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RESEARCH

Effect of Previous Miscarriage on the Maternal Birth Experience in the First Baby Study

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ABSTRACT

Objective: To determine whether a history of miscarriage is related to birth experience and/or maternal fear of an adverse birth outcome for self or infant during a subsequent delivery.

Design: Secondary analysis of a prospective cohort study, the First Baby Study.

Sample: Women age 18 to 35 who were expecting to deliver their first live-born infants in Pennsylvania between January 2009 and April 2011.

Participants: Four hundred fifty-three pregnant women who reported perinatal loss prior to 20 weeks gestation (miscarriage) in a previous pregnancy and 2401 pregnant women without a history of miscarriage were interviewed during pregnancy and again one month after their first live birth.

Methods: Maternal birth experience and fear of an adverse birth outcome measured via telephone interview were compared across groups.

Results: Maternal birth experience scores did not significantly differ between women with and without previous miscarriage. Women with a history of miscarriage reported that they feared an adverse birth outcome for themselves or their infants more frequently than women without a history of miscarriage (52.1% vs. 46.6%; $p = .033$), however, this relationship was not significant after adjustment for confounders.

Conclusion: Our findings indicate that there is no association between miscarriage history and birth experience. Additional research on this topic would be beneficial including an in-depth examination of fear of adverse outcome during birth. However, nurses and midwives may consider using therapeutic communication techniques to ensure that women with a history of miscarriage receive strong emotional support and reassurance during birth.

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According to the World Health Organization, spontaneous abortion, also known as miscarriage, is defined as the spontaneous loss of a pregnancy before completion of 20 weeks gestational age (Zegers-Hochschild et al., 2009). After miscarriage, women may experience intense grief and yearning for the lost future with the infant, with an emphasis on lost hopes and dreams (Brier, 2008). The effects of previous miscarriage on maternal emotional health during and after subsequent pregnancy are often studied in combination with women with a history of other types of perinatal loss including electively induced abortion, stillbirth, and neonatal death, or various combinations. Very few studies of the effects of previous miscarriage alone on subsequent pregnancy and birth are available.

Perinatal loss affects more than one million pregnant women annually (Ventura, Abma, Mosher, & Henshaw, 2004), and more than 85% of these women will become pregnant again within 18 months (Cuisinier, Janssen, de Graauw, Bakker, & Hoogduin, 1996). Previously, researchers have reported that women pregnant after perinatal loss have increased levels of depression, stress, and anxiety compared to women who have not experienced such loss (Armstrong, 2002, 2004; Armstrong, Hutti, & Myers, 2009; Cote-Arsenault, 2003, 2007; Couto et al., 2009; Franche & Mikail, 1999; Gong et al., 2013; Hamama, Rauch, Sperlich, Defever, & Seng, 2010; Lamb, 2002; Tsartsara & Johnson, 2006). Women who were pregnant after loss reported tremendous uncertainty (Cote-Arsenault, 2007) and a loss of control; they felt that

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they could not count on a positive pregnancy outcome (Cote-Arsenault & Morrison-Beedy, 2001). Even late into pregnancy they feared that the fetus or newborn could die (Cote-Arsenault & Marshall, 2000; Cote-Arsenault & Morrison-Beedy, 2001). Additionally, women experiencing pregnancy after loss have reported delayed bonding with the fetus (Cote-Arsenault & Donato, 2007) that can lead to maternal-infant bonding disorders and serious long-term effects on the mother/child relationship and child development (Brockington et al., 2001).

Although researchers (Brockington et al., 2001; Cote-Arsenault & Donato, 2007) have examined the effect of perinatal loss on subsequent pregnancy and parenting, little has been published on the birth experience for this subset of women. The term *birth experience* is used to describe a woman's subjective experience of labor and birth (Salmon & Drew, 1992). A woman's birth experience was initially operationalized as maternal satisfaction with childbirth but has since evolved to include a multidimensional phenomenon with four subdimensions: emotional adaptation, physical discomfort, fulfillment, and negative emotional experience (Salmon & Drew; Salmon, Miller, & Drew, 1990; Stadlmayr et al., 2001; Stadlmayr, Schneider, Amsler, Burgin, & Bitzer, 2004). The consequences of a negative birth experience not only affect the mother, but also may have immediate and enduring effects on her relationship with the newborn. A negative or traumatic birth experience has been associated with maternal postpartum depression (Ballard, Stanley, & Brockington, 1995; Reynolds, 1997; Righetti-Veltema, Conne-Perreard, Bousquet, & Manzano, 1998), difficulty resuming sexual activity (Reynolds), and a preference for future cesarean birth (Ryding, 1993). Furthermore, a traumatic birth experience is associated with an inability to breastfeed and impaired maternal-infant bonding (Reynolds). Conversely, a positive birth experience is associated with a sense of accomplishment and a positive long-term perception of the experience of becoming a mother (Simkin, 1991).

