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Catastrophizing labor pain compromises later maternity adjustments

Sari Goldstein Ferber, PhD,* Michal Granot, DSc, Etan Z. Zimmer, MD

Faculty of Health and Welfare Studies, University of Haifa, Haifa, Israel; Department of Obstetrics and Gynecology, Rambam Medical Center and Technion-Israel Institute of Technology, Faculty of Medicine, Haifa, Israel

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KEY WORDS

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Objective: The purpose of this study was to evaluate the impact of labor pain intensity and labor pain catastrophizing on maternity blues and postpartum social functioning.

Study design: Pain intensity and pain catastrophizing were assessed in 89 women in active labor before the administration of analgesia. Both these measures were assessed again retrospectively 2 days after delivery in 82 women who had a spontaneous vaginal delivery. Women also filled out the Edinburgh Postnatal Depression Scale. Six weeks later women completed the social functioning domain of the short form SF36 health survey.

Results: Pain catastrophizing during labor significantly predicted both maternity blues ($P = .001$) and postpartum social functioning ($P = .001$) when being controlled for maternal age and education, parity, type of analgesia, and labor pain intensity. Low level of education and younger age also contributed to the prediction of maternity blues and social functioning.

Conclusion: Labor pain catastrophizing rather than labor pain intensity predicts postpartum maternal adjustments.

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Childbirth is a significant event in maternal life. It includes the physiologic components of pregnancy, labor, and delivery and the emotional and social components that are attributed to the changes in the family structure and the maternal role. Mothers are concerned about self-esteem, body image, and sexuality; they overcome various levels of distress and endure a decline in social activity.

Maternity blues, the depressed mood in mothers during the first days after the delivery, have been

acknowledged as a cross-cultural phenomenon. The possible involvement of changes in cortisol, gonadal steroids, thyroid hormones, prolactin, and melatonin has been suggested.^{1,2} Some studies claim that the phenomenon is short-lived and declines within a few days.³ Other investigators have shown that the maternity blues phenomenon is associated with a higher incidence of postpartum depression.⁴⁻⁸ However, maternity blues is a distinguished phenomenon with high prevalence close to the delivery experience that is compared with postpartum depression, which occurs later in the postpartum period, even after a few months, with lower prevalence and more augmented symptoms of psychopathologic condition and child neglect.^{3,5,6} In large samples, the prevalence of postnatal depression in

* Reprint requests: Sari Goldstein Ferber, PhD, Faculty of Social Welfare and Health Studies, University of Haifa, Mount Carmel, Haifa 31905, Israel.

E-mail: sarig@reserach.haifa.ac.il

Israel was 9.9% to 22.3% on the second day after the delivery and 5.2% to 12.4% at 6 to 12 weeks after the delivery.⁹ In the United States, 27% of the women experienced maternity blues sometime during the postpartum year.¹⁰ It seems therefore that the early detection of women who are at greater risk of experiencing postpartum blues may be of value to enable early intervention.

Pain is a complex phenomenon that includes physiologic, cognitive, cultural, social, and emotional aspects.¹¹ Pain catastrophizing is defined as an exaggerated negative orientation to painful stimuli. Thus, pain catastrophizing is an important cognitive and emotional factor in pain experience.^{12,13} Pain catastrophizing includes 3 components: (1) rumination (processes of focusing on the pain), (2) magnification (tendency to exaggerate the negative consequences of the pain), and (3) helplessness (the extent of helplessness experienced during the pain).

Because labor involves acute pain and mood changes, the extent of pain catastrophizing may play a role in critical domains of maternity: the maternity blues and the ability to resume full social functioning and adjust to new duties. Social ability has been reported repeatedly as negatively correlated with postpartum depression and is compromised in the immediate postpartum period.¹⁴⁻¹⁷

Therefore, the aim of the present study was to determine whether catastrophizing of labor pain is associated with the level of maternity blues and social functioning in the short-term postpartum period.

Material and methods

Study population

The study was conducted at a public university hospital without private patients where medical care is provided by residents who are supervised by senior physicians. It was a controlled environment in which women have no choices other than analgesia/anesthesia. There were no activities that were related to support in labor, except for a midwife general practice. The study was approved by the institutional review board, in accordance with the Helsinki Declaration. Eighty-two women at 37 to 42 weeks of gestation who were in active labor were assigned randomly to this study. All the women who agreed to participate provided written informed consent. The refusal rate was 12%, most of whom refused on the basis of general resistance to research and collection of private details. Of 89 women who agreed to participate and consent, 4 women who had an emergency cesarean delivery and 3 women who had instrumental delivery were excluded from the study. The statistical analysis was performed for all participants who had spontaneous vaginal delivery. There was no induction of labor

Table 1 Sample description of the 82 participating mothers

Variable	N (%)
Marital status	
Unmarried	5 (6.10)
Married	75 (91.46)
Divorced	2 (2.44)
Maternal education	
Elementary school	15 (18.29)
High school	27 (32.93)
Academic education	40 (48.78)

augmentation. The demographic and obstetric data of the study population are presented in [Table 1](#).

