcaba (2009) reported guided imagery significantly improved comfort ( $F = 4.42, p = .04$ ) while decreasing depression, anxiety, and stress over time ( $F = 11.76, p = .00$ ).

Increased level of comfort was highly predictive of decreased levels of depression, stress, and anxiety ( $r = -0.73, p = .00$ ). Kolcaba's Comfort Theory served as a framework for this research in assessing the contexts of physical comfort, psychospiritual comfort, sociocultural comfort, and environmental comfort in relationship to relief, ease, and transcendence. The concepts of health-seeking behavior, comfort, and comfort measures were used in designing the guided imagery intervention and Psychiatric Inpatient Comfort Scale.

Dowd, Kolcaba, Steiner, and Fashinpaour (2007) used a four group randomized, experimental design to determine if healing touch, coaching, or a combination of healing touch and coaching influence comfort and stress in younger college students. A sample group comprised of 52 students self-identified as having stress-related discomforts in a Midwest state university was used for this study. Stress responses were gathered using a numerical scale for stress and the Stress Questionnaire, which demonstrated an average Cronbach's  $\alpha$  of .91. Comfort responses were obtained using a numerical scale for comfort and the Healing Touch Comfort Questionnaire, which demonstrated an average Cronbach's  $\alpha$  of .93. Dowd et al. (2007) reported that coaching produced a significant increase in comfort ( $q = 2.7, p = .05$ ) compared to the control group. Although not significant long-term, healing touch produced better immediate results on stress, whereas coaching had better long-term effects on stress reduction. All interventions produced a significant short-term effect in reducing stress ( $p = .0001$ ). Kolcaba's Comfort Theory guided the researchers in assessing the contexts of physical comfort, psychospiritual comfort, sociocultural comfort, and environmental comfort in college students reporting stress-related symptoms. The concepts of healthcare needs, comfort measures, and comfort were used in designing the research interventions of healing touch and coaching.

A quasi-experimental design was utilized by Kolcaba, Schirm, and Steiner (2006) to examine the effects of hand massage on the comfort of nursing home residents. A sample group of 60 participants from two Midwest nursing homes was used for this study. Thirty-five participants were randomized into the experimental group and 25 participants were randomized into the control group. Comfort and satisfaction scores were collected utilizing the General Comfort Questionnaire, which had a Cronbach's  $\alpha$

of .88, and a satisfaction scale. Data was collected at three different times over a period of five weeks. Kolcaba et al. (2006) noted no significant findings between the group's comfort levels ( $F = 2.13, p = .15$ ) or comfort levels over time ( $F = 1.24, p = .29$ ). There was no significant difference in comfort level at baseline ( $t = -1.11, p = .27$ ), or at the third data collection time ( $t = -.50, p = .62$ ). However, there was a significant difference between the treatment group and the control group at the second data collection time, with the treatment group having a higher level of comfort ( $F = 1.86, p = .07$ ). The treatment group had a greater increase in mean satisfaction over time compared to the control group, conversely, it was not significant ( $F = .22, p = .64$ ). Both groups had a significant increase in mean satisfaction scores at the third data collection time compared to baseline ( $F = 7.66, p = .008$ ). Kolcaba's Theory of Comfort was utilized as a framework to guide this study. The domains of physical comfort, psychospiritual comfort, sociocultural comfort, and environmental comfort were addressed in relationship to the concepts of comfort and health-seeking behaviors. Kolcaba et al. (2006) proposed that increasing the comfort of nursing home residents would promote health-seeking behaviors that would ultimately improve outcomes.

Kolcaba, Dowd, Steiner, and Mitzel (2004) used a randomized experimental design to explore the efficacy of hand massage in enhancing the comfort of hospice patients. Participants consisted of 31 adult hospice patients, with minimum Karnofsky scores of 40, who were randomized into treatment and comparison groups. The treatment group received a hand massage twice a week for three weeks. The Hospice Comfort Questionnaire, Cronbach's  $\alpha$  of .65, and System Distress Scale, Cronbach's  $\alpha$  of .80, were used to examine comfort and distress related to noxious sensations. Data was

collected once a week for three weeks before the hand massage was administered. No significant differences were noted over time between the treatment group and control group for comfort ( $F = 0.837, p = .445$ ) or distress symptoms ( $F = 0.336, p = .698$ ). Interestingly, the treatment group experienced a slight increase in comfort until death, whereas the control group had a steady decline in comfort until death. The concepts of healthcare needs, comfort measures, and comfort were used in designing the research interventions of hand massage for hospice patients.

### **Comfort Effects on Labor**

Chuntharapat et al. (2007) explored the effects of yoga during pregnancy on maternal comfort, labor pain, and birth outcomes using a randomized trial. A sample of 74 primigravid women in Thailand was randomized and divided equally into treatment and comparison groups. Data regarding comfort and labor pain was collected using the Visual Analog Scale to Total Comfort, the Visual Analog Sensation of Pain Scale, the Maternal Comfort Questionnaire, and the Pain Behavioral Observation Scale. Comfort and pain scores were obtained using the visual analog scales at three precise time points during labor. The Maternal Comfort Questionnaire was completed by the participant two hours after delivery. The investigators completed the Pain Behavioral Observation Scale at the same time intervals of the visual analog scales. The experimental group reported significantly lower pain scores and significantly higher comfort scores than the control group at all three time measurements ( $p < .05$ ). The observational pain scores completed by the researchers were also significantly lower in the experimental group compared to the control group at all three time measurements ( $p < .05$ ). A significant decrease in the length of the first stage of labor ( $p < .05$ ) was noted in the experimental group in

comparison to the control group. However, the length of second stage labor was not significantly different between groups. There were no significant differences between Apgar scores or the use of pharmacologic pain medications between groups. Practicing yoga during pregnancy can enhance maternal comfort while decreasing the perception of maternal pain experienced during labor, and may shorten the first stage of labor. The limitations of this study included a small sample size, and a sample group that may not be generalizable to all pregnant women in labor. It is also difficult to determine if the participants in the experimental group had shorter labor because they were more comfortable, or if they were more comfortable because they had shorter labors. The strengths of this study included the completion of a State-Trait Anxiety Inventory by participants prior to randomization to ensure that participants were distributed evenly in regards to anxiety levels to avoid bias of the results, interventions at scheduled times during pregnancy, and measurements administered at precise times during labor.

Citkovitz et al. (2009) assessed the effects of acupuncture during labor using a case-control pilot study in a United States hospital. A convenience sample of 45 female participants ages 18-40, gestational age 37-41, experiencing uncomplicated singleton pregnancies, and presenting with cervical dilation between 2-5cm were used for data analysis. Data were gathered concerning mode of delivery, Apgar scores, use of analgesia, adverse events, oxytocin rate, duration of second stage labor, and rate of episiotomy. Postpartum satisfaction surveys were used to assess if participants perceived acupuncture to help during labor. Participants were compared to 127 matched historical controls. Women in the acupuncture intervention group were significantly less likely to have a cesarean delivery compared to the control group ( $p = .004$ ). There were no

statistically significant effects on Apgar scores, use of analgesia, adverse events, oxytocin rate, duration of second stage labor, and rate of episiotomy between the acupuncture and control groups. The majority of participants reported that acupuncture helped during labor (87%). The strengths of this study included using a semi-standardized approach to select acupuncture sites based on symptoms or indication. Limitations of this study included the small sample size, non-randomized selection of participants, a case-control design which did not control for a possible placebo effect, possible selection bias, and wide variability of participant variables (gravida, analgesia choice, and induction/augmentation). In addition, limitations to the case-control selection may exist.

Dahlen et al. (2007) used a randomized controlled trial to examine the effects of warm packs applied to the perineum during second stage labor. A sample of 717 nulliparous women in Australia was engaged, 360 of which were randomly selected to receive warm packs applied to the perineum. Perineal trauma was defined as any laceration greater than first degree that required suturing. Because the participants and the midwives assisting the labor could not be blinded to the treatment, an independent midwife was used to assess the trauma and need for suturing after the birth. Data regarding pain was collected when giving birth, and on the first and second days postpartum. The participants were also interviewed at six weeks and three months to gather information regarding pain, sexual intercourse, incontinence, and breastfeeding. There was no significant difference between the treatment and comparison groups regarding the number of women requiring suturing or in the rate of perineal trauma. However, there was a significant decrease in the number of women in the treatment group sustaining third or fourth degree lacerations ( $p = .02$ ). Pain scores were

significantly lower in women receiving the warm packs both during labor and on the first and second day's postpartum ( $p < .001$ ). There were no differences in pain scores between groups at six weeks and three months postpartum. A significant decrease in urinary continence was noted at three months in the group that received standard care ( $p < .001$ ). Perineal warm packs applied during the second stage of labor are effective in reducing pain during second stage and provide benefit into the postpartum period. Limitations of the study included the exclusion of multiparous women and unrecorded length of time the warm packs were applied to the perineum. Participants and the midwives could not be blinded to the group they were allocated, which may have resulted in bias and disappointment in the control group (Dahlen et al., 2007). The study also took over five years to complete. During this time period intervening variables, such as hospital culture changes, turn over, and changes in methods of pain medication administration could have affected the results of this study. Strengths of this study included the use of participants with various cultural and ethnic backgrounds, and use of a large sample size.

Khresheh (2010) utilized a non-randomized comparison design to examine the effects of support from a relative during the first stage of labor on the duration of labor, use of pharmacologic pain relief, mode of delivery, and maternal perception of the childbirth experience. A convenience sample of 226 nulliparous women in Jordan with a single term fetus expecting an uncomplicated vaginal birth was used. Data were gathered using a demographic form and a short interview during the first postpartum day. Women in labor who received support during the first stage of labor were significantly less likely to request pharmacologic pain relief ( $p < .001$ ) and more likely to perceive a positive



birth experience ( $p = .020$ ). There was no significant effect on duration of labor or mode of delivery. Women who received support from a relative during labor were more likely to have positive feelings about the childbirth experience. The strength of the study includes the use of a comparison group, and the use of maternal interviews to provide additional information regarding the outcomes of the study. The limitations of this study included the small sample size, non-randomized selection of participants, and use of a brief Likert-scale interview to examine feelings about the birth instead of an in-depth interview.

Mollamahmutoğlu et al. (2012) employed the use of a prospective clinical trial research design to investigate the effects of water on labor, birth, and newborn outcomes in pregnant women in Turkey. Using a sample of 610 pregnant women, data regarding the length of labor, requirement for induction and episiotomy, trauma to perineum, Apgar scores, admissions to the neonatal intensive care unit (NICU), and visual analog scale pain scores were collected. Participants were self-selected into three groups: (a) water birth group, (b) conventional vaginal delivery group, and (c) vaginal birth with epidural group. The duration of first stage labor was significantly shorter in the conventional vaginal delivery group ( $p < .001$ ), although the duration of second and third stage labor were shortest in the water birth group ( $p < .001$ ). The water birth group had significantly lower rates of induction and episiotomy compared to the conventional vaginal delivery and vaginal birth with epidural delivery groups ( $p < .001$ ). However, perineal lacerations, although most were minimal, were significantly higher in the water birth group ( $p < .001$ ). No significant differences in NICU admission rates were noted between groups. Pain scores were significantly lower in the water birth group ( $p < .001$ ) when

compared to both the conventional vaginal delivery group and the vaginal delivery with epidural group. The comfort of laboring in water significantly diminishes the pain of labor while reducing the need for obstetric interventions, shortening the length of second and third stage labor, and maintaining positive fetal outcomes (Mollamahmutoğlu et al., 2012). Limitations of this study include a patient population that may not represent all pregnant women experiencing labor, especially in regard to pain scores, perineal trauma, and lack of randomization of participants. This study fails to mention what standards of care were included as usual care in the comparison groups. Since women were educated about water births prior to labor, pain perception may have been reduced due to a placebo effect. Another limitation is the inclusion of multiparous women without analysis of demographics or subgroups based on parity to determine if parity influenced the data. Strengths of this study included a large sample size, and the ability to assess several outcomes.