Although a history of perinatal loss is associated with increased levels of fear and anxiety during subsequent pregnancy, little is known about how a history of perinatal loss affects a woman's experience of giving birth to a healthy infant. In this study, the primary aim was to examine the relationship between miscarriage in a prior pregnancy and the maternal birth experience in women giving birth for the first time. Our hypothesis was that women with a history of miscarriage would report a more negative birth experience compared to women without a history of any type of perinatal loss. The secondary aim was to examine the relationship between a history of miscarriage and maternal fear of adverse outcome during birth. The secondary hypothesis was that women with a history of miscarriage would report fear of an adverse birth outcome with greater frequency than women without a history of perinatal loss. If this study's hypotheses are supported, continued exploration into factors contributing to birth experience and fear is warranted, as well as interventions to facilitate a positive birth experience and reduce fear for this population.

Little is known about how a history of miscarriage affects a woman's subsequent experience of giving birth to a healthy infant.

Methods

Participants

We completed a secondary analysis of data from the First Baby Study (FBS), a National Institutes of Health (NIH)-funded cohort study designed to examine mode of delivery for first childbirth and relationship to subsequent pregnancy and birth. In the FBS, women age 18 to 35 who were expecting their first live-born infants were recruited from physician's offices, childbirth classes, and other venues throughout Pennsylvania between January 2009 and April 2011. The FBS excluded women who did not speak English or Spanish, were carrying more than one fetus, had a previous stillbirth that occurred at more than 20 weeks gestation, had a previous cesarean delivery regardless of length of gestation, were a gestational or surrogate carrier, planned to give the newborn up for adoption, planned to have a tubal ligation while hospitalized for delivery, did not have a telephone, or were not able to commit to participation in the study for a period of 3 years. The study was approved by the Institutional Review Board at participating study hospitals, and written informed consent was obtained from each participant after they reached at least 24 weeks gestation. The FBS enrolled 3006 women who completed the baseline prenatal interview in the third trimester of pregnancy (at least 34 weeks gestation) and the 1-month postpartum interview. A more detailed description of the FBS recruitment and sampling plan is published elsewhere (Kjerulff et al., 2013).

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Instruments

For this analysis, the independent variable, history of miscarriage, was measured via self-reported history of miscarriage during a prior pregnancy. Women who were enrolled in the FBS and reported a history of elective abortion were excluded from the present analysis, and no other types of perinatal loss were present in the sample as a result of the FBS exclusion criteria. This resulted in a sample of 453 women with a history of one or more miscarriages and a comparison group of 2401 women experiencing their first pregnancy.

Sociodemographic variables (education, income, marital status, age, race, and ethnicity) were obtained during the baseline interview. Continuous variables age and income were categorized for statistical analysis using tertiles and quartiles, respectively. Although some data is lost using this method, interpretation of results in regression analysis is improved. Dividing income into quarters, for example, allowed us to easily compare the highest income group with the lowest.

Potential confounding variables including prenatal depression and use of fertility advice or treatment were also obtained during the baseline interview. Prenatal depression was measured using the Edinburgh Postnatal Depression Scale (EPDS) (Cox, Holden, & Sagovsky, 1987) that has been used extensively and validated in antepartum and postpartum populations (Gibson, McKenzie-McHarg, Shakespeare, Price, & Gray, 2009). Participants were classified as having probable depression for EPDS >12 and not having probable depression for EPDS scores ≤ 12, as suggested by a recent systematic review (Gibson et al.). Women were said to have used fertility advice or treatment if they had planned the pregnancy and responded positively to the question, "Did you and/or your partner use any type of fertility advice, testing, or treatment before you became pregnant?"