Study design

Women were first assessed during the active phase of labor. During an interval between contractions they were asked to report the level of perceived pain with the Visual Analog Scale (VAS1). The Pain Catastrophizing Scale (PCS1) was also filled out by the investigator, with the use of the women's answers. The questionnaires were completed before the women received analgesic treatment. The type of analgesia that was used during labor was recorded from the medical files after the completion of labor. Two days after delivery, women were asked to assess retrospectively, with the use of a VAS measure, the pain intensity of the entire labor process (VAS2). They were also requested to complete the PCS regarding the labor experience again (PCS2), this time by themselves, and to fill out the Edinburgh Postnatal Depression Scale (EPDS). At 6 weeks after delivery, they were visited at home, where they completed the social functioning domain in the short form of the SF36 survey.

Material

PCS

This questionnaire includes 13 items that assess the 3 components of pain catastrophizing: rumination (4 items), magnification (3 items), and helplessness (6.3 items).¹² Each domain was calculated separately, and the total score of the PCS was computed as a summation of the 3 domains, in accordance with Sullivan et al¹² in their initial study of the PCS validation. The PCS has been studied extensively since 1995 in healthy and sick populations, which included an association with situations of experimental pain.¹³ In line with the above, the scores of >24 in the PCS scale are considered as reflecting a tendency of catastrophizing.¹³ The Hebrew validation of this scale in a sample of 80 healthy subjects revealed that the scale is in high association with experimental pain; the reliability scores for the 3 factors of the scale were as follows: rumination ($\alpha = .926$), helplessness ($\alpha = .921$), and magnification ($\alpha = .654$).¹⁸

Table II Intercorrelations between predictors of maternity blues and social ability

	Maternal age	Maternal education	Parity	Analgesia	Mean VAS
Maternal age					
Maternal education		0.189			
Parity		0.398*	−0.194		
Analgesia		0.010	0.102	−0.290†	
Mean VAS		−0.144	−0.256‡	0.090	−0.426*
PCS1	−0.193	−0.391*	−0.004	−0.188	0.371†

* $P < .001$.† $P < .01$.‡ $P < .05$.

EPDS

This questionnaire aims to detect mothers' suffering from postnatal depression.⁵ It consists of 10 items that are not categorized into factors. The items describe symptoms of depression from low to high severity. There are 4 possible responses to each of the 10 items. A score of ≥ 14 points indicates depressed mood with a risk for severe long-term depressive symptoms.

VAS

This 10-cm scale is used for the assessment of pain intensity. It has 2 anchors: Zero represents "no pain at all," and 10 represents "the worst imaginable pain."¹⁹

Social functioning

This measure is 1 domain of the SF36 survey, which is a measure of general mental and physical health status that provides scores on 8 areas of functioning and well being and 2 broad areas of subjective well being, namely mental and physical health.¹⁷ The SF36 survey is acceptable to patients, is internally consistent, and is a valid measure of the health status in a wide range of patients.²⁰ The domain of social functioning was chosen as the preferred measure for this study because social adjustment is one of the main difficulties of the women after delivery and is considerably impaired in postpartum depression states. The use of 1 domain of the SF36 survey separately is valid because this survey has no total score, only domain scores.

Statistical analysis

Data were analyzed with SPSS software (SPSS, Chicago, Ill). Pearson correlation coefficients were used to test the association between PCS1, PCS2, VAS1, and VAS2. Hierarchic regression models were conducted to reveal the contribution of the PCS to predict maternity blues and social functioning.

Results

The mean maternal age was 29.56 ± 4.97 years (range, 21-42 years), and mean number of previous labors was 1.42 ± 1.42 (range, 0-6). The mean birth weight of the

newborn infants was 3291.2 ± 504.9 g (range, 1800-4500 g). The infants were born at 39.43 ± 1.69 weeks of gestation (range, 38-42 weeks of gestation), on average. Table I shows more demographic characteristics of the entire sample.

