The Effects of Childbirth Education on Maternity Outcomes and Maternal Satisfaction

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ABSTRACT

Past evaluation of the effectiveness of childbirth education classes related to obstetric outcomes and satisfaction with the birth experience have not shown consistent results. This study explored the relationship between attendance of set curriculum childbirth education class and the labor and birth process, as well as maternal satisfaction with the birth experience. Participants were 197 low-risk, primiparous women, self-selected into two groups consisting of 82 women who attended a childbirth class and 115 women who did not. Data were collected from medical records and a postpartum satisfaction survey was completed by each participant. The authors designed the Likert-type satisfaction survey based on "control" as a key factor in satisfaction. Data analysis revealed that women who took a class were less likely to be induced and had lower use of analgesics during labor. A logistical regression model showed that an increase in the number of interventions increased the risk for cesarean surgery for all women. Labor interventions were used significantly less in women who took a childbirth class. No statistical difference was seen in the perception of control or overall satisfaction of the birth experience. Childbirth education may help women prepare for what to expect in birth and minimize the use of medical interventions.

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INTRODUCTION

Childbirth education classes have evolved in recent decades as obstetrical practices have changed. The revolution of childbirth preparation began in the late 1940s and has grown based on expectant parents' desire for a more natural birth process. Modern expectant parents want information that is current and evidence based. The curriculum and credentials of past educators varied. As obstetrical practices evolve, childbirth education curriculum needs to keep up with these changing practices. Presently, teacher certification programs have helped shape the overall content and quality of classes. Instructors receive feedback from the participants regarding

their methods and content in the form of an evaluation at the end of the course. However, the true test of how information is applied often isn't known.

Today, some expectant parents continue to desire a natural birth, yet the use of epidural anesthesia, induction of labor, and cesarean surgery have increased annually. The Centers for Disease Control and Prevention (CDC) reports a national epidural rate of 61% (Osterman & Martin, 2011). Over the last several decades, the percentage of women who use nonpharmaceutical methods has steadily declined and epidural/spinal anesthesia has become the most common pain relief method. The CDC also reports (Osterman & Martin, 2014) the overall national induction rate is at 23.3% and has been declining incrementally since 2010. Research has demonstrated greater risk of morbidity and mortality among infants delivered at 35- to 38-week gestation when compared with those delivered later in pregnancy. When evaluating the rate of individual states, Alaska had a reported rate of 33%—among the highest rates in the nation—and has not mirrored the trend of declining rates seen in the majority of states (Osterman & Martin, 2014). Cesarean surgery is the most commonly performed major surgery in the United States. Over one-third of pregnancies in the United States are delivered by cesarean and there is growing knowledge of morbidities associated with repeat cesarean surgeries. Of the U.S. woman who require an initial cesarean surgery, over 90% will have a subsequent repeat cesarean (Spong, Berghelle, Wenstrom, Mercer, & Saade, 2012). The Healthy People target for 2020 is a cesarean surgery rate of 23.9% in low-risk full-term women with a singleton, vertex presentation (U.S. Department of Health and Human Services, 2018).

Evaluation of the effectiveness of preparatory classes related to obstetric outcomes and satisfaction has not shown a consistent pattern. Studies support that childbirth education may help mothers feel in control, relieve anxiety, decrease pain medications and medical interventions, and empower couples in their transition to parenthood (Akca et al., 2017; Goodman, Mackey, & Tavakoki, 2004; Hetherington, 1990; Karabulut, Coskuner Potur, Dogan Menh, Cebeci Mutlu, & Demirci, 2015; Koehn, 2008). Koehn found that contemporary women value childbirth education in helping them to prepare for birth (Koehn, 2008).

Caregivers have less time to spend teaching women. Findings from two studies indicated that less than 10% of the total workday of labor and delivery nurses was spent providing supportive care (Gagnon & Waghorn, 1996; McNiven, Hodnett, & O'Brien-Pallas, 1992). Collaboration across disciplines benefits patients by incorporating teaching-learning strategies to meet the needs of the mother and infant to improve perinatal outcomes (Thielen, 2012). Ultimately, an optimal birth is the goal for both the parents and caregivers. Patient education can facilitate the best outcome for mother and infant.

Patient satisfaction is used by organizations to measure the quality of care, avoid litigation, make decisions on allocation of services, and maintain a competitive edge. Maternal satisfaction with the birth can affect physical and emotional health, breastfeeding, and bonding with the infant and the partner relationship (Gagnon & Waghorn, 1996). Maternal satisfaction is relevant to the overall quality of care and a positive transition to motherhood.