Potential confounding factors of mode of delivery, neonatal birth complications, and labor support were obtained at the 1-month postpartum interview. Neonatal birth complications were obtained using maternal interview responses. Birth complications included signs of respiratory distress or airway obstruction, pneumothorax, preterm delivery, meconium-stained amniotic fluid, infection, fever or treatment with antibiotics, nuchal cord, broken clavicle, bruising, hip dysplasia, hypoxic-ischemic encephalopathy (HIE), shoulder dystocia, hematoma, hypothermia, or hypoglycemia. Maternal responses that were not considered birth complications included jaundice, congenital structural anomalies, withdrawal from medication exposure in utero, and neonatal weight loss.

Support during labor was examined with the question, "Some women receive supportive care while in labor and giving birth, which can involve helping to make them more comfortable physically, providing emotional support, and providing information. Who, if anyone, provided this type of support while you were in labor or giving birth?" This statement was followed by options including husband or partner, family and friends, and various types of health care provider to which women replied *yes* or *no* to each option.

The first outcome variable, birth experience, was measured at 1-month postpartum using a 16-item questionnaire, FBS Birth Experience, developed by the First Baby Study investigators. The scale asks the question, "Thinking back to right after you had your baby (or if unconscious, after you woke up), please tell me how you felt, using the following scale, extremely, quite a bit, moderately, a little bit or not at all followed by 16 brief adjectives or statements: exhausted, on cloud nine, disappointed, in pain, sick, delighted, upset, excited, worried, calm, like a failure, thankful, traumatized, sad, angry, and proud of myself." The scale includes items from each of the four subdimensions of birth experience (emotional adaptation, physical discomfort, fulfillment, and negative emotional experience). Each item was measured on a 5-point scale, and possible scores ranged from 16 to 80. A high score indicated a positive birth experience. Responses for all 16 items in the birth experience scale were available for 2821 women. Thirty women had birth experience scores with one missing data point. For these women, the mean of her answers for all other items was imputed for the missing item and a total score was calculated. For three women, each in the group without a history of perinatal loss, two items were missing responses, and these cases were eliminated from analysis, resulting in complete birth experience scores for 2851 women.

Reliability analysis for the birth experience scale was completed using data for all study participants. Analysis revealed that each item contributed positively to the overall Cronbach's alpha; therefore, the full 16-item scale was used. Cronbach's alpha for the scale was 0.74, indicating acceptable internal reliability for a new scale.

The second outcome variable, fear of adverse outcome, was measured using a single question that asked, "During your labor and delivery, to what extent were you afraid that you or your baby might be hurt or die?" Five potential responses to the question ranged from *extremely* to *not at all*. Fear of an adverse birth outcome was dichotomized into women who reported no fear at all versus those who reported a range of fear from a *little bit* to *extremely*.

Statistical Analysis

Data analysis was completed using SPSS (ver. 20). To analyze the effect of a history of miscarriage on maternal birth experience, the total score for birth experience was compared between the two groups of women using a *t* test, followed by a multivariate linear regression model including factors significantly related to the independent variable. Data analysis for the second aim was completed first using chi-squared test to determine the relationship between history of miscarriage and fear of adverse birth outcome. A univariate logistic regression model was created followed by a multivariate logistic regression model including factors significantly related to the independent variable to determine if the relationship between history of miscarriage and fear remained significant after adjustment for potential confounding variables.

Results

The final sample size for analysis in this study was 2854 women (2851 for analysis of birth experience). Demographic characteristics for all study participants are shown in Table 1. There was no significant difference between the women with no history of perinatal loss ($n = 2401$) and those with a history of miscarriage ($n = 453$) with respect to sociodemographic, obstetric, and psychosocial characteristics, except that women in the miscarriage group were significantly older than women in the comparison group with mean ages of 28.1 and 27.0 years, respectively ($p < .001$). Women in the miscarriage group were also more likely to have received fertility advice, testing, or treatment for themselves or their partner (20.1% vs. 9.6%, $p < .001$).

To examine the primary study aim, the birth experience scores for women with a history of miscarriage were compared to the scores for women without a history of perinatal loss. Women with a history of miscarriage reported a mean score for birth experience of 68.5 versus women without a history of perinatal loss who reported a mean score of 68.7. As such, there was no statistically significant difference in birth experience for women with a history of miscarriage compared to those without perinatal loss ($p = .50$) using univariate analysis. This nonsignificant result was confirmed using a multivariate linear regression model, controlling for maternal age and use of fertility treatment or advice (details not shown).