Pain and catastrophizing scores

Forty-seven mothers (57.32%) received epidural analgesia during labor, and 35 mothers (42.68%) received pethidine or entonox. There was a positive correlation between pain perception during labor (VAS1) and labor pain intensity recalled 2 days after labor (VAS2; $r = 0.262$; $P < .01$). VAS1 was higher than VAS2: 7.1 ± 2.6 vs 6.2 ± 2 ($P = .014$). There was also a positive correlation between PCS1 and PCS2 ($r = 0.829$; $P < .0001$). PCS1 was significantly higher than PCS2 (25.5 ± 11.9 vs 20.9 ± 12.7 ; $P < .0001$). VAS1 was correlated positively with PCS1 ($r = 0.299$; $P < .0034$) and with PCS2 ($r = 0.353$; $P < .0006$). VAS2 also was correlated positively with PCS1 ($r = 0.373$; $P < .0003$) and with PCS2 ($r = 0.356$; $P < .0006$). There was also a positive correlation between PCS1 and PCS2 ($r = 0.829$; $P < .0001$). In this sample, the score of 9 in the PCS is a significant predictor of severe maternity blues on postpartum day 2 ($\beta = .410$; $t = 4.016$; $P < .0001$).

Prediction of maternity blues and postpartum psychosocial adjustment

The level of EPDS 2 days after labor was 19.29 ± 6.06 (range, 9-32), and the level of social functioning at 6 weeks was 73.78 ± 24.50 (range, 0-100). Thirty-five women experienced maternity blues on postpartum day 2 (EPDS, ≥ 14), and 32 women revealed lower social adjustment at 6 weeks compared with the mean value of the measure. Thirty-one women scored above the cut-off point of catastrophizing in the PCS1 or PCS2, which would be predictive of maternity blues. Twenty-five of the women experienced maternity blues (EPDS, ≥ 14) on the postpartum day 2, and 10 of the women still showed signs of depression at 6 weeks after delivery. Six mothers did not have any signs of maternity blues or social decreased functioning. Table II shows the correlations between the

Table III Prediction of maternity blues and social functioning

Predictor	Maternity blues			Social functioning		
	β	<i>R</i> square change	F change	β	<i>R</i> square change	F change
Maternal age	−0.913	0.010	0.833	0.236	0.056	4.714*
Maternal education	−2.815	0.090	7.922 [†]	0.418	0.167	16.983 [‡]
Parity	1.424	0.023	2.028	−0.065	0.003	0.322
Analgesia	−0.162	<0.001	0.260	0.055	0.003	0.270
Mean VAS	−0.836	0.008	0.698	0.121	0.019	1.881
PCS1	3.463	0.120	11.990 [‡]	−0.235	0.042	4.412*

R-square total, 0.251; *F*(1,75), 4.195 (*P* = .001); *R*-square total, 0.289; *F*(1,75), 5.083 (*P* = .001).

* *P* < .05.

[†] *P* < .01.

[‡] *P* < .001.

variables that predict maternity blues and social functioning. Maternity blues on the postpartum day 2 and social functioning at 6 weeks after delivery were predicted by PCS1 after the results were controlled for maternal age and education, parity (primiparae/multiparae), type of analgesia, and mean VAS that was calculated as an average of VAS1 and VAS2 (Table III).

Further analysis regarding the contribution of the 3 components of PCS1 after the results were controlled for the same variables revealed that rumination (β = .339; significance of the model *R* square, 0.227; *F*(1,75), 3.664; *P* = .003), helplessness (β = .344; significance of the model *R* square, 0.214; *F*(1,75), 3.399; *P* = .005), and magnification (β = .246; significance of the model *R* square, 0.190; *F*(1,75), 2.940; *P* = .012) were significant predictors of maternity blues, whereas only helplessness (β = −.30; significance of the model *R* square, 0.310; *F*(1,75), 5.604; *P* < .001) was significant in the prediction of social functioning at 6 weeks.

Comment

This study demonstrates that higher levels of labor pain catastrophizing are associated with a decrease in postpartum maternal adjustment. The PCS that was measured during active labor was found to be a significant predictor for maternity blues and social functioning at 6 weeks. The correlation between the VAS scores and PCS levels is in agreement with previous studies that evaluated these relationships in various healthy, sick, and experimental pain conditions.^{12,13} The finding that VAS scores did not predict later maternal adjustment points to the possibility that it is not the pain intensity alone, but rather the emotional and cognitive factors, attributed to the pain experience are relevant to the future emotional adjustment of the women after childbirth. The results also show that younger and less educated women are at higher risk. Taken together, young age, relatively low level of education, and the tendency to catastrophize pain may be useful in screening women who may need help in adapting to changes after delivery.

