Effects of Comfort Education on Maternal Comfort and Labor Pain

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ABSTRACT

The effects of providing education regarding comfort options available in the hospital setting on level of maternal comfort and pain during labor were explored in a quasi-experimental pretest/posttest comparison group design ($N = 80$). No significant difference was found in maternal comfort or pain between the intervention group that received comfort education and the control group. 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. Providing education for maintaining comfort during labor can allow women to make informed choices during labor.

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Women who do not receive childbirth education prior to labor may be unaware of options for maintaining comfort during labor. Maternal satisfaction is dependent on more than creating a painless labor and rather is contingent on 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). The literature provides evidence that comfort measures increase comfort, reduce anxiety, and reduce stress (Apóstolo & Kolcaba, 2009; Dowd, Kolcaba, Steiner, & Fashinpaur, 2007; Kolcaba, Dowd, Steiner, & Mitzel, 2004; Kolcaba, Schirm, & Steiner, 2006). The positive effects of comfort on pain during labor is well-documented (Chuntharapat, Petpichetchian, & Hatthakit, 2007; Citkovitz et al., 2009; Khresheh, 2010; Mollamahmutoğlu et al., 2012; Ragnar, Altman, Tydén, & Olsson, 2006; Stark, 2013). The maintenance of choice and maternal control are the most significant predictors of maternal satisfaction during the childbirth experience (Bryanton et al.,

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2008; Cook & Loomis, 2012; Hardin & Buckner, 2004). The need for availability and use of methods to promote comfort is paramount because 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, 2012). The amount of control a woman perceives she maintains during labor is a predictor for increased maternal satisfaction (Goodman et al., 2004). Therefore, it is important to promote maternal satisfaction with the experience and support maternal birthing preferences by providing education on options available for comfort.

Childbirth education can have positive effects on maternal expectations and perceptions of the birth experience by decreasing anxiety, stress, and fear associated with birth, increasing self-efficacy and readiness for birth, and decreasing maternal intent to request a cesarean birth (Byrne, Hauck, Fisher, Bayes, & Schutze, 2014; Hollins Martin & Robb, 2013; Koehn, 2008; Stoll & Hall, 2012). However, 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. From a postnatal viewpoint, Dahlen et al. (2007) also noted possible effects of intrapartum pain reduction using warm packs on the perineum to improving postpartum pain and outcomes. Thus, determining the correlation between providing comfort education and perceived comfort during labor will provide valuable information for guiding current obstetrical practice.

The purpose of this study 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, and many women at the study site report not attending childbirth education classes. Does providing laboring women with a comfort education brochure and discussing alternative options for maintaining comfort in the hospital setting promote comfort and decrease pain? 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.

METHOD

A quasi-experimental pretest/posttest comparison group design was used for this study, 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 intervention in the form of an educational brochure. This study received approval from the Institutional Review Board at Carolinas HealthCare System.

Sample and Setting

Inclusion criteria for participants were anticipated vaginal birth, gestational age 37 weeks or greater, able to read and speak English, 18 years or older, not experiencing documented fetal abnormalities or fetal death, and dilated less than 5 cm at the time of the initial survey. Participants were approached for inclusion upon admission to the labor and delivery unit and received informed consent detailing 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. 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 (α) of .05 (power of .80) 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. 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) that randomized participants into two groups. Participants were assigned a numerical code for data

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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.

collection to protect privacy and confidentiality of health information.

The research study was conducted in a 241-bed nonprofit 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. Births are attended by one of six obstetricians/gynecologists or one of two midwives, all of whom are affiliated with the hospital. Participants were recruited from June 2014 to September 2014.

Intervention

A comfort education brochure, developed for the purpose of this study, served as the transcript for the educational intervention. The information contained within the brochure was reviewed for content and clarity and approved by a panel of experts, which included two obstetricians, one midwife, three labor nurses, the nurse manager of the labor unit, nurse educator of the labor unit, and a women's health nurse practitioner. Participants in the control group received standard care and did not receive the comfort 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 study 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, Sampselle, & Kolcaba, 2011). For example, the woman who chose to have limited pharmacologic interventions for pain during labor may not only 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 not only 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). The educational brochure used for this study was verbalized by the primary investigator to the participants to allow participants a chance to ask questions as the content within the brochure was shown to the participants. Participants were allowed to select comfort measures, from a list on the brochure, they would consider using during labor.

Data Analysis

A pain score and comfort score were documented during latent/active labor (1–5 cm) and again during active/transition labor (6–10 cm). These time periods for score collection were chosen based on prior research to assist with comparison of data (Schuiling et al., 2011). The Childbirth Comfort Questionnaire (CCQ) was used to collect data regarding comfort scores during labor. The CCQ was modeled after the General Comfort Questionnaire, which was developed in the year 2002 (Schuiling et al., 2011). Face validity was established by a panel of experts, and internal reliability of the CCQ was obtained by using Cronbach's α , which was 0.71 (Schuiling et al., 2011). An 11-point (0–10) numerical rating scale (NRS) was used to collect data regarding pain scores. This instrument 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. Both the CCQ and the 11-point NRS were verbalized by the primary investigator to the participant and scores recorded in between contractions to avoid imposing unnecessary stress on the participants.

