Pain in childbirth and postpartum recovery – The role of catastrophizing

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A B S T R A C T

This prospective study investigated how pain catastrophizing was related to labor pain intensity and physical recovery after childbirth. Eighty-eight women giving birth for the first time completed the first questionnaire before delivery. Eighty-two of those returned the second questionnaire after delivery. Participants were classified as catastrophizers (n = 38) or non-catastrophizers (n = 44) based on their scores on the Pain Catastrophizing Scale. Comparison of the groups showed that catastrophizers anticipated and experienced more intense pain (p < .0125) and had poorer physical recovery (p < .0125), measured as the level of self-reported functioning in activities of daily living, than non-catastrophizers. These results extend the association between catastrophizing and pain, to pain and recovery in childbirth and provide support for the fear-avoidance model. It is concluded that pain catastrophizing plays a role in the experience of pain in childbirth and postpartum recovery. Further research is needed to identify appropriate interventions for catastrophizing women during the latter part of pregnancy.

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1. Introduction

Pain during childbirth is one of the most excruciating pain experiences that women encounter in their lives (Melzack, 1993). Although there is great variability, about 60% of the women who give birth for the first time describe their pain as severe or extremely severe (Melzack, 1993). Consequently, anticipation of the remarkably intense pain of childbirth may be associated with psychological reactions, such as pain catastrophizing. Catastrophizing emerges in the literature as one of the most potent predictors of pain in general (Vlaeyen and Linton, 2000; Keefe et al., 2004; Sullivan et al., 2002; Severeijns et al., 2001). It has been associated with heightened pain across several pain populations, and accounts for 7–31% of the variance in pain ratings (Sullivan et al., 1995, 2001). Catastrophizing has also been associated with a number of pain-related outcomes, including reduced involvement in daily activities (Keefe et al., 1989) and activity intolerance (Sullivan et al., 2002). Moreover, in the fear-avoidance model, catastrophizing is described as a cognitive precursor to pain-related fear and tendencies to avoid pain, which may enhance pain intensity and hinder resumption of physical activity (Vlaeyen and Linton, 2000). The role of catastrophizing has mainly been studied in chronic and pathological pain conditions and its influences on childbirth remains unclear.

Melzack (1993) claimed that childbirth provides an excellent model of acute pain with a clear beginning, progress and ending. However, labor pain is different from pathological pain, both in the physiological (Catheline et al., 2006) and the psychological process (Olofsson, 2003). Usually pain is a signal of a potential threat, which should be diminished or eliminated. In contrast, labor pain does not usually mean that something is wrong but is an important signal to the mother that labor is proceeding. Furthermore, childbirth differs from other types of pain with respect to its positive outgrowths; a child is born. Most other pain conditions (e.g. injury, illness) that have been studied do not have these positive associations. Thus, although catastrophizing repeatedly has been associated with heightened pain due to injuries, there is good reason to query if childbirth might represent a unique case where catastrophizing does not predict adverse pain outcomes.

Up to now, only one study has investigated catastrophizing specifically in relation to labor pain (Van den Bussche et al., 2007). Catastrophizing was positively associated with fear of being overwhelmed by pain and tendencies to avoid pain during delivery. However, the relation between catastrophizing and labor pain intensity was not studied, nor whether the tendencies to avoid pain persisted after childbirth.

This study was designed to assess whether the reported pain of childbirth and functioning postnatally differs between women who catastrophize about labor pain, catastrophizers, and non-catastrophizers. We hypothesized that catastrophizers will anticipate and experience more pain during childbirth than non-catastrophizers.
We also hypothesized that recovery, in terms of level of functioning in activities of daily living, would take longer for catastrophizers than for non-catastrophizers.

### 2. Method

#### 2.1. Design

In this prospective study, the data collection was made on two occasions: 34–41 weeks of pregnancy and 2–4 weeks following birth, as shown in Fig. 1.

#### 2.2. Participants

Pregnant women were recruited through maternal health services in the county of Örebro in Sweden. To participate, the women had to be carrying their first child and be at least at 34 weeks of gestation. Women who planned to give birth by caesarean section were excluded from the study but those who had an acute caesarean section in advanced labor were included. Participants were consecutively recruited by their midwife and informed consents were obtained. Eighty-eight women answered the first questionnaire and eighty-two of those returned the second questionnaire (response rate 93%). Only participants answering both questionnaires were included in the analyses. The mean age of the sample was 29.6; range 20–42.

The study was conducted according to current ethical principles for clinical research stated in the Declaration of Helsinki (World Medical Association, 1997) and was approved by the maternal health care board in the county of Örebro.

#### 2.3. Measures

Participants answered two questionnaires; one before and one after delivery. Items from several standardized self-report inventories were included in the questionnaires. Background variables included age, estimated and actual date of delivery, planned and actual use of analgesics. The reliability and internal consistency of the scales and items was assessed by calculating Cronbach’s alpha coefficient. Questionnaires were endorsed by midwives in maternity health care and tested in a pilot study (N = 2). The women in the pilot study provided comments on how to improve the questionnaires and were not included in the data analysis.

