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The effect of attending a prenatal childbirth preparedness course on labor duration and outcomes

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Abstract

Objective: To evaluate the effect of attending a prenatal childbirth preparation course (CPC) on labor duration and outcomes.
Methods: A cross sectional study of 53 primiparous women who attended and 54 women who did not attend a CPC was conducted. The state-trait anxiety inventory (STAI) score was used to diagnose anxiety. Clinical and obstetrical data were collected from the perinatal database of our center. Through post-partum interviews, coping strategies were assessed, patients graded their childbirth experience and breastfeeding was evaluated. Data were analyzed using description analyses and a P-value < 0.05 was considered statistically significant.
Results: The STAI score was significantly lower in the study group compared with controls ($P = 0.025$). The first stage and the entire duration of labor were significantly shorter ($P = 0.036$ and $P = 0.026$, respectively) in women who attended the CPC. No significant differences were found with regard to the mode of delivery, rate of episiotomy, use of analgesics and neonatal outcomes between the groups. Women in the study group rated their labor experience significantly higher ($P = 0.016$) and exhibited significantly higher rates of breastfeeding ($P < 0.001$) than controls.
Conclusions: The knowledge acquired in the CPC has positive effects on the course of labor and delivery outcomes as well as higher rates of breastfeeding.

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Keywords: Breastfeeding; childbirth; childbirth preparedness course; duration of labor; pain; stress; state-trait anxiety inventory (STAI).

Introduction

In the Bible, Eve was punished for her sin, "…in sorrow thou shalt bring forth children" (*Genesis* 3:6). Sorrow is defined as the distress, grief, sadness, or regret caused by loss, affliction, or disappointment [1]. Today, more than 5000 years later, women still have an array of negative feelings and emotions that accompany pregnancy and delivery. These may have detrimental effects on both maternal and neonatal pregnancy outcomes such as preterm delivery, cesarean section (CS) and maternal depression after birth, among others [2–7].

Fear of childbirth has gained growing attention. One out of every five pregnant women fear childbirth [3, 4]. Several factors have been associated with increased prevalence of fear of childbirth, including young maternal age, nulliparity, pre-existing psychological problems, lack of social support and a history of abuse or adverse obstetric events [8–10]. Anxiety and fear of childbirth is reported as being severe and symptomatic in many women. Symptoms may manifest as nightmares, physical complaints and difficulties in concentrating on work or on family activities [4, 6]. A possible explanation for these observations can lie in increased plasma concentrations of catecholamines often seen in states of anxiety and fear [3, 11–13].

It has been postulated that antenatal preparation could play a major role in the health of the mother and newborn during labor and postpartum. Studies on the treatment for fear of childbirth are few, and no consensus exists on how, where and by whom the possible treatment should be given [14]. Childbirth preparation and support during pregnancy and delivery are principal elements in such care. Education and information reduce concerns on the infant's health, but relaxation training and methods of coping with pain are needed to alleviate general anxiety [4].

Studies evaluating birth preparation courses and interventions have shown conflicting results. Following birth

preparation courses and interventions, favorable effects such as reduction in dystocic deliveries, decreased duration of vaginal labor and CSs were noted. Moreover, reducing high childbirth fear levels and increasing childbirth confidence in pregnant women promotes antenatal emotional well-being and may have wider positive social and maternity care implications for optimal childbirth experiences [15–18]. Others have shown no reduction in the request for cesarean delivery or use of overall pain relief medication [19, 20].

Every year about 135,000 pregnant women receive prenatal services in Israel. This care is provided mainly in mother and child health clinics. The purpose of these clinics is to monitor the health of pregnant women and their fetuses, diagnose and detect high risk pregnancies, advice, educate, support and provide preventive and therapeutic treatment where appropriate [21]. Prenatal care is an integral part of health services provided to all women in Israel, whether as part of preventive medicine or therapeutic health care. Lately, care is increasingly being delivered by other providers including private doctors, primary care clinics and women's health clinics. Women are also increasingly using this array of services in conjunction with the traditional mother and child health clinics or instead of them [22].

We undertook this study in order to evaluate the effect of childbirth preparedness courses on labor duration and perinatal outcomes.

Methods

Study population and setting

In this cross sectional study, 53 primiparous women were compared with 54 primiparous women who did and did not attend a prenatal childbirth preparation course, respectively. Women delivered between April and July 2014 were considered. Deliveries occurred at the Soroka University Medical Center (SUMC), a 1000-bed tertiary teaching hospital. It is the only tertiary center for a population of 700,000 residing in Southern Israel. During the study period, the annual number of deliveries managed at our medical center was around 15,000.