Women with a history of miscarriage may define their fear of adverse birth outcomes differently than women without a history of perinatal loss.

For the entire study population, 1356 (47.5%) women reported that they feared an adverse outcome for themselves or their infants during birth. Among women with a history of miscarriage, 52.1% ($n = 236$) reported that they feared an adverse birth outcome. This was significantly greater than the proportion of women in the comparison group who reported fear of adverse outcome during birth ($n = 1120$, 46.6%; $p = .033$). The unadjusted odds of reporting fear for women with a history of miscarriage was 1.24 (95% confidence interval [CI] 1.02, 1.52). After adjustment for maternal age and use of fertility treatment or advice using multiple logistic regression, the relationship between history of miscarriage and fear of adverse birth outcome was no longer significant ($p = 0.116$) (Table 2). In the adjusted model, only age remained statistically significant for fear of adverse birth outcome, with the middle third (age 27–30) and highest third (age ≥31) having greater odds of fear than the youngest group (age ≤26).

Discussion

Our results indicate that women with a history of miscarriage did not report a birth experience that was any more or less positive than women without a history of perinatal loss. Furthermore, although women with a history of miscarriage reported fear of adverse birth outcome more frequently than women without a history of perinatal loss, this relationship was not significant after adjustment for age and use of fertility treatment or advice.

Our findings did not support the hypothesis that women with a history of miscarriage would report a more negative birth experience compared to those women without a history of perinatal loss. This hypothesis was based on the idea that emotional complications of pregnancy after

Table 1: Demographic and Obstetric Characteristics of Study Participants

	All Participants $N = 2854$	Comparison Group $n = 2401$	History of Miscarriage Group $n = 453$	Between groups p value
Race/Ethnicity ($n = 2852$)				$p = .396$
Non-Hispanic White	2395 (83.9)	2009 (83.7)	386 (85.2)	
Non-Hispanic Black	194 (6.8)	160 (6.7)	34 (7.5)	
Hispanic	156 (5.5)	138 (5.8)	18 (4.0)	
Other	107 (3.7)	92 (3.8)	15 (3.3)	
Marital Status ($n = 2851$)				$p = .107$
Married and living with husband	2034 (71.3)	1692 (70.6)	342 (75.5)	
Not married, but living with partner	498 (17.5)	432 (18.0)	66 (14.6)	
Divorced, Separated or Widowed	27 (0.9)	21 (0.9)	6 (1.3)	
Never been married	292 (10.2)	253 (10.6)	39 (8.6)	
Education				$p = .956$
Less than a high school diploma	119 (4.2)	100 (4.2)	19 (4.2)	
High school graduate or General Education Diploma	358 (12.5)	299 (12.5)	59 (13.0)	
Some college or vocational programs	742 (26.0)	629 (26.2)	113 (24.9)	
Completed 4-year college degree	980 (34.3)	819 (34.1)	161 (35.5)	
Advanced degree	655 (23.0)	554 (23.1)	101 (22.3)	
Age				$p = <.001$
≤26 years	1126 (39.5)	992 (41.3)	134 (29.6)	
27–30 years	1052 (36.9)	874 (36.4)	178 (39.3)	
≥31 years	676 (23.7)	534 (22.3)	141 (31.1)	
Annual Household Income (USD) ($n = 2663$)				$p = .074$
≤45,000	686 (25.8)	575 (25.8)	111 (25.6)	
45001–72750	639 (24.0)	553 (24.8)	86 (19.8)	
72751–97000	674 (25.3)	562 (25.2)	112 (25.8)	
≥97001	664 (24.9)	539 (24.2)	125 (28.8)	
Mode of Delivery				$p = .180$
Normal vaginal	1775 (62.2)	1513 (63.0)	262 (57.8)	
Vaginal assisted[a]	250 (8.8)	205 (8.5)	45 (9.9)	
Cesarean planned	147 (5.2)	124 (5.2)	23 (5.1)	
Cesarean unplanned	682 (23.9)	559 (23.3)	123 (27.2)	
Partner Labor Support ($n = 2713$)				$p = .622$
Yes	2505 (92.3)	2105 (92.2)	400 (93.0)	
No	208 (7.7)	178 (7.8)	30 (7.0)	
Family & Friends Labor Support ($n = 2714$)				$p = .623$
Yes	1730 (63.7)	1451 (63.5)	279 (64.9)	
No	984 (36.3)	833 (36.5)	151 (35.1)	