**Pain catastrophizing**: Pain catastrophizing was measured with the Pain Catastrophizing Scale (PCS) (Sullivan et al., 1995), designed to assess various dimensions of catastrophizing about pain. The PCS consists of 13 statements describing various thoughts and feelings that people may experience when they are in pain (e.g. “I keep thinking how badly I want the pain to stop”, “There is nothing I can do to stop the intensity of the pain”). Respondents were asked to rank each statement on a five-point scale, with respect to the degree to which they have these thoughts and feelings when they are in pain (0 = not at all; 4 = all the time). In our study, the women were asked to focus specifically on the thoughts they had about labor pain. The PCS has been used in similar ways to measure catastrophizing about genital pain (Pukall et al., 2002). In the present study the PCS had good internal consistency (α = 0.925). Catastrophizing about labor pain was measured before delivery.

**Pain**: The Present Pain Intensity scale, a part of McGill Pain Questionnaire (MPQ) (Melzack, 1975), was used to assess anticipated and experienced labor pain. It is a six-point numerical scale used for rating pain intensity (0 = none, 1 = mild, 2 = discomforting, 3 = distressing, 4 = horrible, 5 = excruciating). The MPQ is the most commonly used measure of labor pain (Stockman and Altmayer, 2001).

Pain ratings were measured on two occasions; before (anticipated pain) and after delivery (experienced pain). On each occasion, the women were asked to rate both the average and the maximum pain during labor. Labor pain has been measured in similar ways in earlier research (Lang et al., 2005). The average score of the two items (average/maximum) was calculated for both occasions (anticipated/experienced), respectively. The internal consistency of the two items was good (α = 0.791 for anticipated pain and α = 0.825 for experienced pain).

**Physical recovery in ADL**: To measure physical recovery after delivery we assessed the level of functioning in Activities of Daily Living (ADL). Most standardized instruments for measuring ADL have been developed for chronic conditions, such as stroke or chronic backpain (Buer and Linton, 2002). In our study the level of functioning in ADL was defined as the degree to which the woman estimated being able to do activities within the following three and seven days after delivery, compared to their level before the pregnancy: Households chores (e.g. cleaning, cooking), personal care (e.g. hygiene, getting dressed) and physical activities (e.g. taking walks, climbing the stairs, light exercising). Responses were given on an index between 1 and 6 (1 = a lot worse than before pregnancy, 6 = as good as, or better than, before pregnancy).

To obtain one score for physical recovery the average score for the three questions was calculated for the two occasions respectively. Cronbach’s alpha coefficients indicated good internal consistency and high reliability for the items three days (α = 0.881) and seven days (α = 0.894) after delivery.

**Use of analgesics**: To explore the planned and actual use of analgesics during labor, two items were employed: “Do you plan to use analgesics?” (before delivery) and “Did you use analgesics during delivery?” (after delivery). For both items the answers “yes” or “no” were given. Participants were also asked to write down the type of analgesics planned and actually used.

#### 2.4. Procedure

Midwives in maternal health services provided the participants with information about the study, a consent form, the first questionnaire and a pre-paid envelope to return the questionnaire. The follow up questionnaire was mailed one week after the date

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![Fig. 1. Overview of the design of the study. M1 = first measurement, 1–8 weeks before expected delivery; M2 = second measurement, 2–4 weeks after expected delivery; R = reminder, if needed.](image-url)
of estimated delivery (see Fig. 1). Women completed the first questionnaire some time between the 34th and 41st week of their pregnancy, and the second 2–4 weeks after delivery. If no response was obtained within 2 weeks, a reminder phone-call was made.

Based on their PCS scores, a median-split divided the participants into two groups; catastrophizers and non-catastrophizers. PCS has been used similarly in previous studies (Sullivan et al., 1997; Sullivan and Neish, 1999).

2.5. Data analysis

To evaluate the data, descriptive statistics were calculated and distributions checked. To explore the differences between groups, comparisons of the means were made with independent t-tests for the variables anticipated labor pain, experienced labor pain and physical recovery at three and seven days after delivery. Since four t-tests were employed, a Bonferroni correction for multiple tests was made, requiring \( p < .0125 \) for statistical significance.

Statistical analyses were performed with SPSS 14.0. Missing values were estimated by calculating the mean score for the scale used.

3. Results

3.1. Pain catastrophizing

Table 1 displays mean and median scores for the PCS. The median for the whole group (20) was used to classify the participants as catastrophizers or non-catastrophizers.

Of the drop-outs (i.e. the six women who did not return the second questionnaire), five scored above the median on the PCS (catastrophizers), and one scored below the median (non-catastrophizer).

3.2. Group characteristics

As shown in Table 2, there were no marked differences between catastrophizing and non-catastrophizing women regarding age, number of women giving birth by acute caesarean sections or use of analgesics during the delivery.