A randomized controlled trial was utilized by Ragnar, Altman, Tydén, and Olsson (2006) to compare the duration of second stage labor and maternal experience using two upright delivery positions. A sample population of 271 primiparous women from Sweden was randomly allocated to a kneeling position or a sitting position during the second stage of labor. Analysis included the main outcome of the length of the second stage of labor and a self-reported questionnaire containing questions regarding the maternal delivery experience. There was no significant difference in duration of the second stage of labor between the kneeling position and the sitting position. Maternal survey results demonstrate the sitting position during second stage was associated with higher levels of delivery pain ( $p = .01$ ), an increased perception of the length of second

stage ( $p = .002$ ), less comfort for giving birth ( $p = .03$ ), and more feelings of vulnerability ( $p = .05$ ) and exposure ( $p = .02$ ) as compared to the kneeling position. Strengths of this study include a randomized design, inclusion of exclusively primiparous participants, and spontaneous labor. Limitations of this study include the inability to generalize findings to other populations and subjectivity for the classification of entry into second stage labor.

Stark (2013) utilized a quasi-experimental pretest-posttest single group design to determine the effectiveness of therapeutic showering during labor in relationship to pain, coping, tension, anxiety, relaxation, and fatigue. A convenience sample of 24 American women with uncomplicated singleton pregnancies was used to examine the effects of 30 minutes of therapeutic showering during labor using the numerical rating scale to measure pain. It is unclear what tool was used to measure coping, tension, anxiety, relaxation, and fatigue. Showering during labor produced a significant reduction in tension ( $p = .003$ ) and anxiety ( $p = .002$ ), and produced a significant increase in relaxation ( $p < .001$ ) and coping ( $p = .006$ ). There was not a significant reduction in pain and fatigue. None of the participants had adverse physiologic effects after 30 minutes of showering. Strengths of this study include a pretest-posttest design and time-controlled intervention. Limitations of this study included the small convenience sample, the one group design, lack of randomization of participants, no measures assessed during the intervention, and assessments taken during various points of labor instead of specific dilation times.

### **Childbirth Education Related to Labor**

A single-arm repeated measures design was employed by Byrne, Hauck, Fisher, Bayes, and Schutze (2014) to determine the effectiveness of Mindfulness-Based

Childbirth Education of maternal self-efficacy and fear of childbirth. A sample size of 12 pregnant Australian women completed a prenatal eight-week course on Mindfulness-Based Childbirth Education. Prior to beginning the course, participants completed a pretest, and then completed the posttest at the end of the eight-week course. Participants were questioned within 12 weeks following birth to gather data regarding birth outcomes, depression, anxiety, stress, mindfulness awareness, and childbirth fear. Participants had a significant increase in self-efficacy ( $p < .001$ ) and positive expectations for birth ( $p = .02$ ) in comparison of pretest and posttest scores. Participants had a significant decrease in fear of birth ( $p < .001$ ) in comparison of the pretest and posttest scores. In comparing the pretest scores to post-delivery scores, participants had a significant improvement in mindfulness ( $p = .02$ ), fear of birth ( $p = .043$ ), anxiety ( $p < .001$ ), and stress ( $p = .036$ ). There was no significant reduction in depression in comparing pretest scores to post-delivery scores. Limitations of this study included a small sample size, lack of control group, and lack of control over several confounding variables. Strengths of this study included use of well-validated measures for scoring and the use of a standardized intervention.

Koehn (2008) used a qualitative grounded theory study to describe and analyze contemporary women's perceptions of the role of childbirth education in preparing for birth. Audiotaped interviews were collected from a snowball sample of nine pregnant women in Kansas and analyzed using constant comparative analysis. Interviews lasted 30-90 minutes and were performed three times prior to childbirth education classes, once during childbirth education classes, and once again within two weeks after birth. The underlying basic social psychological process of "Negotiating the Journey" was

identified. Phases of the underlying journey emerged, “Exploring the Unknown,” “Making It Real,” and “Sensing the Readiness.” Overall, the relationship between childbirth education and readiness for the childbirth experience was supported by the participants’ narratives. Childbirth classes were viewed as a method to help define and clarify the birthing process, and to help prepare for motherhood. Limitations of this study included the homogenous sample, and lack of standardization of classroom content and qualifications of instructors. Strengths of this study included inclusion of participants of varying ages and from varying sites.

Martin and Robb (2013) utilized a qualitative content analysis design to interpret childbearing women’s views about the importance of childbirth education in preparation for childbirth. A convenience sample population of 228 postnatal women in Scotland who had experienced uncomplicated pregnancies at term was surveyed. Emerging themes included “Better to be prepared,” “Prepared through previous experience,” and “In labour nothing goes as planned.” Women may perceive more value in childbirth education when there is a feeling of education being critical to outcomes. Limitations of this study included the limited depth of analysis related to the data collection survey method, and a convenience sample. Strengths of this study included a large sample size and use of a standardized survey to collect responses.

Stoll and Hall (2012) examined the relationship between attendance at childbirth classes and maternal factors using a descriptive design. The Wijma Delivery Expectancy/Experience Questionnaire – A and the Spielberger’s State Anxiety Inventory questionnaires were used to collect data from a sample population of 624 Canadian women regarding maternal characteristics, psychological state, type of maternity care

received, and prenatal expectations for obstetric interventions. Maternal charts were reviewed after delivery to gather data on the actual rate of obstetric interventions, and breastfeeding initiation. Older, more educated, nulliparous women were more likely to attend childbirth education classes than younger, less educated, multiparous women. Attending childbirth education classes was associated with less intention to request a cesarean delivery ( $p = .001$ ), and higher rates of vaginal births for nulliparous participants ( $p = .004$ ). Attendance at childbirth education classes did not have a significant effect on self-reported anxiety. Limitations of this study included lack of control for confounding variables, lack of standardization of childbirth classes attended, and grouping of participants into attenders and non-attenders without taking into account other prenatal information sources. Strengths of this study included the large sample size and use of standardized questionnaires.

### **Maternal Childbirth Perception**

A longitudinal, descriptive study was utilized by Beebe, Lee, Carrieri-Kohlman, and Humphreys (2007) to describe the levels of anxiety and self-efficacy for childbirth. A sample population of 35 English-speaking nulliparous women in the United States was consented for data analysis. All participants were 38 weeks gestation or greater, and had attended childbirth education classes. The Spielberger Trait Anxiety Inventory, Prenatal Self-Evaluation Questionnaire, Childbirth Self-Efficacy Inventory, McGill Pain Questionnaire-Short Form, postpartum interviews, and medical records review were used to collect data. Measures of anxiety were inversely related to self-efficacy for childbirth. Women with high levels of anxiety had less confidence in their abilities to perform relaxation techniques ( $p < .01$ ), and women who used a higher number of cognitive

coping strategies had lower total pain scores ( $p = .04$ ). Women with higher anxiety scores had higher pain scores, which may be related to the lack of confidence in the ability to perform relaxation techniques. Limitations of this research included a small convenience sample with homogenous characteristics, the interval of time between the prenatal measures and onset of labor varied between participants, and retrospective recall of information. Strengths of this study included the use of standardized measurements and the ability to assess multiple variables.

Bryanton et al. (2008) used a prospective cohort design to determine variables that are predictive of women's perceptions of the childbirth experience and to examine any variation dependent upon the type of birth experienced. A sample population of 652 Canadian women and their newborns were used to collect data using a questionnaire and chart review within 12 to 48 hours postpartum. Out of the 20 predictors of women's perceptions of childbirth, the variables most predictive of birth perception for all types of birth ( $p < .00$ ) were degree of awareness, relaxation, and control; helpfulness of partner support; being together with the infant; and type of birth. The majority of these predictors of maternal satisfaction can be guided by nursing interventions. The degree of awareness of the events occurring during labor and birth was the strongest predictor of perception for all types of births (vaginal, planned cesarean birth, and emergency cesarean birth), which indicated that maintaining control during labor is highly meaningful to women. Limitations of this study included a population sample with an inadequate number of women having cesarean births and obstetric complications, a population that may not represent the general beliefs and attitudes of all pregnant women in labor, a general birth environment that employs low obstetric interventions, and the

possibility that non-participants with complications might have expressed more negative feelings about the birth experience, which could have resulted in altered birth perception predictor scores. Strengths of this study were the ability to assess several outcomes at once and the use of a large sample size.

Cook and Loomis (2012) utilized a one-group qualitative, descriptive design to investigate the methods women use to develop a birth plan, and how changes to the initial plan effect the overall perception of the birth experience. A convenience snowball sample of 15 Canadian women who had given birth within the past two years was interviewed. Women created birth plans, intentionally or unintentionally, and referred to friends, family, and medical professionals in the initial planning and negotiation of the birth plan. The degree of specificity of the birth plan varied when compared to the actual birth experience. Negative birth experiences occurred in relationship to the degree of change to the birth plan and the amount of control a woman maintains over the changes. Women who reported more drastic changes in the birth plan, with a limited amount of control also reported more negative birth experiences. Limitations of this study included the use of a convenience snowball sample, a non-generalizable sample population, and a birth environment specific to the study location. Strengths included the inclusion of primiparous and multiparous women, women with variation in the provider type chosen for birth, and an audit trail kept by the primary researcher.

Fair and Morrison (2012) used a repeated measures exploratory design to explore the relationship between perceptions of prenatal control, expectations for childbirth, experienced control in labor, and the effect on birth satisfaction. A sample population of 31 primiparous women between 26 to 40 weeks gestation in the United States was used



to collect data with standardized interviews prior to birth and at six weeks following birth. Experienced control was a significant predictor of birth satisfaction with high levels of control correlating with high level of satisfaction ( $p < .001$ ). Complications during labor significantly decreased for both experienced control in labor ( $p = .007$ ) and birth satisfaction ( $p = .001$ ). Limitations of this study included a small sample size, participants from the same geographical location, and lack of inclusion of multiparous women. Strengths of the study included use of standardized measurements and analysis of various relationships of predictors.

Hardin and Buckner (2004) used a qualitative descriptive study to identify perceived positive characteristics of women who had an un-medicated childbirth within the United States. A convenience sample of 17 women who had experienced an un-medicated childbirth within the past 12 months was interviewed. All participants reported a positive childbirth experience and an overriding theme of the ability to maintain physical and environmental control was noted. Feelings contributing to a positive birth experience included physical comfort, emotional support, and the ability to maintain control over the birth experience. Being able to move freely was a vital factor related to a positive birth experience. Limitations of this study included the varying length of time between the birth and the interview, and lack of analysis of women who planned an un-medicated birth but were unsuccessful. Strengths of this study included variation in provider type, parity, age, and length of labor.