Women with full oral and written comprehension of the Hebrew language, between the ages of 18 and 46, following their first delivery at SUMC were included in the study. Women with preterm deliveries, stillbirth, multiple gestation, home or road delivery, known genetic or congenital fetal abnormalities and those with lack of prenatal care were excluded from the study.

Study tool: state trait anxiety inventory (STAI)

The STAI is an instrument that quantifies adult anxiety. This particular instrument is used to simplify the separation between state anxiety (a temporary emotional state experienced by many) and trait anxiety (a consistent personality attribute), feelings of anxiety and depression. The STAI includes a 40 question response, taking approximately 5–10 min for completion and the test was validated in the Hebrew language. This test is split into the S-Anxiety scale and the T-Anxiety scale, each having 20 items. These tests are answered on the basis of a 1–4 scale, with the focus areas including: worry, tension, apprehension and nervousness. Anxiety as measured by the STAI score is usually divided into three categories. A score of 20–40 represents normal anxiety, a score of 40–50 represents intermediate anxiety and a score over 50 represents severe anxiety.

Study design

The study was approved by the Institutional review board committee of the SUMC. Participants that met the inclusion criteria and were not excluded were identified at the maternity admission unit. After giving an informed consent to participate in the study, demographic data, data regarding the childbirth preparedness course and a stress and anxiety evaluation using a validated questionnaire, the STAI were obtained pre-partum before initiation of active labor.

Following delivery data were collected from the patients' medical and obstetrical hospital records. Data included information on maternal baseline characteristics, co-morbidities and pregnancy complications; data regarding the delivery including mode of delivery, length of first and second stages of labor, and neonatal data including birth weight, Apgar scores, cord blood gas and complications.

During the postpartum period, a thorough face-to-face or telephone interview was conducted during which patients graded their childbirth experience and breastfeeding and these were evaluated.

Statistical analysis

All statistical analyses were processed using statistical package for the social sciences (IBM SPSS Statistics for Windows, Version 22.0., IBM Corp., Armonk, NY, USA). Statistical significance of the categorical variables was tested using the chi-square or Fisher's exact test, as appropriate. For continuous variables, the Student's *t*-test was used. Multivariable logistic regression models were carried out to control for confounders. Pearson's correlation coefficient was used to measure the linear dependence between variables. A P-value < 0.05 was considered statistically significant.

Results

During the study period, primiparous women were randomly approached at the maternity admission unit and 107 were found eligible to participate in the study. Women who underwent a prenatal childbirth preparedness course ($n = 53$) comprised the study group, while 54 women who did not, served as controls. Post-delivery data were retrieved for all participants but one woman from the

Table 1: Demographic characteristics of parturient who did and did not attend a childbirth preparedness course.

Characteristic	Childbirth preparedness course	No childbirth preparedness course	P-value
Maternal age	28.4 ± 4.0	25.2 ± 4.3	< 0.001
BMI	28.75 ± 6.8	28.15 ± 4.91	0.638
Ethnicity			< 0.001
Jewish	94.3%	70.4%	
Bedouin Arabs	5.7%	29.6%	
Native born	79.2%	85.2%	0.421
Time from immigration (years)	16.7 ± 5.6	15.0 ± 9.6	0.628
Dwelling place			0.003
Urban	69.8%	40.7%	
Rural	30.2%	59.3%	
Self-reported religious affinity			0.98
Religious	49.1%	33.3%	
Secular	50.9%	66.7%	
Education			0.02
High school education or less	15.1%	42.6%	
Higher education	84.9%	57.4%	

Data are presented as mean ± SD or percentage as appropriate.
BMI = Body mass index.

Table 2: Labor and delivery characteristics of parturient who did and did not attend a childbirth preparedness course.

Characteristic	CPR	No CPR	OR	95% CI	P-value
Vaginal delivery	66.0%	73.6%	1.43	0.62–3.30	0.397
Induction of labor	71.2%	86.5%	0.38	0.12–1.04	0.055
Epidural analgesia	77.4%	84.6%	0.62	0.23–1.67	0.344
Episiotomy	29.8%	30.6%	0.96	0.40–2.30	0.930
Perineal tears	41.3%	44.9%	0.86	0.38–1.95	0.724
PPH	3.80%	3.80%	0.98	0.13–7.23	0.999
Duration of labor					
First stage of labor (min)	332 ± 233	441 ± 272	0.99	0.99–1.00	0.036
Second stage of labor (min)	81 ± 54	85 ± 51	0.99	0.93–1.07	0.660
Third stage of labor (min)	12.8 ± 4.8	12.0 ± 6.5	0.99	0.99–1.00	0.980
Total duration of labor (min)	42 ± 2345	551 ± 308	0.99	0.99–1.00	0.026
Duration of hospitalization (days)	3.39 ± 0.66	3.13 ± 0.55	2.16	1.02–4.60	0.033

PPH = Postpartum hemorrhage; min = minutes.

study group who had delivered elsewhere. Five women from the study group and four controls had not responded to the telephone after numerous attempts to reach them. Therefore the 48/53 and 50/54 women in the study and control group, respectively, had completed the post-delivery interview. There was no significant difference between the groups in the response rate (P = 0.742).