Table 1: Continued

	All Participants $N = 2854$	Comparison Group $n = 2401$	History of Miscarriage Group $n = 453$	Between groups p value
Healthcare Provider Labor Support ($n = 2694$)				$p = .425$
Yes	2541 (94.3)	2141 (94.5)	400 (93.5)	
No	153 (5.7)	125 (5.5)	28 (6.5)	
Fertility Advice or Treatment ($n = 2845$)				$p = <.001$
Yes	321 (11.3)	230 (9.6)	91 (20.1)	
No	2524 (88.7)	2163 (90.4)	361 (79.9)	
Depression ($n = 2847$)				$p = .488$
Yes (EPDS>12)	166 (5.8)	143 (6.0)	23 (5.1)	
No (EPDS≤12)	2681 (94.2)	2252 (94.0)	429 (94.9)	
Newborn Birth Complications				$p = .590$
Yes	361 (12.6)	300 (12.5)	61 (13.5)	
No	2493 (87.4)	2101 (87.5)	392 (86.5)	

Note. All values reported as n (%). EPDS = Edinburgh Postnatal Depression Scale.
[a]Vaginal-assisted delivery is defined by the use of forceps or vacuum extraction.

a previous miscarriage or other perinatal loss, such as increased risk for anxiety or depression (Blackmore et al., 2011; Carrera et al., 1998; Gong et al., 2013; Marcinko, Marcinko, Dordevic, & Oreskovic, 2011; Tsartsara & Johnson, 2006) may be related to maternal perception of the birth experience. Our results concur with those found by Salmon and Drew (1992) who found no difference in women's subjective experience of birth when comparing women with previous miscarriage to those without.

This study also did not provide strong evidence that women with a history of miscarriage may fear an adverse outcome for themselves or their infants during the labor and birth process when compared to women without a history of perinatal loss. In multivariate analysis, only a woman's age was significantly related to fear of adverse outcome. However, the relationship between perinatal loss and fear has been supported by previous studies. For example, in a study by Cote-Arsenault and Donato (2007), pregnant women with a history of perinatal loss reported fear of losing the fetus late into pregnancy. In a qualitative study of pregnant women with a history of perinatal loss, Cote-Arsenault and Morrison-Beedy (2001) reported a focus group theme of "waiting to lose the baby" as women consistently feared a negative outcome.

There are several possible explanations for our findings. First, it is possible that the quantitative measurement of fear of an adverse birth outcome used in this study was unable to differentiate between the fear that many primiparous women feel during the birth process and the type of fear that women with a history of miscarriage have reported in qualitative studies. It is possible that women with

Table 2: Adjusted Odds Ratios (ORs) for Fear of Adverse Birth Outcome

	Adjusted OR	95% Confidence Interval
History of Miscarriage		
Yes	1.18	[0.96, 1.44]
No	Reference	
Age		
≤26 years	Reference	
27–31 years	1.32	[1.11, 1.56]*
≥32 years	1.47	[1.21, 1.79]**
Fertility Advice or Treatment		
Yes	1.11	[0.87, 1.41]
No	Reference	

Note. $^{*}p < .05$. $^{**}p < 0.001$

Clinicians should ensure than women with a history of miscarriage receive strong emotional support and reassurance during birth.

a history of miscarriage would define their fear differently than women without a history of perinatal loss.

Second, it is possible that the normative response to perinatal loss in general, or miscarriage in particular, simply does not involve long-term negative consequences to maternal emotional health. A considerable strength of the study is that recruitment of participants did not depend on their perinatal loss status. In many existing studies of pregnancy subsequent to perinatal loss, participants are recruited knowing that they will be answering questions about their previous perinatal loss, or are recruited directly from perinatal loss bereavement support groups, which may result in sampling bias. This study is unaffected by this particular sampling bias and may be revealing a more normative picture of the effect of previous perinatal loss during subsequent pregnancy and birth. Price (2006) also discussed this possibility and suggested that other social and emotional contextual features may contribute significantly in those women who develop depression or other emotional difficulties after perinatal loss.