A descriptive, correlational design was employed by Hunter (2009) to examine the concept of “being with woman” during labor. A convenience sample of 238 American postpartum women who had a nurse-midwife as the primary caregiver during

labor and birth was surveyed using the Positive Presence Index measurement (PPI). The birth environment was a significant predictor of higher PPI scores ( $p < .03$ ) with women who labored and gave birth in a birth center environment having higher scores.

Limitations of this study included a convenience nonprobability sample, unequal ethnic distribution, and lack of analysis between preexisting differences between women who delivered in an in-hospital birthing center compared to a standard labor unit. Strengths of this study included the large sample size and analysis of multiple variables.

### **Gaps in Literature**

Limited research articles were found that related comfort education to perceived comfort and pain during childbirth. Therefore, an existing gap in the literature is inferred regarding the relationship between comfort education and perceived comfort and pain during labor. The most significant gap in literature is the lack of research that addresses the relationship between providing comfort education to women in labor and the effects on perceived comfort.

### **Strengths and Limitations of Literature**

The literature provided evidence that comfort measures increase comfort, reduce anxiety, and reduce stress (Apostolo & Kolcaba, 2009; Dowd et al., 2007; Kolcaba et al., 2006; Kolcaba et al., 2004). The literature also provided strong evidence that support the positive effects of comfort on pain during labor (Chuntharapat et al., 2007; Citkovitz et al., 2009; Khresheh, 2010; Mollamahmutoğlu et al., 2012, Ragnar et al., 2006; Stark, 2013) and the possible effects of pain reduction on postpartum outcomes (Dahlen et al., 2007). Current literature inferred that childbirth education can have positive effects on maternal expectations and perceptions of the birth experience (Byrne et al., 2014; Koehn,

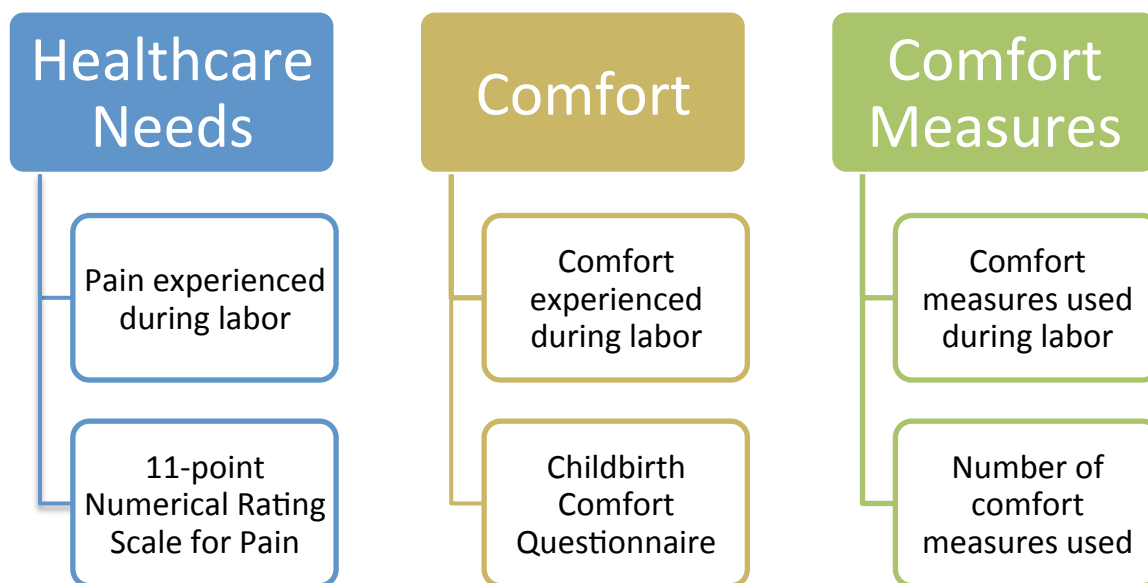
2008; Martin & Robb, 2013; Stoll & Hall, 2012). The literature also inferred maternal perception can improve pain scores and satisfaction with the birth experience (Beebe et al., 2007; Fair & Morrison, 2012; Hunter, 2009) and the maintenance of choice and maternal control as the most significant predictors of maternal satisfaction during the childbirth experience (Bryanton et al., 2008; Cook & Loomis, 2012; Hardin & Buckner, 2004). Limitations of the literature included the lack of randomization (Apostolo & Kolcaba, 2009; Beebe et al., 2007; Byrne et al., 2014; Citkovitz et al., 2009; Cook & Loomis, 2012; Hunter, 2009; Khresheh, 2010; Martin & Robb, 2013; Mollamahmutoğlu et al., 2012), small sample sizes (Byrne et al., 2014; Chuntharapat et al., 2007; Citkovitz et al., 2009; Fair & Morrison, 2012; Khresheh, 2010; Kolcaba et al., 2004), and lack of generalizability in regard to ethnicity, culture, and other variables (Bryanton et al., 2008; Byrne et al., 2014; Citkovitz et al., 2009; Cook & Loomis, 2012; Chuntharapat et al., 2007; Fair & Morrison, 2012; Hardin & Buckner (2004); Hunter, 2009; Koehn, 2008; Mollamahmutoğlu et al., 2012; Ragnar et al., 2006; Stoll & Hall, 2012). In addition, many studies did not evaluate the differences between multiparity in comparison to primiparity (Citkovitz et al., 2009; Dahlen et al., 2007; Fair & Morrison, 2012; Mollamahmutoğlu et al., 2012; Ragnar et al., 2006).

### **Theoretical/Conceptual Framework**

Kolcaba's Theory of Comfort is a mid-range theory in which nursing intervention is the comforting action and comfort results from the nursing intervention (Apostolo, 2009). Kolcaba's theory defines holistic comfort in nursing as "the immediate state of being strengthened through having human needs for relief, ease, and transcendence addressed in four contexts of experience" (Kolcaba & DiMarco, 2005, p. 188). Relief

refers to having the discomfort alleviated, whereas ease is the absence of specific discomfort (Kolcaba & DiMarco, 2005). Transcendence refers to the ability of overcoming discomforts knowing the discomfort cannot be avoided or alleviated (Kolcaba & DiMarco, 2005). The four contexts of experience include physical, psychospiritual, sociocultural, and environmental (Kolcaba & DiMarco, 2005). Kolcaba's theory advocates that a patient's needs arise from a stimulus that can generate negative tension (McEwen & Wills, 2007). By increasing comfort, the nurse can assist the patient in engaging positive tensions while reducing negative tensions (McEwen & Wills, 2007). Increasing comfort can enhance health-seeking behaviors in the patient and family, thus promoting health and further enhancement of comfort (McEwen & Wills, 2007). The Theory of Comfort states that humans have holistic responses to complex stimuli, comfort is the desirable nursing outcome, humans actively strive to maintain comfort, enhanced comfort strengthens patients to continue health-seeking behaviors, patients who actively participate in health-seeking behaviors are more satisfied with their healthcare, and institutional integrity is patient-focused in providing care (Tomey & Alligood, 2002). The major concepts of Kolcaba's Theory of Comfort included healthcare needs, comfort measures, intervening variables, comfort, health-seeking behaviors, and institutional integrity (Tomey & Alligood, 2002) (Figure 1). The key concepts from Kolcaba's Theory of Comfort that apply to the labor and delivery setting are healthcare needs, comfort, and comfort measures. Theoretically, healthcare needs can be defined as pain experienced by the women in labor. Comfort consists of physical relief from pain and emotional transcendence over discomfort, and is provided by

numerous factors within the labor setting including atmosphere, psyche, nursing support, and family support.



*Figure 1.* Conceptual-Theoretical-Empirical Diagram

### Summary

Due to the great impact that childbirth can have on the mother's physical health, emotional health, and maternal-child attachment, it is paramount to increase maternal satisfaction with the childbirth experience (Carlton et al., 2005; Goodman et al., 2004). Determining the complex relationship between education on comfort and pain during labor will allow for a more conclusive understanding of the maternal experience of childbirth. The premise of pain is closely associated with childbirth, although the idea of comfort during childbirth fails to imbue similar connotations. Notwithstanding, comfort is a basic human need, and the experience of comfort during labor depends not only on the physical relief of pain, but also on the balance of emotional and cognitive wellbeing

(Schuiling, Sampsele, & Kolcaba, 2011). The idea that the absence of pain in labor should equal a positive perception of the childbirth experience inundates current obstetrical practice, and is evidenced by the current epidural rate in the United States of 61% (Osterman & Martin, 2011). However, a woman's satisfaction with the experience of childbirth is directly related to how her birthing preferences are supported during labor, and personal control during labor, not the relief of pain (Bryanton et al., 2008; Carlton et al., 2005; Goodman et al., 2004). The predictors of satisfaction, specifically supporting maternal birth preferences and maintaining control during labor, suggested that promoting maternal satisfaction involves more than establishing the absence of pain during labor, but rather a multi-faceted approach to increasing comfort during labor. Nurses need to shift the focus of providing care during childbirth from pain relief to comfort promotion. Understanding the effect of encouraging comfort during labor can increase maternal satisfaction with childbirth, and illuminate a relationship between providing options for comfort and maternal comfort and control.

## **CHAPTER III**

### **Project Description**

The utilization of comfort-promoting techniques during labor is necessary to give the woman in labor a sense of control over the childbirth experience that can positively impact her level of satisfaction with her personal performance, nursing care, and the healthcare institution (Carlton et al., 2005; Meyer, 2012; Stevens et al., 2011). Women may be overwhelmed at the level of discomfort experienced during childbirth, despite the use of pharmacological pain relief methods, and may feel dissatisfaction with the care provided by the healthcare team. The purpose of this project was to determine if providing education on comfort and comfort options available in the hospital setting increases level of comfort during labor, where comfort is defined as a positive state of relief, ease, or transcendence. By understanding the impact comfort measures can have on comfort and pain levels, nurses can assist women during childbirth with understanding the importance of comfort during labor.

### **Project Implementation**

The purpose of this project was to determine if, during admission to the labor and delivery unit, providing education on comfort and comfort options available in the hospital setting increases level of comfort during labor. This project compared comfort scores and pain scores between the treatment and comparison groups. A brochure, created for the purpose of this project, provided information about comfort during labor and various comfort techniques available within the hospital setting. The Childbirth Comfort Questionnaire was used, with permission, to record perceived comfort scores. An 11-point numerical rating scale (NRS), currently used in the hospital setting, was used to evaluate pain scores.

### **Setting**

The research project was conducted in a 241-bed non-profit hospital located in the Piedmont region of western North Carolina. The facility's labor and delivery unit consists of eight labor and delivery suites, and averages 90 births per month. The labor and delivery unit currently encourages family presence during the labor and birth, skin-to-skin contact following birth, and rooming-in with the infant. Deliveries are attended by one of six physicians or one of two midwives, all of whom are affiliated with the hospital. For the 2014 year, the current rate of induction was 32%, rate of cesarean delivery was 32%, and rate of epidural usage was 55% (S. Davis, personal communication, November 24, 2014).