The parenting program at this Alaskan, nonprofit, midsize hospital has been offering childbirth classes since 2000. Since then, the program has grown and now offers four childbirth classes a month in three different formats: 4-night, 5-night, and a 1-day overview. The hospital saw 1,007 term singleton infants born to first time moms in 2017, averaging 84 deliveries per month. Roughly 26% of the primiparous women delivering at this hospital attended one of the childbirth classes offered through the parenting program. All educators are certified, and a general curriculum is set by the International Childbirth Education Association. All classes include information relating to healthy pregnancy, anatomy and physiology, stages of labor, relaxation, pain management, comfort measures, labor positions, breathing and pushing techniques, common medical interventions and pain medications, birth planning, cesarean birth, postpartum care for the family, early newborn care, and basic breastfeeding information. Tours of the maternity center are encouraged and offered outside of the class. The classes average 6 couples per series with a maximum of 10. The parenting program mission aims to provide education and support for all families in the community. The initial inquiry that led to this study was whether or not current class structure was helping to improve physical and emotional outcomes and in what areas curriculum might be revised.

Modern expectant parents want information that is current and evidence based.

METHOD

The primary objective of this study was to evaluate the effect of childbirth education classes on labor and birth outcomes and maternal satisfaction in primiparous women. The desired outcome would be lower medical interventions such as: cesarean surgeries, induction, oxytocin use, artificial rupture of membranes (AROM), second-stage interventions, epidurals, and analgesic medication, in addition to higher maternal satisfaction. Research protocol approval was obtained by the Institutional Review Board.

A comparative design was used to evaluate the effect of childbirth education on labor and birth outcomes and maternal satisfaction. This Alaskan, nonprofit, midsize hospital in an urban setting had 2,006 deliveries in 2017, with 1,007 (38.7%) of those births to primiparous women. This study recruited 208 low-risk, primiparous women, of which 11 were excluded due to age, failure to complete the questionnaire, or having been determined to be high risk upon data collection from the records. The final study population included 197 low-risk, primiparous women: 115 non-attendees and 82 attendees of a childbirth class (see Table 1 for demographic information). Participants self-selected into two groups based on their attendance or lack of attendance in one of the childbirth education classes offered by the hospital parenting program. Participants were recruited from childbirth classes, physician/midwife offices, and the hospital maternity center. A $5 gift certificate to the hospital maternity boutique was offered as an incentive to complete the questionnaire. Once consent was obtained and inclusion criteria met, the participants completed a survey assessing their attendance or non-attendance group, demographics, and maternal satisfaction using a Likert-type questionnaire. The body of the questionnaire was designed to include five categories of mothers' perceived "control" during the birth process, based on Namely and Lyerly's (2010) study. These included self-determination, respect, personal security, attachment, and knowledge. Information relevant to patient care, caregiver preference, timing of data collection, infant age in days, and infant feeding were also included. Cronbach's alpha showed good reliability of the questionnaire tool developed by the authors (α .714). Data were collected from participant birth records regarding use of medical interventions and type of birth.

When comparing the indications for cesarean surgery documented in the medical record, the group that did not attend a childbirth class had more elective cesarean surgeries as well as fetal heart rate issues, second stage arrest and large for gestational age.

RESULTS

Table 2 displays the type of birth and the interventions used during labor and birth in the compared groups. The type of birth was equally comparable in both groups (26.09% vs. 26.83% cesarean rate). Data collected showed that the only significant difference in interventions for the compared groups was that attendees had lower induction rates (p = .0441) and less analgesic use (p = .0006). The overall induction rate was 24.37% (n = 48 of 197 total). The induction rate for non-attendees was 29.57%. The induction rate for attendees was 17.07%. Postdate was the most common reason for induction in both groups. When comparing the indication for induction, the non-attending group had higher elected inductions, rupture of membrane, large for gestational age, and fetal heart rate issues. Interestingly, all five elective inductions were women who did not attend a class. When analyzing inductions and cesarean surgery, 39.58% (n = 19) of the total inductions (n = 48) resulted in a cesarean surgery.

When comparing the indications for cesarean surgery documented in the medical record, the group that did not attend a childbirth class had more elective cesarean surgeries as well as fetal heart rate issues, second-stage arrest, and large for gestational age. Of note, cesareans for large for gestational age were indicated for an estimated fetal weight greater than 9 lbz. At birth the babies' actual weights were 8 lbs 1 oz and 8 lbs 6 oz (2 weeks after the ultrasound for estimated fetal weight). Attendees of a childbirth class had a higher rate of breech presentation as an indication for cesarean surgery although this did not significantly change the overall rate of cesarean surgery.