Parametric statistics, Kendall's tau, and the chi-square test were entered by the primary investigator. An alpha (α) of .05 was used to determine significance. Demographics were explored using *t* tests and ANOVA tests as appropriate. Prior to conducting analysis, data were analyzed for outliers and multicollinearity. Prior to conducting *t* tests and ANOVA, data were screened to eliminate or transform outliers and assure that assumptions of normality, homogeneity of variance, and factor interaction were met. Assumptions were met for all parametric tests conducted. The Wilcoxon rank sum test was used 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. To adjust for multiple comparisons, a Bonferroni-corrected α of $0.05/6 = 0.008$ was used for the six comparisons of comfort scores and pain scores.

RESULTS

Ninety-eight women were identified for inclusion in this project during admission to the labor and birth unit from June 2014 to September 2014. 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. Of the 15 participants who did not complete both posttest surveys, 5 participants were from the intervention group and 10 from the control group. Reasons for not completing the second surveys included participant progressed to second stage labor too quickly or primary investigator not notified of progression in a timely manner ($n = 9$), emergency cesarean surgery ($n = 1$), participant declined to answer the second comfort survey and/or pain survey for personal reasons ($n = 4$), or participant left the facility prior to 6–10 cm dilation ($n = 1$). The final sample size ($n = 80$) was used for all data analysis. Recruitment stopped when 80 complete cases were obtained. 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.

Outcomes

Variables were created for the change in comfort score and pain score from Time 1 to Time 2 (i.e., Time 2 score – 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 used 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. To adjust for multiple comparisons, a Bonferroni-corrected α 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 ($Mdn = 3.50$).

Comfort scores for Group 1 did not significantly differ from Group 2 at Time 1 or Time 2. 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 did not significantly differ from Group 2 at Time 1 or Time 2. 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.

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. There was no statistically significant difference in plans for maintaining comfort during labor between Group 1 (educational

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	21	2
Black	21	79	22
White	78		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 birth			
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

Note. OB/GYN = obstetrician/gynecologist.

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 2.

The participant's plans 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

TABLE 2

Comfort Control Plans 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)
Plans for comfort			
1–2 options	62.5	59	66
3–4 options	35	41	29
5 or more options	2.5		5

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 3.

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 0 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 0 were recoded to a value of 1 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 4.

DISCUSSION

The purpose of this project was to determine if providing education on comfort and comfort options

TABLE 4

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

Characteristic	Group 1 (<i>n</i> = 39)	Group 2 (<i>n</i> = 41)	Total	<i>p</i> Value
Change in pain control choice	16	25	41	.074
No change in pain control choice	23	16	39	
Total	39	41	80	

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. The findings of this project suggest 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 increased pain, scores decreased. This is an expected and rational finding that is supported by literature (Schuiling et al., 2011). Because of the low number of participants who labored without pain medication, epidural, or a combination of pain medication and epidural, comparisons between unmedicated 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 no 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.

Results indicate pregnant women make plans prenatally regarding pain control during labor, and most participants had decided on pain control options prior to labor. Plans for pain control during

TABLE 3

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**

** $p < .01$.

labor may be driven by health-care 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, through childbirth education, or during the prebirth hospital visit to allow women an opportunity to plan in advance for use of nonpharmacologic measures during labor and to also provide information regarding differences between comfort and pain during labor. Current literature implies that a woman perceives more value in childbirth education when there is a feeling that the education is critical to her outcome (Hollins Martin & Robb, 2013). If health-care 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. Placing more value on comfort during labor can also empower the support person to assist in providing care to the women in labor.

Reports of increased pain and decreased comfort may have resulted in the need for use of more comfort measures. The need for an increased number of measures to maintain comfort in the presence of reduced comfort and increased pain is a logical finding because humans typically seek to maintain comfort (Kolcaba et al., 2004). The frequency, duration, or continuity of use of comfort measures were not recorded in this study. 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 suggest 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 study, it can be speculated that the level of comfort and pain may have differed significantly if use of comfort measures was equal between groups. Findings indicate 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.

Several limitations of this project must be acknowledged. Educating women at the onset of labor is not ideal. Multiple variables that may have influenced comfort and pain scores of participants and the progression of labor can vary considerably, which makes it difficult to standardize findings. In addition, the definition of active labor was ambiguous at the research site for inductions and may have influenced results related to length of labor. Last, some participants already had an epidural in place prior to the intervention or Time 1 data collection (Group 1, $n = 4$ and Group 2, $n = 7$), which may have affected results for comfort scores, pain scores, and use of comfort measures during labor.

Implications for Practice

Educating women in labor about available options for maintaining comfort in the hospital setting can empower women to make informed choices for pain and comfort control during 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 in Group 1 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. Although a brief education on comfort options at the onset of labor is not ideal, it may provide some benefit to women who do not attend childbirth education classes prior to labor. Childbirth educators can also use the information gained from this research to educate women on the importance of making choices for labor that support maternal preferences. Nurses working with women during labor and birth may also benefit from additional training in comfort measures for women.

Implications for Research

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.

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