### **Sample**

Anticipated sample size was 80 participants, and was divided into 40 participants in the control group and 40 participants in the intervention group. To obtain an alpha ( $\alpha$ ) of .05, power of .81, and a medium effect size of 0.6 (Cohen's  $d$ ), a sample size of 72 participants was determined adequate by G\*Power, a power analysis program. A goal of 80 participants obtained over the timeframe of three months was set to allow for participants who decide to withdraw from the study or to account for missing data. Each month, an average of 90 deliveries is recorded at the hospital site, of which an average of 50 meets inclusion criteria. With approximately 56% of admissions being eligible for participation, a timeline estimate of three months to complete the study was predicted to be adequate to obtain the sample of 80 participants while allowing for the possibility of drop-outs, low enrollment, or missing data.



## **Project Design**

A quasi-experimental pretest/posttest comparison group design was used for this project, in which a convenience sample of participants was randomly assigned into a standard care group or an educational intervention group. Both groups received a pretest and posttest, consisting of the Childbirth Comfort Questionnaire and the 11-point numerical rating scale for pain (0-10 pain scale). Both groups received standard labor care per hospital protocol, however the intervention group received the additional comfort education brochure. Standard labor care was determined by the labor care order set used by the hospital system and included but was not limited to: fetal monitoring, intravenous fluids, options for pain medication and epidural option, and laboratory tests (blood, urine, amniotic fluid). The goal of this project was not to determine if using comfort measures improves comfort and pain scores, but to determine if being educated about the role comfort has during labor and the options for comfort measures improves comfort and pain scores. Participants were not encouraged or discouraged from using pharmacologic methods (pain medication or epidural) or from using comfort measures. Women who chose to use pain medication or an epidural during labor were not excluded from participating in either the control group or intervention group because women in the United States commonly use pharmacologic pain relief during labor, and thus reflected the general population of women in labor. Both pain scores and comfort scores were examined, because it is possible to maintain comfort during a painful experience, and conversely experience discomfort despite pain relief (Schuiling et al., 2011). For example, the woman who chose to have limited pharmacologic interventions for pain during labor may have reported higher pain levels, but may also have reported higher

comfort levels because she was able to change positions. Conversely, the woman who chose to use an epidural during labor may have reported low levels of pain, but also have reported low levels of comfort because she was confined to the hospital bed with limited movement. In comparing comfort to pain, comfort refers to a positive state of relief, ease, or transcendence, whereas pain refers to a physical discomfort influenced by sensory, cognitive, and affective components. Focusing on comfort during labor, instead of pain, does not change the presence of pain, but can offer expanded options for management of pain during labor (Schuiling et al., 2011).

### **Protection of Human Subjects**

Prior to project implementation, the project received approval from the Institutional Review Board at the university and the hospital system where the research was conducted. Participants who volunteered to join the research project were approached for informed consent upon admission to the labor and delivery unit. Inclusion criteria for participants was anticipated vaginal delivery, gestational age 37 weeks or greater, able to read and speak English, 18 years or older, and not experiencing documented fetal abnormalities or fetal death. Participants received a consent form that detailed information about the research project and explained the study was voluntary, had no quantifiable risks, no incentives, and no risk of negative relationships with medical professionals for declining to participate, or withdrawing from participation. Once informed consent was obtained, participants were randomly assigned into the control and intervention group, using assignments from a random number generator ([www.graphpad.com](http://www.graphpad.com)) that randomized participants into two groups. Using a covariate adaptive randomization was advantageous for research with a small sample size to

prevent imbalances of variation between intervention and control groups (Suresh, 2011). Participants in the intervention group received a comfort education brochure that explained comfort during labor, listed options available in the hospital to enhance comfort, and encouraged the participant to select options that were personally appealing for use during labor. The brochure (see Appendix A) served as the transcript for education, and was verbalized by the project administrator to the participants to allow participants a chance to ask questions. The information contained within the brochure was reviewed for content and clarity, and approved by a panel of experts, the project committee, and the university's project chair. Participants in the control group received standard care and did not receive the comfort brochure. Participants were blinded as to the randomization. It was not feasible for the project administrator to be blinded since the nature of this intervention involved verbal discussion of the intervention with participants. Participants were assigned a numerical code for data collection to protect privacy and confidentiality of health information. A risk of participating included possible emotional distress caused by the additional time needed for completing the comfort questionnaire during labor. Participants reporting emotional distress would be referred to the hospital chaplain for counseling. None of the participants reported emotional distress from answering the survey questions during labor. Benefits of participating included possibly experiencing enhanced comfort during labor and increased satisfaction with the birth experience.

### **Instruments**

The Childbirth Comfort Questionnaire (CCQ) was used to collect data regarding comfort scores during labor (permission received, see Appendix B). The CCQ (see

Appendix C) was modeled after the General Comfort Questionnaire, and developed in the year 2002 (Schuiling et al., 2011). Face validity and internal reliability of the CCQ was established by a panel of experts, and a Cronbach's  $\alpha$  of 0.71 (Schuiling et al., 2011). An 11-point numerical (0-10) rating scale (NRS) was used to collect data regarding pain scores. This instrument (see Appendix D) was chosen because of its acceptable use with laboring women (Pan, Misa, & Owen, 2005), high reliability (0.84) and validity (0.85), ease of use, and low rate of errors (Hjermstad et al., 2011; Phan et al., 2012). The 11-point NRS was also chosen because it was already used at the research site to assess levels of pain.

### **Data Collection**

A pain score and comfort score were documented during latent/active labor (1-5 cm) and again during active/transition labor (6-10cm). These time periods for score collection were chosen based on prior research to assist with comparison of data (Schuiling et al., 2011). Both the CCQ and 11-point NRS were verbalized by the project administrator to the participant and scores recorded in between contractions to avoid imposing unnecessary stress on the participants. Demographics (age, race, attendance at childbirth education classes, previous deliveries, employment status, marital status, plans for pain control, plans for comfort, educational level, and primary provider), use of pain medication/epidural, use of comfort measures (freedom of movement, support, massage, etc.), induction/augmentation of labor, and mode of delivery were gathered from the participant's responses and from the participant's electronic health record.

## Data Analysis

Coded data was collected on electronic spreadsheets and stored on an electronic storage device that was encrypted and secured in a double-locked area controlled by the project administrator during the data collection phase. The project administrator was exclusively responsible for data collection and storage. IBM® SPSS® Statistics Version 22 was used to calculate parametric statistics, Kendall' tau, and the chi-square test, and were entered by the project administrator. SAS® Enterprise Guide® 5.1 was used for all other non-parametric analyses and entered by a statistician. An  $\alpha$  of .05 was used to determine significance. It was planned to use MANOVA to determine the effect of comfort education group differences (education intervention group versus control group) in pain scores and comfort scores at two different times during labor. It was planned the pain score (0-10) and the summed comfort score (14-70) would be treated parametrically as a vast majority of social science research is (Meyers, Gamst, & Guarino, 2006, p. 23) unless the data was skewed, in which case non-parametric tests would be considered. Summed scores from a 5-point Likert scale questionnaire could be treated parametrically, with equivalent power to non-parametric procedures provided data was normally distributed (De Winter & Dodou, 2012). Demographics were explored using *t* tests and ANOVA tests as appropriate. Prior to conducting analysis, data was analyzed for outliers and multicollinearity. Data was screened to assure assumptions of normal distribution, linearity, and homogeneity of variance was met, prior to conducting MANOVA. Prior to conducting *t* tests and ANOVA, data was screened to eliminate or transform outliers, and assure assumptions of normality, homogeneity of variance, and factor interaction were met. Assumptions were met for all parametric tests conducted. If assumptions were not

met, non-parametric tests were utilized as appropriate, after assuring assumptions for non-parametric tests were met.

### **Timeline**

Each month, an average of 90 deliveries are recorded at the hospital site, of which an average of 50 meet inclusion criteria. With approximately 56% of admissions being eligible for participation, a timeline estimate of three months to complete the study was adequate to obtain the sample of 80 participants while allowing for the possibility of drop-outs, low enrollment, or missing data. At the end of the three-month period, a total of 88 participants had consented to participate. After reviewing cases for missing data, an additional eight participants were needed and were collected the following month. An additional two months were needed to analyze data and interpret findings.

### **Budget**

The cost of printing tri-fold brochures was \$25. Participants did not receive compensation of any kind for agreeing to participate in the research study. The cost of hiring a statistician for statistical guidance was \$100 per hour. This total cost associated with completing this research project was \$225.

### **Limitations**

Foreseeable limitations include small sample size, and information gathered from one setting that may not reflect the general feelings of all women during childbirth. The project administrator was responsible for all participant enrollments and data collection, which slightly limited the ability to approach all potential participants during admission to the labor and delivery unit and within the pre-test timeframe of 1-5 centimeters dilation.

## **Summary**

A quasi-experimental design was used to determine if providing education on comfort options during labor influences the perception of comfort and impacts the perception of pain for women experiencing childbirth. A lack of current literature regarding the effects of comfort education on maternal perception of comfort and pain during labor prompted this research study. The study consisted of a minimum sample size of 80 women in labor admitted to the labor and delivery unit. The project implementation, setting, project design, ethical considerations, instruments, data collection, timeline, and budget are methodically described and outlined.

## **CHAPTER IV**

### **Results**

The purpose of this project was to determine if, during admission to the labor and delivery unit, providing education on comfort and comfort options available in the hospital setting increased level of comfort during labor. This project compared comfort scores and pain scores between participants who received comfort education upon admission to the labor and delivery unit, and participants who did not receive education upon admission to the labor and delivery unit. Both pain and comfort scores were analyzed prior to the intervention and after the intervention. In addition, possible influencing variables such as age, marital status, educational level, attendance at childbirth classes, or previous labor experience were gathered and analyzed for comparison.

### **Sample Findings**

A total of 98 women were identified for inclusion in this project during admission to the labor and delivery unit. The total 98 women approached represents 42% of the number of anticipated vaginal deliveries at the facility in the three month time period, not considering participants ineligible for inclusion related to age, ability to speak and read English, gestational age, or documented fetal abnormalities or death. Three women declined to participate after receiving informed consent. Of the 95 participants who gave informed consent and completed the pretest surveys, 15 participants did not complete the posttest comfort and/or pain surveys, resulting in a final total sample size of 80 participants. Reasons for not completing the second surveys included: participant progressed to second stage labor too quickly or project administrator not notified of



progression in a timely manner ( $n=9$ ), emergency cesarean section ( $n=1$ ) participant declined to answer the second comfort survey and/or pain survey for personal reasons ( $n=4$ ), or participant left the facility prior to 6-10cm dilation ( $n=1$ ). The final sample size ( $n=80$ ) was used for all data analysis. The mean age of all participants was 25 years old with a range from 18-39 years, and a mean gestational age of 39.6 weeks with a range from 37.2-41.4 weeks. The majority of participants had some college or a college degree (54%), with Group 1 having 49% of participants with some college or a college degree, and Group 2 having 58% of participants with some college or a college degree. The sample represents a 51% rate of primiparity and a 49% rate of multiparity. The sample population's racial distribution represents 21% black participants and 78% white participants. The majority of participants were single (59%) compared to married (41%). Some participants (40%) attended childbirth education classes with the current pregnancy and/or a past pregnancy. The majority of participants (94%) attended other pregnancy-related classes, such as epidural class (mandatory at the research site for women requesting an epidural), hospital tour, or breastfeeding class. The rate of induction of labor was 60% versus spontaneous labor. Rates for providers managing labor for the sample ( $n=80$ ) was 69% physician and 31% midwife. The average length of first stage labor was 496 minutes, and the average length of second stage labor was 36 minutes. Mode of delivery for the sample was 94% vaginal delivery, and 6% cesarean delivery. A description of the sample ( $n=80$ ), and characteristics for Group 1 (comfort education intervention) and Group 2 (control group) are provided in Table 1. IBM® SPSS® Statistics Version 22 was used to calculate demographics, all parametric statistics, and

non-parametric statistics for influencing variables (chi-square test) and correlations (Kendall' tau).