This study has several limitations that deserve comment. The women in the FBS do not have the same sociodemographic characteristics as women experiencing their first birth in Pennsylvania. This study's participants were older, more likely to be non-Hispanic White, had higher levels of education, and higher household income than the overall population (Kjerulff et al., 2013). This type of selection bias is common in research studies where participation is voluntary. As such, although our sample size was large and relatively diverse, the results of the study may not be generalizable to the entire population. Furthermore, although definitive data are not available on the rates of miscarriage in the United States, this study's participants may differ slightly from those in other studies with respect to characteristics of the women with a history perinatal loss. According to the Centers for Disease Control and Prevention (CDC), the fetal mortality rate is 2.2 times higher for non-Hispanic Black women than for non-Hispanic White women (MacDorman, Kirmeyer, & Wilson, 2012). In addition, the fetal mortality rate is 10% higher for Hispanic women than for non-Hispanic White women (MacDorman et al.). In contrast, the participants in this study with a history of perinatal loss did not differ significantly by race or ethnicity. In fact, Hispanic women reported the lowest rate of perinatal loss (12%) compared to Non-Hispanic White, Non-Hispanic Black, and Other women (16%, 17%, and 14%, respectively). Therefore, our population may not be representative of all women with a history of perinatal loss.

The study also has limitations related to the secondary analysis of data. Most notably, the outcome measure for birth experience was created by study investigators, and although it demonstrated acceptable internal reliability and is somewhat similar to Salmon's item list for birth experience (Salmon & Drew, 1992), it has not previously been used in research.

With regard to implications for practice, although our findings do not indicate that women with a history of miscarriage are at increased risk for negative birth experience or fear of adverse outcome during birth, several studies of pregnancy after perinatal loss indicate that there may be a need for nurses and midwives in the labor and delivery setting to be aware that a history of perinatal loss may be related to a woman's fear of adverse outcome for herself or the infant. It is possible that women with a history of perinatal loss, especially those that are older, are more aware that a negative outcome is sometimes a possibility, as perinatal loss is an experience that strips women of their naivety about pregnancy (Cote-Arsenault, 1999).

In light of this, nurses and midwives should ensure that these women receive strong emotional support and reassurance. Nurses and midwives should be especially cognizant of signs of fear or anxiety in women with a history of perinatal loss so they can provide appropriate feedback. Mothers with a history of perinatal loss will have widely varied experiences with hospital and birth settings from prior pregnancies, and the best way for practitioners to understand how these prior experiences may affect the current birth experience is to open dialogue with women and their families. Therapeutic communication techniques such as active listening, empathy, and validation may make a woman more comfortable expressing her fears during her childbirth experience, thus allowing the nurse to reassure her that the birth is proceeding as expected. Also, pregnant women with a history of perinatal loss have more concerns about their fetus compared to first time mothers without a history of perinatal loss, leading them

to utilize more health care resources, such as unscheduled office visits during pregnancy (Hutti, Armstrong, & Myers, 2011). This suggests that these mothers' fears and concerns may be ameliorated with reassurance and detailed information. Thus, in the event of clinical complications, it may be especially critical to provide this support and reassurance to women with a history of perinatal loss.

Conclusions

This study's results do not provide evidence that women with a history of miscarriage who give birth subsequently to a healthy infant perceive their birth experiences more negatively than women without a history of perinatal loss. Although there was no evidence of an association between a history of miscarriage and fear of an adverse outcome for mother or infant during birth, previous researchers have reported increased fear in these women. Future research in this area is needed and should examine in detail how women with a history of miscarriage experience subsequent birth, paying particular attention to the risk factors that may potentiate a negative effect of miscarriage history. More extensive survey or interview methods may potentially reveal differences between women with and without histories of perinatal loss.

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REFERENCES

Armstrong, D. (2002). Emotional distress and prenatal attachment in pregnancy after perinatal loss. *Journal of Nursing Scholarship*, *34*(4), 339–345.

Armstrong, D. (2004). Impact of prior perinatal loss on subsequent pregnancies. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, *33*(6), 765–773. doi:10.1177/0884217504270714

Armstrong, D., Hutti, M., & Myers, J. (2009). The influence of prior perinatal loss on parents' psychological distress after the birth of a subsequent healthy infant. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, *38*, 654–666.