A logistic regression of the number of interventions (cervical ripening, oxytocin, AROM, cervical dilation device, epidural, analgesics) and the risk for cesarean surgery was performed. Results of the binary logistic regression show a significant association between volume of interventions and the need for a cesarean surgery (χ^2 (1) = 5.47, p = .019) such that the exponentiated odds ratio showed for every

TABLE 1

Demographics Based on Class Attendance

	Class Attendance	
	Yes (n = 82) % (n)	No (n = 115) % (n)
Age		
18–23	12.2 (10)	36.5 (42)
24–29	43.9 (36)	43.5 (50)
30–34	43.9 (36)	20 (23)
Marital status		
Married	81.7 (67)	54.8 (63)
Single	4.9 (4)	15.7 (18)
Living with partner	12.2 (10)	29.6 (34)
Separated	1.2 (1)	0 (0)
Education		
Less than high school	0 (0)	.01 (1)
High school/General Education Diploma	7.3 (6)	27.8 (32)
Some college	15.9 (13)	34 (39)
College degree	50 (41)	30 (34)
Graduate degree	26.8 (22)	.08 (9)
Income		
<$20,000	.01 (1)	13.9 (16)
$20,000–39,999	9.8 (8)	26 (30)
$40,000–99,999	34.1 (28)	39.1 (45)
>$100,000	54.9 (45)	9.6 (11)
Ethnicity		
White/Caucasian	82.9 (68)	55.7 (64)
Black/African-American	1.2 (1)	7 (8)
Asian	6 (5)	18.3 (21)
Native Hawaiian/Pacific Islander	1.2 (1)	8.7 (10)
Hispanic or Latino	6.1 (5)	5.2 (6)
From multiple races	2.4 (2)	5.2 (6)
Pregnancy		
Early	15.9 (13)	20 (23)
Full-term	61 (50)	69.6 (80)
Late-term	23.2 (19)	10.4 (12)
Feeding		
Only breastmilk	95.1 (78)	78.3 (90)
Breastmilk supplementing with Combination breast-milk and artificial supplements	3.7 (3)	19.1 (22)
Formula	1.2 (1)	2.6 (3)

TABLE 2

Contingency Table Analyses for Birth Outcomes Based on Class Attendance

Variable	**Class Attendance (*n*)**				
	Yes (n = 82) % (n)	No (n = 115) % (n)	χ^2	df	p-value
Type of birth					
Spontaneous Vaginal Delivery	73.2 (60)	73.9 (85)			
Cesarean surgery	26.8 (22)	26.1 (30)	0.014	1	ns
Induced	17.1 (14)	29.6 (34)			
Not induced	82.9 (68)	70.4 (81)	4.053	1	.0441
Augmented	63.4 (52)	59.1 (68)			
Not augmented	36.6 (30)	40.9 (47)	3.69	1	ns
Analgesic	29.3 (24)	54 (62)			
No analgesic	70.7 (58)	46.1 (53)	11.82	1	.0006

(*Continued*)

TABLE 2

Contingency Table Analyses for Birth Outcomes Based on Class Attendance *(Continued)*

Variable	Class Attendance (*n*)				
Second-stage intervention					
Yes	12.2 (10)	.09 (10)			
No	87.8 (72)	91.3 (105)	.643	1	ns
Prostaglandin					
Yes	17.1 (14)	20 (23)			
No	83 (68)	80 (92)	.269	1	ns
Pitocin					
Yes	53.7 (44)	54.8 (63)	.024	1	ns
No	46.3 (38)	45.2 (52)			
AROM					
Yes	31.7 (26)	33.9 (39)	.106	1	ns
No	68.3 (56)	66.1 (76)			
Epidural[a]					
	n = 76	*n* = 105			
Yes	76.3 (58)	73.3 (77)			
No	23.7 (18)	26.7 (28)	.207	1	ns
Progression at admission[b]					
	n = 50	*n* = 60			
0–3.5	28 (14)	35 (21)			
4–5.5	38 (19)	40 (24)			
6–10	34 (17)	25 (15)	1.207	2	ns

Note. AROM = artificial rupture of membranes.

[a]Spinal anesthesia was not included in this data.

[b]Progression at admission was not documented by the provider for all participants.

TABLE 3

Logistic Regression Analysis of Type of Birth (Cesarean, SVD) by JMP Pro 12

Predictor	β	Seβ	Wald's χ^2	df	*p*	Odds Ratio	Unit Odds Ratio
Constant	-1.71	.347	24.18	1	.0001	N/A	N/A
Total interventions	.28	.12	5.47	1	.0193	5.406	1.325
Test							
Overall model evaluation			χ^2	df	p	R^2	
Likelihood ratio test			5.68	1	.0172	.025	

additional intervention, the odds of a cesarean were 1.32 times more likely (Table 3).

When comparing the two groups in their number of interventions and cesarean risk, women who took a childbirth class had fewer interventions overall. Labor interventions were used more often in those who did not attend a class, but the difference was not significant.

There was no significant difference seen in the maternal perceived "control" or overall satisfaction when comparing the two groups. Both groups had a comparable experience with pain management (medications and/or comfort measures). The majority of the women who attended a childbirth class noted the childbirth class was helpful to them in the birth process. When asked about the method of infant feeding at the time of the survey, more mothers in the group who had attended a childbirth class were exclusively breastfeeding their infant (95% attendees vs. 78% non-attendees). The majority of both groups were feeding some breastmilk to their infant. Most mothers completed the survey within 4 days postpartum.