Table 1

*Demographics as a Percentage of the Sample and Between Groups*

Characteristic	Sample ( <i>n</i> = 80)	Group 1 ( <i>n</i> = 39)	Group 2 ( <i>n</i> = 41)
Age	25 ( <i>M</i> )	25 ( <i>M</i> )	26 ( <i>M</i> )
18-24 years	51	49	54
25-31 years	33	41	24
32-39 years	16	10	22
Gestation	39.6 ( <i>M</i> )	39.6 ( <i>M</i> )	39.6 ( <i>M</i> )
37 weeks	5	8	2
38 weeks	10	10	10
39 weeks	44	41	46
40 weeks	30	23	37
41 weeks	11	18	5
Parity			
Primipara	51	54	49
Multipara	49	46	51
Education level			
Less than high school	16	18	15
High school graduate	30	33	27
Some college	20	23	17
College graduate	34	26	41
Race			
Asian/Pacific Islander	1		2
Black	21	21	22
White	78	79	76
Marital status			
Single/Separated	59	62	56
Married	41	38	44
Pregnancy education			
Childbirth classes	40	33	46
Other classes	94	90	98
Induction rate	60	62	59
Provider			
Physician (OB/GYN)	69	72	67
Midwife	31	28	33
Length of labor			
First stage (minutes)	496	547	448
Second stage (minutes)	36	35	37
Mode of delivery			
Vaginal	94	90	98
Cesarean	6	10	2
Average dilation			
Time 1	3.39 cm	3.37 cm	3.22 cm
Time 2	7.13 cm	6.84 cm	7.39 cm

Age was analyzed between Group 1 (educational intervention group) and Group 2 (control group) to determine if a significant difference existed. No significant difference in participant's age occurred when comparing Group 1 ( $M = 24.59$ ,  $SD = 4.69$ ) to Group 2 ( $M = 26.02$ ,  $SD = 5.90$ ),  $t(75.642) = 1.207$ ,  $p = .231$ . The age comparisons between groups are listed in Table 2.

Table 2

*Comparison of Age Between Group 1 and Group 2*

Characteristic	N	Mean	SD	<i>p</i> value
Group 1	41	24.59	4.69	.231
Group 2	39	26.02	5.90	

A one-way analysis of variance was conducted to compare the effects of age on comfort scores at Time 2. Participants were divided into age categories (18-24 years, 25-31 years, and 32-39 years). There was no significant difference in comfort scores at Time 2 between age categories,  $F(2, 77) = 1.099$ ,  $p = .338$ . The Time 2 comfort score comparisons of age categories are summarized in Table 3.

Table 3

*Comparisons of Comfort Scores Between Age Categories*

Characteristic	SS	<i>df</i>	MS	<i>F</i>	<i>p</i> value
Between groups	137.14	2	68.57	1.099	.338
Within groups	4805.75	77	62.41		

A one-way analysis of variance was conducted to compare the effects of age on pain scores at Time 2. Participants were divided into age categories (18-24 years, 25-31 years, and 32-39 years). There was no significant difference in pain scores at Time 2

between age categories,  $F(2, 77) = .469, p = .628$ . A summary of Time 2 pain score comparisons between age categories are detailed in Table 4.

Table 4

*Comparisons of Pain Scores Between Age Categories*

Characteristic	SS	df	MS	F	p value
Between groups	13.10	2	6.10	.469	.628
Within groups	1149.55	77	14.93		

Cervical dilation in centimeters between Group 1 (educational intervention group) and Group 2 (control group) were compared before the intervention (Time 1) and after the intervention (Time 2). Results are presented in Table 5. There was no significant difference in Time 1 cervical dilation between Group 1 ( $M = 3.37, SD = .38$ ) and Group 2 ( $M = 3.32, SD = 1.53$ ),  $t(77) = -.453, p = .652$ . However, there was a significant difference in Time 2 cervical dilation between Group 1 ( $M = 6.84, SD = .973$ ) and Group 2 ( $M = 7.39, SD = 1.26$ ),  $t(74.59) = 2.17, p = .033$ , with Group 2 having a larger cervical dilation than Group 1.

Table 5

*Comparisons of Cervical Dilation Between Group 1 and Group 2*

Characteristic	N	Mean	SD	p value
Time 1				.652
Group 1	39	3.37	.38	
Group 2	41	3.32	1.53	
Time 2				.033*
Group 1	39	6.84	.973	
Group 2	41	7.39	1.26	

Note. \* $p < .05$ , two-tailed.  $p^{**} < .01$ , two-tailed.

Comfort scores were analyzed after the intervention (Time 2) in comparison to parity. No significant difference in comfort scores at Time 2 occurred when comparing

primiparas ( $M = 60.4$ ,  $SD = 7.75$ ) to multiparas ( $M = 61.3$ ,  $SD = 8.25$ ),  $t(78) = -.516$ ,  $p = .607$ . A summary of comfort score comparisons of the primiparity group to the multiparity group are listed in Table 6.

Table 6

*Comparisons of Comfort Scores Between Primiparity and Multiparity*

Characteristic	N	Mean	SD	<i>p</i> value
Primiparity	41	60.4	7.75	.607
Multiparity	39	61.3	8.25	

A one-way analysis of variance was conducted to compare the effects of parity on comfort scores in primiparas, participants with one previous birth (para 1), with two previous births (para 2), and with three previous births (para 3). One grand multipara (para 6) outlier was excluded from ANOVA comparisons. There was not a significant effect of parity on comfort scores at Time 2 in comparing the primipara group to multiple multipara groups,  $F(3, 75) = .238$ ,  $p = .870$ . The comparisons of comfort scores in the primiparous group to multiple multiparous groups are listed in Table 7.

Table 7

*Comparisons of Comfort Scores Between Primiparity and Groups of Multiparity*

Characteristic	SS	<i>df</i>	MS	<i>F</i>	<i>p</i> value
Between groups	46.57	3	15.52	.238	.870
Within groups	4892.90	75	65.24		

Pain levels were analyzed at Time 2 in comparison to parity. A significant difference in pain scores at Time 2 occurred when comparing the primipara group ( $M = 2.9$ ,  $SD = 3.59$ ) to the multipara group ( $M = 4.9$ ,  $SD = 3.93$ ),  $t(78) = -2.33$ ,  $p = .023$ . The

pain score comparisons of the primiparous group to the multiparous group are listed in Table 8.

Table 8

*Comparisons of Pain Scores Between Primiparity and Multiparity*

Characteristic	N	Mean	SD	<i>p</i> value
Primiparity	41	2.88	3.59	.023*
Multiparity	39	4.84	3.93	

Note. \* $p < .05$ , two-tailed.  $p^{**} < .01$ , two-tailed.

A one-way analysis of variance was conducted to compare the effects of parity on pain scores in primiparas, participants with one previous birth (para 1), with two previous births (para 2), and with three previous births (para 3). One grand multipara (para 6) outlier was excluded from ANOVA comparisons. There was no significant difference in pain scores at Time 2 when comparing the primipara group to multiple multipara groups,  $F(3, 75) = 2.69, p = .053$ . The pain score comparisons of the primiparous group to multiple multiparous groups are summarized in Table 9.

Table 9

*Comparisons of Pain Scores Between Primiparity and Groups of Multiparity*

Characteristic	SS	<i>df</i>	MS	<i>F</i>	<i>p</i> value
Between groups	112.90	3	37.63	2.69	.053
Within groups	1050.62	75	14.01		

Level of completed education was analyzed between Group 1 (educational intervention group) and Group 2 (control group) to determine if a significant difference existed. Educational levels were coded as “some high school” (1), “high school” (2), “some college” (3), and “college” (4). There was no significant difference in participant’s educational level completed between Group 1 ( $M = 2.56, SD = 1.07$ ) and

Group 2 ( $M = 2.85$ ,  $SD = 1.13$ ),  $t(78) = -1.175$ ,  $p = .244$ . Results of group educational level are listed in Table 10.

Table 10

*Comparisons of Educational Level Between Group 1 and Group 2*

Characteristic	N	Mean	SD	$p$ value
Group 1	39	2.56	1.07	.244
Group 2	41	2.85	1.13	

A one-way analysis of variance was conducted to compare the effects of educational level on comfort scores at Time 2. There was no significant difference in comfort scores at Time 2 between educational level categories,  $F(3, 76) = .299$ ,  $p = .826$ . The comfort score comparisons of educational level categories are detailed in Table 11.

Table 11

*Comparisons of Comfort Scores Between Educational Level Categories*

Characteristic	SS	$df$	MS	$F$	$p$ value
Between groups	57.589	3	19.20	.299	.826
Within groups	4885.98	76	64.28		

A one-way analysis of variance was conducted to compare the effects of educational level on pain scores at Time 2. There was no significant difference in pain scores at Time 2 between educational levels,  $F(3, 76) = .174$ ,  $p = .914$ . The pain score comparisons of Group 1 (educational intervention group) and Group 2 (control group) are summarized in Table 12.



Table 12

*Comparisons of Pain Scores Between Educational Levels*

Characteristic	SS	df	MS	F	p value
Between groups	7.949	3	2.65	.174	.914
Within groups	1155.601	76	15.21		

Marital status was analyzed for significant differences between Group 1 (educational intervention group) and Group 2 (control group). Results of group marital status differences are listed in Table 13. There was no significant difference in the rate of participant's marital status between Group 1 ( $M = 1.38$ ,  $SD = .08$ ) and Group 2 ( $M = 1.59$ ,  $SD = .10$ ),  $t(75.18) = -1.589$ ,  $p = .116$ .

Table 13

*Comparison of Marital Status Between Group 1 and Group 2*

Characteristic	N	Mean	SD	p value
Group 1	39	1.38	.08	.116
Group 2	41	1.59	.10	

Comfort scores were analyzed after the intervention (Time 2) in comparison to marital status. No significant difference in comfort scores at Time 2 occurred when comparing participants in the single/separated status ( $M = 61.00$ ,  $SD = 1.09$ ) to participants in the married status ( $M = 60.61$ ,  $SD = 1.50$ ),  $t(78) = .218$ ,  $p = .828$ . A summary of Time 2 comfort score comparisons of marital status are provided in Table 14.

Table 14

*Comparison of Comfort Scores Related to Marital Status*

Characteristic	N	Mean	SD	<i>p</i> value
Single/Separated	47	61.00	1.09	.828
Married	33	60.61	1.50	

Pain scores were analyzed after the intervention (Time 2) in comparison to marital status. No significant difference in comfort scores at Time 2 occurred when comparing participants in the single/separated status ( $M = 4.30$ ,  $SD = 3.9$ ) to participants in the married status ( $M = 3.15$ ,  $SD = 3.7$ ),  $t(78) = 1.321$ ,  $p = .190$ . A summary of Time 2 pain score comparisons of marital status are listed in Table 15.