Ballard, C., Stanley, A., & Brockington, I. (1995). Post-traumatic stress disorder (PTSD) after childbirth. *British Journal of Psychiatry*, *166*, 525–528. doi:10.1192/bjp.166.4.525

Blackmore, E. R., Cote-Arsenault, D., Tang, W., Glover, V., Evans, J., Golding, J., & O'Connor, T. G. (2011). Previous prenatal loss as a predictor of perinatal depression and anxiety. *British Journal of Psychiatry*, *198*(5), 373–378. doi:10.1192/bjp.bp.110.083105

Brier, N. (2008). Grief following miscarriage: A comprehensive review of the literature. *Journal of Women's Health*, *17*(3), 451–464. doi:10.1089/jwh.2007.0505

Brockington, I. F., Oates, J., George, S., Turner, D., Vostanis, P., Sullivan, M., . . . Murdoch, C. (2001). A screening questionnaire for mother-infant bonding disorders. *Archives of Women's Mental Health*, *3*, 133–140.

Carrera, L., Diez-Domingo, J., Montanana, V., Monleon Sancho, J., Minguez, J., & Monleon, J. (1998). Depression in women suffering perinatal loss. *International Journal of Gynecology & Obstetrics*, *62*(2), 149–153.

Cote-Arsenault, D. (1999). Pregnancy after loss. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, *28*(1), 13–14.

Cote-Arsenault, D. (2003). The influence of perinatal loss on anxiety in multigravidas. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, *32*(5), 623–629.

Cote-Arsenault, D. (2007). Threat appraisal, coping, and emotions across pregnancy subsequent to perinatal loss. *Nursing Research*, *56*(2), 108–116. doi:10.1097/01.NNR.0000263970.08878.87

Cote-Arsenault, D., & Donato, K. L. (2007). Restrained expectations in late pregnancy following loss. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, *36*(6), 550–557. doi:10.1111/j.1552–6909.2007.00185.x

Cote-Arsenault, D., & Marshall, R. (2000). One foot in-one foot out: Weathering the storm of pregnancy after perinatal loss. *Research in Nursing & Health*, *23*(6), 473–485. doi:10.1002/1098–240x

Cote-Arsenault, D., & Morrison-Beedy, D. (2001). Women's voices reflecting changed expectations for pregnancy after perinatal loss. *Journal of Nursing Scholarship*, *33*(3), 239–244.

Couto, E. R., Couto, E., Vian, B., Gregorio, Z., Nomura, M. L., Zaccaria, R., & Passini, R., Jr. (2009). Quality of life, depression and anxiety among pregnant women with previous adverse pregnancy outcomes. *Sao Paulo Medical Journal*, *127*(4), 185–189.

Cox, J., Holden, J., & Sagovsky, R. (1987). Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry*, *150*, 782–786.

Cuisinier, M., Janssen, H., de Graauw, C., Bakker, S., & Hoogduin, C. (1996). Pregnancy following miscarriage: Course of grief and some determining factors. *Journal of Psychosomatic Obstetrics and Gynecology*, *17*, 168–174.

Franche, R., & Mikail, S. (1999). The impact of perinatal loss on adjustment to subsequent pregnancy. *Social Science Medicine*, *48*(11), 1613–1623.

Gibson, J., McKenzie-McHarg, K., Shakespeare, J., Price, J., & Gray, R. (2009). A systematic review of studies validating the Edinburgh Postnatal Depression Scale in antepartum and postpartum women. *Acta Psychiatrica Scandinavica*, *119*(5), 350–364. doi:10.1111/j.1600–0447.2009.01363.x

Gong, X., Hao, J., Tao, F., Zhang, J., Wang, H., & Xu, R. (2013). Pregnancy loss and anxiety and depression during subsequent pregnancies: Data from the C-ABC study. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, *166*(1), 30–36. doi:10.1016/j.ejogrb.2012.09.024

Hamama, L., Rauch, S. A., Sperlich, M., Defever, E., & Seng, J. S. (2010). Previous experience of spontaneous or elective abortion and risk for posttraumatic stress and depression during subsequent pregnancy. *Depression and Anxiety*, *27*(8), 699–707. doi:10.1002/da.20714