The early detection of maternal emotional adjustment is of importance because it may have a negative impact on mother-infant attachment and reduce optimal emotional development of the newborn infant.^{21,22} Earlier studies suggested that the mode and process of labor may be a risk factor for the development of postpartum depression.²³ More recent studies did not find such a correlation.^{24,25} In the present study, we also found that, in women who undergo vaginal delivery, the level of intensity of pain did not predict maternity blues and later social adjustment. However, pain catastrophizing was a significant predictor of both maternity blues and social functioning.

An analysis of the different components of the PCS revealed that rumination and helplessness were the best predictors of maternity blues. Wisner et al²⁶ studied women with postpartum depression and reported that helplessness and obsessive thoughts (which are similar to the rumination domain) characterized these mothers. Similarly, the role of reduced effectiveness of coping resources and symptoms of obsessive thoughts and obsessive-compulsive disorder were found to be associated with the clinical nature of postpartum affective disorders.^{3,27-29} It seems therefore that pain catastrophizing contributes to the occurrence of maternity blues in a similar way that postpartum depression does, by blocking spontaneous mood and adjustment processes. It is suggested that the meaning of the catastrophizing that is attributed to the pain may be comprised of cognitive components, which in turn inhibit spontaneous mechanisms of emotional and mood adjustment.

Social support and good social relations are the best predictors of well-being in the early postpartum period and are usually lower in cases of postpartum depression.¹³⁻¹⁵ Pain catastrophizing mothers were found in this study to have diminished social ability and activity; in other words, this catastrophizing tendency in coping with a painful event was shown to predict low resourcefulness in the social perspective after delivery. According to Sullivan et al,¹³ pain catastrophizers tend to impose demands on their social partners and use the pain as an

attention seeker, yet they obtain only distant responses from their partners, which leaves them without real support and with greater pain experience. This could be a more generalized social behavior beyond pain experience; therefore, it is possible that mothers who catastrophize the labor pain are not effective in getting support and resuming social relations after delivery. Thus, PCS is suggested to be a reliable predictor of social functioning, which is one of the most important facets in the prevention of postpartum depression.

Little is known about the stability of pain catastrophizing over time in regard to specific noxious events. This study is the first to address this issue prospectively in the context of labor and delivery and its impact on motherhood. We found a high correlation between PCS1 and PCS2, but only PCS1 was a significant predictor of postpartum adjustment, which may suggest that, although pain catastrophizing is a personal tendency, the timing of the measurement is important, and assessment during the actual painful event is the best predictor of long-term mood and social adjustment after delivery.

Part of the women received preparation for delivery, but this variable did not turn out to significantly predict/ or to be in association at all with maternity blues or later social adjustment; thus, it was not included in our regression analyses. Further study should address the issues of specific personal expectation for analgesia versus nonmedicated delivery and the association between the role of the midwife and pain perception. Also, more research must be done to enable generalization of the results and conclusions. Nevertheless, the incidence of maternity blues in the group of women who were studied (30%) is akin to the incidence in the United States and is higher than the published incidence in Israel, which is a result that emphasizes the importance of the PCS tool. Although PCS1 was filled in with the help of a research assistant and PCS2 was filled in by the mothers without such help, the high significant correlation between PCS1 and PCS2 shows that the PCS is reliable beyond these 2 ways of administration that are used to adjust to maternity circumstances and inconvenience (such as contractions) and that the personal judgment of the mothers is kept and revealed with or without help in writing. Thus, both ways of filling in the PCS are appropriate for 2 reasons. First, support from the research assistants potentially could be seen by the mothers as a therapeutic call for reflection on the pain during the completion of the PCS1. Second, the independent filling in of the PCS2 could be experienced by the mothers as reflecting respect and as a symbol of returning to regular functioning. Rigid methods that could try to match the ways of filling in exactly might have resulted in negative attitudes of the mothers.

In summary, because the subjective perception of delivery pain had not been assessed from the angle of catastrophizing, the current study used the PCS with

pregnant and laboring women for the first time to reveal that the PCS use involves a safe, appropriate, valid, and reliable administration of this important measure. Most of the current research on labor pain focuses on the different methods of reducing pain intensity. Our study suggests that, in addition to pain reduction, the aspect of pain catastrophizing should also be addressed before analgesia is given. The process of filling in the PCS is short and may have a therapeutic effect of helping the mother to reflect on her pain, thus decreasing her suffering. The score of ≥ 24 on the PCS should alert care providers. It is possible that early assessment with the PCS, which is a simple tool, may be of clinical value for the identification of women with the potential risk for later impaired adjustment.

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