Table 15

*Comparison of Pain Scores Related to Marital Status*

Characteristic	N	Mean	SD	<i>p</i> value
Single/Separated	47	4.30	3.9	.190
Married	33	3.15	3.7	

Attendance at childbirth classes was analyzed for significant differences between Group 1 (educational intervention group) and Group 2 (control group). There was no significant difference in the rate of participant's attendance at childbirth classes between Group 1 ( $M = .33$ ,  $SD = .48$ ) and Group 2 ( $M = .46$ ,  $SD = .51$ ),  $t(77.99) = -1.184$ ,  $p = .240$ . Results of group attendance at childbirth class differences are listed in Table 16.

Table 16

*Comparison of Childbirth Class Attendance Between Group 1 and Group 2*

Characteristic	N	Mean	SD	<i>p</i> value
Group 1	39	.33	.48	.240
Group 2	41	.46	.51	

Comfort scores were analyzed after the intervention (Time 2) in comparison to attendance at childbirth classes. No significant difference in comfort scores at Time 2 occurred when comparing participants who attended childbirth classes ( $M = 60.34$ ,  $SD = 8.54$ ) to participants who did not attend childbirth classes ( $M = 61.17$ ,  $SD = 7.34$ ),  $t(78) = -.454$ ,  $p = .651$ . The Time 2 comfort score comparisons of attendance at childbirth classes are listed in Table 17.

Table 17

*Comparison of Comfort Scores Related to Childbirth Class Attendance*

Characteristic	N	Mean	SD	<i>p</i> value
Childbirth classes				.651
Attended	32	60.34	8.54	
Did not attend	48	61.17	7.34	

Pain scores were analyzed after the intervention (Time 2) in comparison to attendance at childbirth classes. No significant difference in pain scores at Time 2 occurred when comparing participants who attended childbirth classes ( $M = 3.81$ ,  $SD = 3.60$ ) to participants who did not attend childbirth classes ( $M = 3.83$ ,  $SD = 4.03$ ),  $t(78) = -.024$ ,  $p = .981$ . The Time 2 pain score comparisons of attendance at childbirth classes are listed in Table 18.

Table 18

*Comparison of Pain Scores Related to Childbirth Class Attendance*

Characteristic	N	Mean	SD	<i>p</i> value
Childbirth classes				.981
Attended	32	3.81	3.60	
Did not attend	48	3.83	4.03	

The participant's plans for pain control in labor were collected and compared to the participant's actual choice for pain control during labor. Participants were asked, "What do you plan to use for pain control during labor?" There were no changes in plan for pain control after the intervention for either group. Comparisons for plans for pain control and choice for pain control are listed for the entire sample and for Group 1 (educational intervention group) and Group 2 (control group) in Table 19.

Table 19

*Pain Control Choices as a Percentage of the Sample and Between Groups*

Characteristic	Sample ( $n = 80$ )	Group 1 ( $n = 39$ )	Group 2 ( $n = 41$ )
Plans for pain control			
IV medication	22.5	21	24
Epidural	44	41	46
IV medication/epidural	12.5	20	5
None/undecided	21	18	24
Choice for pain control			
IV medication	66	72	61
Epidural	81	77	85
None	1		2

The participant's plan for maintaining comfort during labor was collected prior to the educational intervention. Participants were asked "What do you plan to use to stay comfortable during labor?" Options for comfort included bath/shower, birthing ball, breathing techniques, distractions (music, television), massage/touch, squatting bar, family/support, and walking/changing positions. All participants planned to use at least one option to maintain comfort during labor, with many participants choosing two options. The most popular choices for maintaining comfort were having family/support and utilizing distractions. The least popular choice for maintaining comfort was use of the squatting bar. There was no statistically significant difference in plans for maintaining comfort during labor between Group 1 (educational intervention group) ( $M =$

1.41,  $SE = .08$ ) and Group 2 (control group) ( $M = 1.39$ ,  $SE = .09$ ) prior to the educational intervention  $t(78) = 1.64$ ,  $p = .87$ . A summary of plans for comfort during labor are provided in Table 20.

Table 20

*Comfort Control Plans as a Percentage of the Sample and Between Groups*

Characteristic	Sample ( $n = 80$ )	Group 1 ( $n = 39$ )	Group 2 ( $n = 41$ )
Plans for comfort			
1-2 options	62.5	59	66
3-4 options	35	41	29
5 or more options	2.5		5

The participant's plan for comfort during labor prior to the educational intervention was collected and compared to the participant's plans for comfort during labor after the educational intervention. On average, participants in the educational intervention group (Group 1) planned to use more comfort options after the intervention ( $M = .92$ ,  $SE = .04$ ) as compared to participants in the control group (Group 2), in which no change in plans was noted ( $M = 0$ ,  $SE = 0$ ). This change in plan for comfort options between Group 1 and Group 2 was statistically significant,  $t(38) = 21.4$ ,  $p = .000$ . Plans for comfort during labor after the educational intervention were also recorded and compared to the participant's actual choice during labor. Usage of comfort measures during labor was noted through direct observation and participant self-reporting. There was a significant difference,  $t(78) = 4.53$ ,  $p = .000$ , in actual use of comfort measures during labor, with the comfort intervention group ( $M = 2.44$ ,  $SE = .09$ ) using more options than the control group ( $M = 1.76$ ,  $SE = .12$ ). The changes in comfort option choice and actual use of comfort options are recorded in Table 21.

Table 21

*Changes in Comfort Control Plan Means After Intervention Between Groups*

Characteristic	Group 1 ( <i>n</i> = 39)	Group 2 ( <i>n</i> = 41)	<i>p</i> value
Plan for comfort options	.92	.00	.000**
Actual use of comfort options	2.44	1.76	.000**

Note. \**p* < .05, two-tailed. \*\**p* < .01, two-tailed.

Comfort scores and pain scores at Time 1 were compared to comfort scores and pain scores at Time 2. Comfort scores at Time 1 had a significant inverse relationship to pain scores at Time 1 ( $\tau = -.245, p = .003$ ) but not for pain scores at Time 2 ( $\tau = -.145, p = .081$ ). Pain scores at Time 1 had a significant positive relationship to pain scores at Time 2 ( $\tau = .191, p = .027$ ). Comfort scores at Time 1 had a strong positive relationship to comfort scores at Time 2 ( $\tau = .450, p = .000$ ). There was a significant negative relationship between the comfort score at Time 2 and the pain score at Time 2,  $\tau = -.405, p = .000$ . Results are provided in Table 22.

Table 22

*Correlations of Comfort Score and Pain Score at Time 1 and Time 2*

Measure	Time 1 comfort	Time 1 pain	Time 2 comfort	Time 2 pain
Time 1 comfort	-			
Time 1 pain	-.245**	-		
Time 2 comfort	.450**	-.128	-	
Time 2 pain	-.145	.191*	-.405**	-

Note. \**p* < .05, two-tailed. \*\**p* < .01, two-tailed.

The number of comfort measures used was also compared to comfort scores and pain scores at Time 2. Participants with lower comfort scores and higher pain scores used more comfort measures on average than participants with higher comfort scores and lower pain scores. The number of comfort measures used was significantly related to the

comfort score at Time 2,  $\tau = -.182$ ,  $p = .043$ , and the number of comfort measures used was significantly related to the pain score at Time 2,  $\tau = .209$ ,  $p = .025$ . Results are included in Table 23.

Table 23

*Correlations of Comfort Score, Pain Score, and Number of Comfort Measures Used at Time 2*

Measure	Comfort measures used	P value
Comfort score	-.182	.043*
Pain score	.209	.025*

Note. \* $p < .05$ , two-tailed. \*\* $p < .01$ , two-tailed.

The participants were asked plans for pain control before and after the intervention. None of the participants in Group 1 (educational intervention group) or Group 2 (control group) reported change in plans for pain control choice during labor at Time 1. The plan for pain control was compared to the actual choice for pain control during labor. Frequencies of plans for pain control and actual choice for pain control during labor were compared between groups. Comparisons of pain control plans and actual choice for pain control frequencies for Group 1 and Group 2 are provided in Table 24.

Table 24

*Frequencies of Pain Control Plans and Choice During Labor for Group 1 and Group 2*

Characteristic	Group 1 ( $n = 39$ )	Group 2 ( $n = 41$ )	Total
None/undecided	7	10	17
IV pain medication	8	10	18
Epidural	16	19	35
IV pain med. & epidural	8	2	10

A variable was created for the change in pain control choice from initial plan to actual choice (actual choice minus planned choice) to compare between Group 1 (educational intervention group) and Group 2 (control group), with numbers equaling zero indicating that the participant was able to maintain her original plan for pain control, and other numbers indicating a change from the plan. Scores other than zero were recoded to a value of one to indicate a change in plans for pain control. There was an association between receiving comfort education and continuing with the original plan for pain control, however this association was not significant  $\chi^2(1) = 3.184, p = .074$ . The comparison of pain control choice change between Group 1 and Group 2 is provided in Table 25.

Table 25

*Frequencies of Changes in Pain Control Choice During Labor Between Group 1 and Group 2*

Characteristic	Group 1 ( $n = 39$ )	Group 2 ( $n = 41$ )	Total	$p$ value
Change in pain control choice	16	25	41	.074
No change in pain control choice	23	16	39	
Total	39	41	80	

In comparing first stage labor characteristics, Group 1 ( $M = 547, SE = 49$ ) participants experienced longer labors on average than participants in Group 2 ( $M = 448, SE = 38$ ). However, there was not a statistically significant difference between groups for length of first stage labor  $t(78) = 1.60, p = .114$ . Group 1 had a higher rate of intravenous medication ( $M = .72, SE = .07$ ) usage compared to Group 2 ( $M = .61, SE = .08$ ), and a lower rate of epidural usage ( $M = .77, SE = .07$ ) compared to Group 2 ( $M = .85, SE =$



.06), although neither was statistically significant  $t(78) = 1.02, p = .331$  and  $t(78) = -.961, p = .340$ , respectively. The comparison of first stage labor characteristics between Group 1 (educational intervention group) and Group 2 (control group) are detailed in Table 26.

Table 26

*First Stage Labor Mean Characteristics Between Group 1 and Group 2*

Characteristic	Group 1 ( $n = 39$ )	Group 2 ( $n = 41$ )	$p$ value
Minutes of first stage	547	448	.114
IV medication usage	.72	.61	.311
Epidural usage	.77	.85	.340

In comparing second stage labor characteristics, Group 1 ( $M = 35, SE = 7$ ) experienced fewer minutes of pushing compared to Group 2 ( $M = 37, SE = 6$ ). However, there was not a statistically significant difference between Group 1 and Group for length of second stage labor,  $t(76) = -.46, p = .806$ . On average, participants in Group 1 ( $M = .03, SE = .03$ ) experienced lower rates of vacuum usage for second stage labor when compared to Group 2 ( $M = .18, SE = .06$ ), which was statistically significant at  $p = .028$ . There was no statistically significant difference between rates of forceps usage,  $t(38) = 1.00, p = .324$ . The characteristics of second stage labor between Group 1 (educational intervention group) and Group 2 (control group) are recorded in Table 27.