Demographic characteristics of the study population are presented in Table 1. In the study group, patients were significantly more likely to be older, of Jewish ethnicity (as opposed to Bedouin Arabs), urban dwellers and have a higher level of education. No differences were noted between the groups with regard to BMI, native birth place, duration since immigration or religious affinity.

We evaluated obstetrical characteristics of patients who did and did not attend a childbirth preparedness course including nulliparity, spontaneous gestation, high-risk pregnancy, gestational hypertensive disorders, gestational diabetes mellitus, intrauterine growth restriction and pre-gestational comorbidities. No significant differences were noted between the groups.

Table 2 presents labor and delivery characteristics of parturient who did and did not attend a childbirth preparedness course. No significant difference was noted between the groups with regard to mode of delivery although rates of labor induction were lower among patients who attended a childbirth preparedness course (71.2%) as compared to the controls (86.5%). Nevertheless,

Table 3: STAI score, patients' self-graded childbirth experience and breastfeeding rate among parturient who did and did not attend a childbirth preparedness course.

Characteristic	CPR	No CPR	P-value
STAI score	38.11 ± 11.02	43.22 ± 12.21	0.025
Patients' self-graded childbirth experience	7.0 ± 2.9	5.6 ± 3.0	0.016
Breastfeeding	86.8%	54.7%	< 0.001

Data are presented as mean ± SD or percentage as appropriate.

this difference showed only borderline significance (P = 0.055). No statistical difference was noted between the groups with regard to use of epidural analgesia. When comparing the duration of the different stages of labor between the groups, we found that patients who attended a childbirth preparedness course had a significantly shorter mean first stage of labor (P = 0.036) as well as significantly shorter mean total labor duration (P = 0.026). Duration of hospitalization was found to be slightly longer for patients who attended the childbirth preparedness course. However, this difference was statistically significant (3.39 ± 0.66 vs. 3.13 ± 0.55, P = 0.033).

The perinatal outcomes of patients who did and did not attend a childbirth preparedness course that were evaluated included gestational age at birth, neonatal gender, Apgar scores at 1 min and 5 min, cord blood Ph, birth weight and respiratory distress syndrome. No significant differences were noted between the groups.

In the univariate analysis, the STAI score was significantly higher in patients who did not attend a childbirth preparedness course than in those who did attend the course (Table 3). Moreover, more patients who did not attend a childbirth preparedness course scored higher than 50 in the STAI (severe anxiety) however this difference did not reach statistical significance (24.1% vs. 13.2%, P = 0.149). In a multivariate analysis controlling for maternal age and childbirth experience grading, anxiety was not found to be independently associated with attending the childbirth preparedness course (P = 0.164). Using the Pearson's correlation coefficient to measure the linear dependence between the STAI score and other variables (labor duration and neonatal birth weight), no correlation was demonstrated between the parameters. In an attempt to predict anxiety, another multivariate model was constructed, while controlling for attending the childbirth preparedness, maternal age, marital status, ethnicity, urban dwelling place and higher education level. While a higher educational level and ethnicity were found to be independently associated with the STAI score (P = 0.006 and P = 0.016, respectively), attending the childbirth preparedness course was not (P = 0.894). Patients' self-graded childbirth experience and rate of breastfeeding were significantly higher among patients who attended the childbirth preparedness course (Table 3). No significant association was found between the STAI score and patients' self-graded childbirth experience (Pearson's r = – 0.052, P = 0.602).

Discussion

In the current study, we aimed to evaluate the effect of attending a prenatal childbirth preparedness course on labor duration and outcomes. The main findings of our study are that attending a prenatal childbirth preparedness course was associated with a significantly shorter first stage and total duration of labor and with an improved labor experience and significantly higher rates of breastfeeding.

Clinical fear of childbirth complicates approximately 20% of pregnancies in developed countries where it is mostly evaluated. Severe clinical fear affects some 6%–10% of parturients [4, 6]. Fear of childbirth can be attributed to biological (fear of pain), psychological (related to personality, previous traumatic events, or fear of future parenthood), social (lack of support, economic uncertainty), or secondary (originating from previous childbirth experiences) reasons and factors [4].