DISCUSSION

This study's findings show that mothers who attended childbirth classes at this facility had a lower induction rate and analgesic use and the overall number of interventions were higher in non-attendees of a class. While attendance of a childbirth class does not seem to influence the type of birth a woman experiences, data show that it may decrease the induction rate, as well as reduce the total number of interventions. Most inductions depend on the caregiver's interpretation, recommendation, or

action in response to the developing situation. The overall likelihood of vaginal birth is lower after labor induction than after spontaneous labor, especially when labor induction is attempted in a nulliparous woman with an unfavorable cervix (Osterman & Martin, 2008). As the number of interventions increases, so does the risk of cesarean surgery and thus could follow that cesarean risk is reduced by attending childbirth class. The most effective approach to reducing overall morbidities related to cesarean surgery is to avoid the first cesarean (Spong et al., 2012). Further, by reducing elective inductions and elective cesarean surgeries the total number of first cesarean surgeries could be decreased. As indicated in other studies, the caregiver performance and procedures may have a bigger impact on intervention use and outcomes in birth (Spong et al., 2012).

Use of epidural anesthesia is common among both women who attend a childbirth class and those who do not. In this study, analgesics were used more often in the labor of women who did not attend a class. Curriculum for the childbirth series includes information about the risk and benefits associated with both methods of pain management. Conditions of labor and birth that are shown to be associated with the use of epidural/spinal anesthesia include increased risk of instrumental birth (forceps or vacuum), fetal malposition, a longer second stage of labor, and fetal distress (compared with women who received opiates, intravenously or by injection; Osterman & Martin, 2011). Trends in acceptance of epidural anesthesia as "normal" may be a factor in the rate of use as well as cultural differences and the attitudes of medical professionals toward pain management. Pain management with medications rather than comfort measures such as breathing techniques and/or positions and the risks of such may not be enough to override the benefits perceived by contemporary women.

This study did not find that attendance of a childbirth class had a significant impact on satisfaction with the birth process over non-attendance or the perceived level of "control" in labor and birth, which suggests that this may not be associated with childbirth education. Limitations include the timing of the survey in relation to birth (majority within < 4 days postpartum) and the mothers' opportunity to reflect on the birth experience. The sample size of the participants who had lower satisfaction scores was too small to be of use in this study although further analysis revealed those women had labors that were longer than 24-hours and resulted in a cesarean surgery. This might warrant further study including variables that could change the outcome such as doula use, midwives versus doctor, type of pain management used, food consumption, and so on.

Although, breastfeeding rates were not part of the initial inquiry, it was discovered that at the time of survey, the exclusive breastfeeding rate was higher among attendees. The yearly exclusive breastfeeding rate for the hospital was 62.95% in 2017. Attendees of a childbirth class were exclusively breastfeeding at a rate of 95% versus 78% of non-attendees. Healthy People 2020 goals cite an objective of increasing the proportion of infants who are ever breastfed at a target of 81.9% (U.S. Department of Health and Human Services, 2018). Those women who were feeding their infants exclusively formula or supplementing with formula were noted to be predominantly of ethnic minority, be of lower income, lower education, younger and unmarried compared to those who were exclusively breastfeeding. Research regarding the association between childbirth education and breastfeeding outcomes is needed.

Demographic information from this study will help to shape the future of the childbirth and parenting education program at this hospital. An initial step of offering an online childbirth class that allows for greater flexibility for working families, language differences, and provides an opportunity to reach out to remote populations in the state has been implemented. Further discussion and evaluation should be done in order to have a clear plan to improve outreach and recruitment and to create programs that better reflect the needs of the community, especially for younger, single women of ethnic minorities, lower income, and lower education.

Women who receive education on the risks and benefits of interventions such as induction, augmentation, and cesarean surgery, may ask more questions and a have a greater capacity to be involved in the decision making process around these choices. Although women aren't the one interpreting and making the judgment for these interventions, they can influence their caregivers' decision. Research has been inconclusive as to whether attending a childbirth series improves outcomes for families.

This study's findings show that mothers who attended childbirth classes at this facility had a lower induction rate and analgesic use and the overall number of interventions were higher in non-attendees of a class.

However, evaluators of childbirth education should also consider women's motives for enrolling in classes and not necessarily view classes as an intervention tool (Murray, 1990; Strurrock & Johnson, 1990). The purpose of childbirth education for health-care providers most likely is different than for pregnant women. Women may not be looking for information to decrease their induction rate or use of pain medications. Future studies to better understand the objectives of women in taking a childbirth class would help shape the curriculum based on those objectives.

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