Table 27

*Second Stage Mean Characteristics Between Group 1 and Group 2*

Characteristic	Group 1 ( $n = 39$ )	Group 2 ( $n = 41$ )	$p$ value
Second stage (minutes)	35	37	.806
Vacuum usage	.03	.18	.028*
Forceps usage	.03	.00	.324

Note. \* $p < .05$ , two-tailed. \*\* $p < .01$ , two-tailed.

## Major Findings

Variables were created for the change in comfort score and pain score from Time 1 to Time 2 (i.e., Time 2 score minus Time 1 score). Descriptive statistics were calculated for comfort score and pain score at Times 1 and 2, and for the change in scores. Descriptive statistics were calculated for the entire sample, and also by group to compare the comfort education group to the control group. The data were not normally distributed and data transformations were ineffective, thus nonparametric methods were used to compare the groups on comfort and pain score variables. The Wilcoxon rank sum test was utilized to compare the groups on comfort score and pain score at Times 1 and 2, and on the change in the respective scores from Time 1 to Time 2. SAS® Enterprise Guide® 5.1 was used for all nonparametric analyses related to the main variables. To adjust for multiple comparisons, a Bonferroni-corrected  $\alpha$  of  $0.05/6 = 0.008$  was used for the six comparisons. On average, comfort scores improved from Time 1 ( $Mdn = 61$ ) to Time 2 ( $Mdn = 61$ ), and pain scores improved from Time 1 ( $Mdn = 2.50$ ) to Time 2 ( $Mdn = 3.50$ ). Findings for changes in comfort scores and pain scores for the entire sample are listed in Table 28.

Table 28

*Comparison of Mean and Median Scores for Comfort and Pain for Sample*

Characteristic	Mean	Median	SD
Comfort score time 1	60.21	61	4.94
Comfort score time 2	60.84	63	7.91
Comfort score change from time 1 to time 2	.63	1.00	6.72
Pain score time 1	3.28	2.5	3.28
Pain score time 2	3.83	3.5	3.84
Pain score change from time 1 to time 2	.55	.00	4.53

Comfort scores for Group 1 ( $Mdn = 61$ ) did not significantly differ from Group 2 ( $Mdn = 60$ ) at Time 1,  $W_s = 1646$ ,  $z = .719$ ,  $p = .472$ ,  $r = .08$ . Comfort scores for Group 1 ( $Mdn = 63$ ) did not significantly differ from Group 2 ( $Mdn = 63$ ) at Time 2,  $W_s = 1557$ ,  $z = -0.212$ ,  $p = .832$ ,  $r = .02$ . Changes in comfort scores between Time 1 and Time 2 did not significantly differ between Group 1 ( $Mdn = 0$ ) and Group 2 ( $Mdn = 2$ ),  $W_s = 1429$ ,  $z = -1.453$ ,  $p = .146$ ,  $r = .16$ . Pain scores for Group 1 ( $Mdn = 4$ ) did not significantly differ from Group 2 ( $Mdn = 1$ ) at Time 1,  $W_s = 1754$ ,  $z = 1.711$ ,  $p = .087$ ,  $r = .19$ . Pain scores for Group 1 ( $Mdn = 3$ ) did not significantly differ from Group 2 ( $Mdn = 2$ ) at Time 2,  $W_s = 1655$ ,  $z = 0.739$ ,  $p = .459$ ,  $r = .08$ . Changes in pain scores between Time 1 and Time 2 did not significantly differ between Group 1 ( $Mdn = 0$ ) and Group 2 ( $Mdn = 0$ ),  $W_s = 1530$ ,  $z = -0.472$ ,  $p = .294$ ,  $r = .05$ . There was no statistically significant difference between the comfort education group (Group 1) and the control group (Group 2) for comfort scores or pain scores at any time. Findings for changes in median comfort scores and median pain scores between groups are listed in Table 29.

Table 29

*Comparison of Median Scores for Comfort and Pain Between Groups*

Characteristic	Group 1 ( <i>n</i> = 39)	Group 2 ( <i>n</i> = 41)	<i>p</i> value
Comfort score time 1	61	60	.472
Comfort score time 2	63	63	.832
Comfort score change from time 1 to time 2	0	2	.146
Pain score time 1	4	1	.087
Pain score time 2	3	2	.459
Pain score change from time 1 to time 2	0	0	.294

**Summary**

The purpose of this project was to determine if, during admission to the labor and delivery unit, providing education on comfort and comfort options available in the hospital setting increased level of comfort during labor. This project compared comfort scores and pain scores between participants who received comfort education upon admission to the labor and delivery unit, and participants who did not receive education upon admission to the labor and delivery unit. Both pain and comfort scores were analyzed prior to the intervention and after the intervention using nonparametric tests. No significant difference was found for the sample or between groups when comparing pain scores and comfort scores. Possibly influencing variables such as age, marital status, educational level, attendance at childbirth classes, or previous labor experience were gathered and analyzed for comparison using parametric analyses. Significant differences were noted in plans for use of comfort measures and actual use of comfort measures after the intervention, with the comfort education intervention group having

higher rates of usage. Primiparas experienced significantly less pain when compared to multiparas at Time 2. Vacuum extraction rates were significantly higher in the control group when compared to the educational intervention group. There was no significant difference noted between the comfort education intervention group and control group when comparing plans and choice for pain control, initial plans for comfort, minutes of labor, analgesia and epidural usage, comfort score between parity, or forceps usage.

## **CHAPTER V**

### **Discussion**

The purpose of this project was to determine if providing education on comfort and comfort options available in the hospital setting increased level of comfort during labor. This study was proposed because there is limited use of alternative methods of pain control in the hospital setting for labor. Although there may be numerous variables influencing pain and comfort during labor, the aim of this study was to determine if providing laboring women with a comfort education brochure and discussing alternative options for maintaining comfort in the hospital setting would be effective in promoting comfort and decreasing pain.

### **Implication of Findings**

The findings of this project suggested that providing comfort education during admission to the labor and delivery unit does not increase comfort scores or decrease pain scores. This lack of difference between pain and comfort scores between groups may reflect the overall healthy population included in this project. However, providing comfort education did result in change for plans to maintain comfort during labor, an increased use of comfort measures during labor, and an increased likelihood of continuing with original plans for pain control during labor. There was a significant inverse correlation between comfort scores and pain scores during labor, meaning that as comfort scores decreased pain scores increased. This is an expected and rational finding that is supported by literature (Schuiling et al., 2011). Due to the low number of participants who labored without pain medication, epidural, or a combination of pain

medication and epidural, comparisons between un-medicated and medicated labor experiences were not possible.

In comparing group demographic characteristics, no significant differences were noted regarding age, parity, education level, or marital status. Group 1 participants (educational intervention group) did experience longer labors on average, but there was not a significant difference between groups. However, it is worth considering that longer labors could have affected perceptions of comfort and pain reported by participants, which should be considered when interpreting results. There was a significant difference in dilation at Time 2, with Group 2 (control group) being dilated more than Group 1 (educational intervention group). Conversely, this is most likely a score collection variation, and not necessarily a true variation between groups, since there were only dilation requirements for collecting scores at Time 2 and not time length requirements. It is worth noting that the dilation differences between Group 1 (educational intervention group) and Group 2 (control group) at Time 2 may have influenced comfort scores and pain scores, which should be considered when interpreting results.

Results of this project indicated during pregnancy women make plans regarding pain control during labor, and most participants at the research site had decided on pain control options prior to labor. Plans for pain control during labor may be driven by healthcare provider questions at prenatal appointments, and the requirements at the research site for an epidural “class” for participants who wish to receive an epidural. During data collection many participants needed clarification on the definition of comfort measures when asked initially “What do you plan to do/use to stay comfortable during labor?” This question regarding planned comfort measure usage during labor was asked

following asking the participant her plan for pain control during labor. Many women were unsure of other methods to maintain comfort during labor besides having family present. Because women tend to plan for labor, it could prove beneficial to provide comfort education during prenatal appointments to allow women an opportunity to plan in advance for use of comfort measures during labor and to also provide information regarding differences between comfort and pain during labor. Current literature infers that a woman perceives more value in childbirth education when there is a feeling that the education is critical to her outcome (Martin & Robb, 2013). If healthcare providers would place more emphasis on the positive association of comfort during labor, instead of the negative association of pain, by providing comfort education for labor, women would be more aware of all options available during labor and feel that maintaining comfort was an important component of experiencing a healthy birth.

Care was taken that the project administrator did not make the labor nurse aware of the participant's plans for comfort during labor, to avoid the possible influence of comfort measures utilized. Participants were asked to select comfort measures from the brochure they would like to use during labor, and then encouraged to let the labor nurse know when they desired to use any of the interventions. If participants asked questions regarding comfort measures at any point during labor, regardless of which group they were assigned, the project administrator or the labor nurse provided information and clarification. All participants were given opportunity to request and use comfort measures, as medically appropriate. After the intervention, the project administrator did not remain in the room during labor, unless the participant requested her presence. Another interesting note was that most participants had family present during the comfort



education intervention, which may have contributed to the higher rate of comfort measure usage in the comfort education group. Some family members reported appreciation of learning methods to help the participant remain comfortable during labor, which may have contributed to the increased usage of comfort measures during labor noted in the intervention group. A test of the speculated relationship between family education and use of comfort measures is beyond the extent of this project, but warrants further study. The power of suggestion and Hawthorne's effect must also be considered. Participants who received comfort education may have been more aware of measures used during labor, which could have increased the frequency of measures self-reported, and may not represent a true increase in the number of measures used.

Reports of increased pain and decreased comfort may have resulted in the need for use of more comfort measures, as supported by the significant correlation between increased pain scores and increased use of comfort measures for participants. The need for an increased number of measures to maintain comfort in the presence of reduced comfort and increased pain is a logical finding. It must be noted that the frequency, duration, or continuity of use of comfort measures was not recorded. Participants were observed using comfort measures and were asked to recall what comfort measures they had used during labor up to the Time 2 collection point. If participants were observed or self-reported using a comfort measure at any point during labor, this was recorded into the number of comfort measures used during labor. Participants in the educational intervention group (Group 1) may have been aware of the use of more options for maintaining comfort to cope with the increased levels of pain when compared to the control group (Group 2). Findings suggested that comfort and pain scores were not

significantly different between Group 1 (educational intervention group) and Group 2 (control group) at both collection points during labor, however the use of comfort measures was significantly increased in Group 1. From the findings of this project, it can be speculated that the level of comfort and pain may have differed significantly if use of comfort measures was equal between groups. Results of the project indicated that Group 1 (educational intervention group) was able to maintain the original plan for pain control during labor while maintaining comfort throughout labor. The use of comfort measures could have improved the participant's ability to maintain her original choice, while also maintaining similar levels of comfort and pain when compared to participants in Group 2 (control group), who did not use as many comfort measures on average. Current literature (Bryanton et al., 2008; Cook & Loomis, 2012; Fair & Morrison, 2012) infers that being able to continue with the plan for labor increases maternal satisfaction with the birth experience. Thus, it may be important to provide comfort education to increase the chance women are able to continue with the original plan for labor and possibly improve maternal satisfaction with the birth experience and the institution.