In the current study, a difference of borderline significance was demonstrated between groups in rates of labor induction that were lower among patients that attended a childbirth preparedness course. Nevertheless, no significant difference was noted between the groups with regard to the mode of delivery, use of epidural analgesia and neonatal outcomes. These results are similar to previous studies [16, 18, 23] that found no differences between groups for use of pharmacological analgesia, induction of labor or neonatal outcomes.

In a study of 2206 women with intended vaginal delivery, women with fear of childbirth spent 1.54 h (1 h and 32 min) longer in labor than women with no such fear. This was reduced to 0.78 h (47 min) after adjustment for other factors associated with labor duration. However, the duration of labor remained significantly longer in these women [3]. In our study we found that, patients who attended a childbirth preparedness course had a significantly shorter mean first stage of labor as well as significantly shorter mean total labor duration. The second and third stages of labor were not significantly different between the groups; however these are less likely to change regardless of prenatal interventions. Although no correlation was found between the STAI scores

and labor duration, attending a prenatal childbirth preparedness course may have wider positive social and obstetrical care implications other than alleviating anxiety.

Breastfeeding for all infants is strongly supported by both governmental and medical professional organizations because of its acknowledged benefits to the infant with respect to nutrition, gastrointestinal function, host defense and psychological well-being. In addition to these direct short-term benefits, breastfeeding is associated with long-term benefits to the infant. As with infants, breastfeeding provides direct clinical benefits to mothers during lactation and long-term benefits beyond the breastfeeding period. Moreover, there are also significant economic benefits for the family and society [24–26]. In this study, we have demonstrated that the rate of breastfeeding was significantly higher among patients who attended the childbirth preparedness course. Likewise, Imdad et al. [27] reported that prenatal counseling had a significant impact on breastfeeding outcomes at 4–6 weeks [27].

In our study, feelings of anxiety, depression and fear of childbirth were evaluated using the STAI score. The STAI is a validated instrument that quantifies adult anxiety. The univariate analysis revealed that women who attended a prenatal childbirth preparedness course had significantly lower STAI scores and that the rate of women with a high STAI score (indicating severe anxiety) was also lower. Previous studies have demonstrated that prenatal psycho-educational interventions provided by trained midwives or other obstetrical staff, are effective in reducing high childbirth fear levels. Moreover, improving antenatal emotional well-being has beneficial effects on perinatal outcomes such as a reduction in overall CS rates and may also have wider positive, social and maternity care implications for optimal childbirth experiences [17, 18]. In contrast to the favorable impact of prenatal interventions aimed at alleviating anxiety and fear of childbirth, in our study, the multivariate analysis revealed that anxiety levels were not independently associated with attending the childbirth preparedness course. In addition, no correlation was demonstrated between the STAI score and other outcome variables such as labor duration and neonatal birth weight. These findings may indicate that the favorable outcomes of attending the childbirth preparedness course as were demonstrated in our study can be attributed to other effects rather than alleviating anxiety.

Our study might have some limitations. We evaluated several outcomes in association with attending a prenatal preparedness course in nulliparous women. It is possible that for at least some of these outcomes our sample size was underpowered to detect significant differences between groups. In addition, as we included only nulliparous women, our results may not be generalized to the entire parturient population. It is possible that other factors including previous childbirth experience and previous labor trauma may influence the results. This point may be perceived by some as a merit of this study, as it isolates previous experiences and focuses on pure perceptions of labor that are possible only in nulliparous women. It would be interesting in the future to investigate differences between primiparous and multiparous women. However, there are several strengths to our study including the prospective nature of data collection, using a validated tool to evaluate anxiety and fear of labor and the use of the perinatal database in our medical center for retrieving data. It should be noted that the clinical and obstetrical data are routinely reported by an obstetrician directly after delivery. Skilled medical secretaries routinely review the information prior to entering it into the database. Coding is done after assessing the medical prenatal care records together with the routine hospital documents. This makes missing data less likely.

In conclusion, the knowledge acquired in the prenatal childbirth preparation course may have a role in reducing anxiety of labor and is associated with a significantly shorter first stage and total duration of labor and with an improved labor experience. Moreover, attending the prenatal course, increases women's awareness to the importance of breastfeeding and results in significantly higher rates of breastfeeding.

Author's statement

Conflict of interest: Authors state no conflict of interest.

Material and methods: Informed consent: Informed consent has been obtained from all individuals included in this study.

Ethical approval: The research related to human subject use has complied with all the relevant national regulations, and institutional policies, and is in accordance with the tenets of the Helsinki Declaration, and has been approved by the authors' institutional review board or equivalent committee.

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