Hutti, M. H., Armstrong, D. S., & Myers, J. (2011). Healthcare utilization in the pregnancy following a perinatal loss. *MCN American Journal of Maternal/Child Nursing*, *36*(2), 104–111. doi:10.1097/NMC.0b013e3182057335

Kjerulff, K. H., Velott, D. L., Zhu, J., Chuang, C. H., Hillemeier, M. M., Paul, I. M., & Repke, J. T. (2013). Mode of first delivery and women's intentions for subsequent childbearing: Findings from the first baby study. *Paediatric and Perinatal Epidemiology*, *27*(1), 62–71. doi:10.1111/ppe.12014

Lamb, E. H. (2002). The impact of previous perinatal loss on subsequent pregnancy and parenting. *Journal of Perinatal Education*, *11*(2), 33–40. doi:10.1624/105812402X88696

MacDorman, M., Kirmeyer, S., & Wilson, E. (2012). Fetal and perinatal mortality, United States, 2006. *National Vital Statistics Report*, *60*(8), 1–22.

Marcinko, V. M., Marcinko, D., Dordevic, V., & Oreskovic, S. (2011). Anxiety and depression in pregnant women with previous history of spontaneous abortion. *Collegium Antropologicum*, *35*(Suppl 1), 225–228.

Price, S. (2006). Prevalence and correlates of pregnancy loss history in a national sample of children and families. *Maternal Child Health Journal*, *10*, 489–500. doi:10.1007/s10995–006–0123–x

Reynolds, J. L. (1997). Post-traumatic stress disorder after childbirth: The phenomenon of traumatic birth. *Canadian Medical Association Journal*, *156*(6), 831–835.

Righetti-Veltema, M., Conne-Perreard, E., Bousquet, A., & Manzano, J. (1998). Risk factors and predictive signs of postpartum depression. *Journal of Affective Disorders*, *49*, 167–180.

Ryding, E. (1993). Investigation of 33 women who demanded a cesarean. *Acta Obstetricia et Gynecologica Scandinavica*, *72*(4), 280–285.

Salmon, P., & Drew, N. (1992). Multidimensional assessment of women's experience of childbirth: Relationship to obstetric procedure, antenatal preparation, and obstetric history. *Journal of Psychosomatic Research*, *36*(4), 317–327.

Salmon, P., Miller, R., & Drew, N. (1990). Women's anticipation and experience of childbirth: The independence of fulfillment, unpleasantness, and pain. *British Journal of Medical Psychology*, *63*, 255–259.

Simkin, P. (1991). Just another day in a woman's life? Women's long-term perceptions of their birth experience. Part I. *Birth*, *18*(4), 203–210.

Stadlmayr, W., Bitzer, J., Hosli, I., Amsler, F., Leupold, J., Schwendke-Kliem, A., . . . Burgin, D. (2001). Birth as a multidimensional experience: Comparison of the English- and German-language versions of Salmon's Item List. *Journal of Psychosomatic Obstetrics and Gynecology*, *22*, 205–214.

Stadlmayr, W., Schneider, H., Amsler, F., Burgin, D., & Bitzer, J. (2004). How do obstetric variables influence the dimensions of the birth experience as assessed by Salmon's item list (SIL-Ger)? *European Journal of Obstetrics & Gynecology and Reproductive Biology*, *115*, 43–50. doi:10.1016/j.ejogrb.2003.12.015

Tsartsara, E., & Johnson, M. P. (2006). The impact of miscarriage on women's pregnancy-specific anxiety and feelings of prenatal maternal-fetal attachment during the course of a subsequent pregnancy: An exploratory follow-up study. *Journal of Psychosomatic Obstetrics and Gynaecology*, *27*(3), 173–182.

Ventura, S., Abma, J., Mosher, W., & Henshaw, S. (2004). Estimated pregnancy rates for the United States, 1990–2000: An update. *National Vital Statistics Report*, *52*(23), 1–10.

Zegers-Hochschild, F., Adamson, G., de Mouzon, J., Ishihara, O., Mansour, R., Nygren, K., . . . Vanderpoel, S. (2009). International Committee for Monitoring Assisted Reproductive Technology (ICMART) and the World Health Organization (WHO) revised glossary of ART terminology, 2009. *Fertility and Sterility*, *92*(5), 1520–1524. doi:10.1016/j.fertnstert.2009.09.009