### **Application to Theoretical/Conceptual Framework**

Kolcaba's Theory of Comfort was used to guide this project regarding the effects of comfort education on comfort and pain during labor. The key concepts of Kolcaba's Theory of Comfort that relate to this project in the labor and delivery setting are healthcare needs, comfort, and comfort measures. Theoretically, healthcare needs can be defined as pain experienced by the women in labor and were congruent with the conceptual-theoretical-empirical framework of this project. Pain is defined as a physical discomfort influenced by sensory, cognitive, and affective components (Melzack, 1993).

All participants reported pain at some point during labor, and many reported pain throughout labor until relieved by analgesia or anesthesia. Comfort is defined as a positive state of relief, ease, or transcendence (Kolcaba & DiMarco, 2005). The Maternal Comfort Questionnaire captured the maternal experience of comfort during this project. Comfort measures were provided by numerous factors within the labor setting including atmosphere (positions, distractions, showering/bathing, etc.), psyche, nursing interventions, and family support (massage, support, and encouragement). Kolcaba's theory advocates that a patient's needs arise from a stimulus, such as labor, that can generate negative tension (McEwen & Wills, 2007). By increasing comfort, through use of comfort education, the nurse can assist the patient in engaging positive tensions while reducing negative tensions (McEwen & Wills, 2007). Increasing comfort can enhance health-seeking behaviors in the patient and family, thus promoting health and further enhancement of comfort (McEwen & Wills, 2007).

### **Limitations**

Several limitations of this project must be acknowledged. The quasi-experimental design of this project limits the ability for inference and causation. The small sample size of homogenous participants may not reflect the attitude and feelings of the general population. There are multiple variables that may have influenced comfort and pain scores of participants. The progression of labor can vary considerably, which makes it difficult to standardize findings. Additionally, the definition of active labor was ambiguous at the research site for inductions and may have influenced results related to length of labor. Lastly, some participants already had an epidural in place prior to the

intervention or Time 1 data collection, which may have affected results for comfort scores, pain scores, and use of comfort measures during labor.

### **Implications for Nursing**

Currently, labor nurses in the hospital setting are responsible for the majority of care for a woman during the labor experience, and are often the first point of contact upon admission to the hospital setting. Nurses can use information gained from this project to understand the importance of educating women on options for maintaining comfort to increase the woman's ability to continue with her original plans for labor. It is important for labor nurses to understand that predictors of maternal satisfaction, mainly the ability to maintain control and choice, can be influenced by nursing interventions. Understanding the importance of education related to childbirth outcomes can assist nurses with supporting maternal preference during labor and possibly improving maternal satisfaction with the childbirth experience. Nurses can use the information from this project to understand the numerous variables that can affect a woman's childbirth experience, and plan time during the admission process to educate women on available options in the hospital setting for comfort promotion and pain reduction. Nurses can also advocate for improved education in the prenatal setting for both comfort and pain options. Although findings from this project cannot be generalized to other populations, it is worth considering that nurses have the opportunity to provide comfort education to all patients within the hospital setting. Providing education regarding diagnosis-specific comfort measures could be beneficial in providing additional coping methods to patients for all types of discomfort. Nursing leaders are in a position to advocate for healthcare that promotes health and comfort across the continuum of life.

## **Recommendations**

Looking toward the future, additional information regarding the effects of comfort education on comfort and pain during labor could be obtained by repeating this study with a larger sample size and limiting variables, especially previous childbirth education. Including an outcome of maternal satisfaction with the birth experience is paramount to understanding the relationship between the variables that influence the perception of labor. Assessing maternal satisfaction in future studies may provide a better evaluation of the effects of comfort education for labor outcomes, and predictors of maternal satisfaction are more readily identified in the literature for comparison and synthesis of findings. Including assessments on anxiety could also prove beneficial to understanding the psychosocial effects of comfort education for women during labor and may be more indicative of maternal satisfaction of comfort scores. Completing a pretest-posttest study to evaluate the effects of comfort education related to maternal comprehension of the use of comfort measures during labor could also prove beneficial. Understanding the best time to educate women about the options for comfort promotion and pain control during labor could assist health care providers and childbirth educators in providing time-appropriate material during the prenatal period.

## **Conclusion**

Generally, educating women in labor about available options for maintaining comfort in the hospital setting can allow the nurse to provide care that better supports maternal preferences for labor. This study attempted to determine if providing laboring women with a comfort education brochure and discussing alternative options for maintaining comfort in the hospital setting would be effective in promoting comfort and

decreasing pain. Although educating participants on comfort measures available did not improve comfort or pain scores during labor, it did allow participants to continue with the original plans for pain control, to use more comfort measures during labor, and to maintain similar levels of comfort and pain during labor when compared to participants who did not receive comfort education. In an effort to provide enhanced care, nurses in the hospital setting may need to shift the focus of labor support from pain relief to comfort promotion. Focusing nursing care during labor on promoting comfort can provide care that better supports maternal preferences for labor and enhances the relationship between the patient and the healthcare team.

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## Appendix A

### Comfort Education Brochure Intervention

#### Alternative Options

Please select the options you would like to use during labor. This will allow your support person(s) and nurse to be aware of options that appeal to you.

- Bath/shower
- Birthing ball
- Breathing exercises
- Distractions (TV, music, etc.)
- Massage
- Squatting bar
- Support and encouragement
- Walking/changing positions



#### Comfort During Labor

We want to help you stay comfortable during labor. Please remember that every labor is unique. Some women will require both medicine and alternative comfort measures during labor, while other women may only need one option. Some comfort methods may not be possible in every labor circumstance or in combination with medicine or an epidural. Ask your health care provider for more information.

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## Comfort During Labor

Alternative Options for Labor

## Are comfort and absence of pain different?

Labor pain is part of childbirth and can be used to guide your actions during labor. It may be impossible or unsafe to relieve all of your pain during labor with medicine or an epidural. Comfort can be experienced in spite of pain. Focusing on comfort during labor does not deny the presence of labor pain, but can allow you to feel a sense of control throughout the labor process. Focusing on comfort can also provide you with more options for controlling pain during labor.



## How can I maintain comfort during labor?

### Changing positions

Changing positions during labor can help you stay comfortable and may help speed up your labor. Using upright positions (walking, squatting, sitting, knee-chest, birthing ball) uses gravity to your advantage to cause better contractions and allow the baby to rotate more easily.

### Breathing

Controlling your breathing during labor can help you stay comfortable. Deep, slow breathing provides your body with extra oxygen that can relieve pain and help you relax.

### Support and Encouragement

Having a loved one present can help you relax and feel more comfortable. Your support person can provide encouragement, help you change positions, or massage sore areas. Sometimes having a loved one nearby is enough to help you feel comfortable.

### Water and Distractions

Taking a shower or bath can help relax your muscles and may help speed up your labor. Using distractions (TV, music, etc.) can help take your mind off labor so that you do not focus on pain.



## Appendix B

## Permission to Use Childbirth Comfort Questionnaire

Hi Abby,

I apologize for just responding but have been out of my office. Absolutely feel free to use my comfort instrument. I only ask that I am referenced as the person who developed it. If you need newer references I did provide chapters on the work in a UK book and just more recently in a book edited by Melissa Avery. The instrument was developed from Kathy Kolcaba's work and she maintains a website on her work with comfort. It would probably be helpful for you to look at her work. Good luck and I would love to know the outcomes! Best, Kerri

On Sat, Jul 6, 2013 at 1:22 PM, Abby Elisabeth Garlock <[agarlock@gardner-webb.edu](mailto:agarlock@gardner-webb.edu)> wrote:

Dr. Schuiling,

I am currently a DNP student at Gardner-Webb University in Boiling Springs, NC. I am requesting permission to use the Childbirth Comfort Questionnaire that you created. The purpose of my project is to examine the relationship between pain and comfort during childbirth, and to examine the effects of comfort on maternal birth outcomes.

Thank you for your time and consideration.

**Abby Garlock, MSN, RN, LCCE**  
**Lab Coordinator, School of Nursing**

Gardner-Webb University  
PO Box 7309 Boiling Springs, NC 28017  
Office: 704-406-2306

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Kind regards,

Kerri D. Schuiling, Ph.D., CNM, FACNM, FAAN  
Dean, School of Nursing  
Oakland University  
2200 North Squirrel Road  
3001 Human Health Building  
Rochester, MI 48309  
Phone: 248-364-8787

## Appendix C

## Childbirth Comfort Questionnaire

**Data Collectors please read the statement below at each data collection time point. Circle her score.**

Thank-you VERY MUCH for helping in this study about the feelings women experience during labor. I am going to ask you to rate how you feel about 14 statements. Please rate each statement from 1 to 5 with "1" meaning you 'strongly disagree' and "5" meaning you 'strongly agree' at this moment.

Example: I am glad I am being asked these questions....1 (strongly disagree) to 5 (strongly agree).

- 
- |  |                   |
|--|-------------------|
| 1. I have enough privacy.                                      | 1...2...3...4...5 |
| 2. My pain is difficult to endure.                             | 1...2...3...4...5 |
| 3. I feel empowered by those around me.                        | 1...2...3...4...5 |
| 4. I don't think I can do this without the help of others.     | 1...2...3...4...5 |
| 5. I am working well with my body.                             | 1...2...3...4...5 |
| 6. This chair (bed) makes me hurt.*                            | 1...2...3...4...5 |
| 7. I can rise above my pain because it helps me birth my baby. | 1...2...3...4...5 |
| 8. I feel confident I can birth my baby.                       | 1...2...3...4...5 |
| 9. This room makes me feel weak and helpless.                  | 1...2...3...4...5 |
| 10. The pain of the contractions motivates me to be strong.    | 1...2...3...4...5 |
| 11. This is a safe place to be.                                | 1...2...3...4...5 |
| 12. I feel like giving up.                                     | 1...2...3...4...5 |
| 13. I worry I will lose control.                               | 1...2...3...4...5 |
| 14. I need to feel better informed about my progress.          | 1...2...3...4...5 |

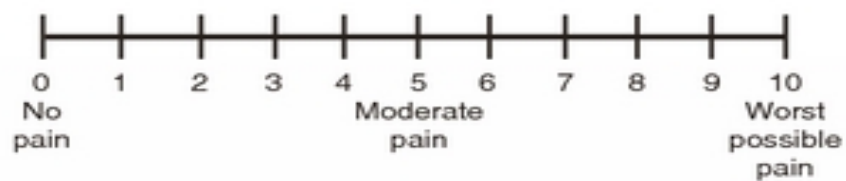
© 2002 by Kerri Durnell Schuiling, PhD, CNM, FACNM

Note: The Childbirth Comfort Questionnaire (CCQ) was developed and tested in 2002-2003. Face validity was accomplished by a panel of experts: midwives, obstetricians, labor and delivery nurses and women who had given birth. The instrument has a 0.71 Cronbach's (sample size n = 64). The instrument is administered twice during labor: latent & active phase. To score, reverse code the negative responses and total the sum. Higher totals mean higher comfort. This instrument was used in a population of primiparous women who gave birth in the United States. Further testing of the instrument is ongoing. For comments or questions please contact: (kschuili@nmu.edu) or 906-227- 2834 or via mail:

Kerri Durnell Schuiling, PhD, CNM, FACNM Professor & Associate Dean Northern Michigan University  
School of Nursing 1401 Presque Isle Ave. 2301 NSF Marquette, MI 49855

## Appendix D

## 11-point Numerical Rating Scale for Pain

**0–10 Numeric Pain Rating Scale**

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