3.3. Pain

Table 3 displays anticipated and experienced pain intensity for pain catastrophizers and non-catastrophizers (0 = none, 5 = excruciating). As can be seen, catastrophizing women rated their pain as significantly higher than non-catastrophizers on both occasions. The magnitude of the differences is large in anticipated pain (Cohen’s \( d = 1.17 \)) and moderate in experienced pain (Cohen’s \( d = .74 \)).

3.4. Physical recovery after delivery

Fig. 2 displays recovery in terms of level of functioning in activities of daily living (ADL) after childbirth for pain catastrophizers and non-catastrophizers (1 = a lot worse than before the pregnancy, 6 = as good as, or better than, before the pregnancy).

As illustrated in Fig. 2, non-catastrophizers rated their ADL function significantly higher than catastrophizers at three days \( [M = 2.53, SD = 1.13; M = 3.59, SD = 1.38; t(80) = 3.76, p = .00] \) and at seven days \( [M = 3.58, SD = 1.21; M = 4.71, SD = 1.07; t(80) = 4.49, p = .00] \) after delivery. The magnitude of the differences in recovery is large after three days (Cohen’s \( d = .83 \)) as well as after seven days (Cohen’s \( d = .99 \)).

4. Discussion

This study was designed to investigate how pain catastrophizing is associated with labor pain and physical recovery after childbirth. We found that women who catastrophized about labor pain anticipated and experienced more pain than non-catastrophizers, supporting our first hypothesis. The second hypothesis was also
supported; non-catastrophizers rated their recovery after childbirth better than catastrophizers.

These findings replicate and expand findings from earlier studies, mostly carried out in populations with chronic and pathological pain, where catastrophizing has been associated with heightened pain (Sullivan et al., 2001, 1995) and reduced involvement in daily activities (Keefe et al., 1989). In this study, we found the same associations for pain associated with childbirth. Thus, despite the positive facets of childbirth (e.g. a new life), the relation between catastrophizing and pain outcomes was comparable with other pain situations.

Furthermore, our study provided an opportunity to observe catastrophizing women over time, as catastrophizing was measured when the women were pregnant and outcomes were measured a number of weeks later, after the child was born. In this way, the present study contributes to the growing amount of prospective research that has emerged recently within the area (Picavet et al., 2002; Severeijn et al., 2005).

The results may be explained by the fear-avoidance model of pain. According to this model, pain experience is influenced by a range of emotional, cognitive, biological and behavioural factors (Vlaeyen and Linton, 2000). The central idea is that some individuals tend to interpret pain stimuli as threatening, which generates catastrophic thoughts, tension, vigilance, fear of pain and attempts to avoid the pain. The model was elaborated to describe the development of chronic pain but there is also some evidence that some pain-free individuals may have a tendency to harbour fear-avoidance beliefs, which become activated when they approach pain (Buer and Linton, 2002). Applied to the present study, women with this tendency may interpret labor pain as menacing, which evokes catastrophizing thoughts. They may then focus their attention on the pain, leading to an overestimation of its intensity (i.e. they anticipate more pain) and an underestimation of their own coping abilities. In the model, this vigilance is associated with increased muscle tension which may also increase pain intensity, and induce attempts to avoid the pain. Catastrophizing has indeed been positively associated with tendencies to avoid pain during delivery (Van den Bussche et al., 2007). In our study, the women also seemed to show a tendency to avoid certain movements after childbirth, resulting in a slower resumption of daily activities; i.e. walking, cooking and personal hygiene. Thus, our results indicate that the fear-avoidance model may also be relevant to the pain of childbirth.

Our findings may be viewed in relation to the increasing number of women requiring caesarean sections because of fear of childbirth (Wax et al., 2004). About 6–11% of the pregnant women in the industrialized countries suffer from this fear (Saisto and Halmesmäki, 2003; Waldenström et al., 2006). Fear of pain during delivery is one of the most common reasons for fear of childbirth (Eriksson et al., 2006; Sjögren, 1997; Geissbuehler and Eberhard, 2002). Also, fear of childbirth has been found to be related to a lower pain threshold (Saisto et al., 2001). Our findings provide a possible explanation for these relationships. Although fear was not measured in the present study, it is conceivable that catastrophizing women also have fear of pain. However, while catastrophizing and fear of pain are overlapping constructs, catastrophizing has been found to provide a unique predictor for pain, beyond fear per se (Sullivan et al., 2004). Therefore, catastrophizing may act as a mediator, explaining fear of childbirth and a lower pain threshold among these women.

Both groups of women in this study managed to predict the level of pain they later experienced during delivery. This contradicts earlier findings, where women who were giving birth for the first time underestimated the actual pain experienced during childbirth (Fridh and Gaston-Johansson, 1990; Paech, 1991; Waldenström, 1999). On the other hand, catastrophizers have been found to exaggerate the menace of pain, while understating their own capacity to handle the situation (Sullivan et al., 2001). However, in the present study both catastrophizers and non-catastrophizers had a fairly realistic picture of how intense their pain would actually be.

Catastrophizing may be an important indicator for identifying mothers who may have difficulties with labor and recovery after delivery. This coincides with earlier studies, where catastrophizing has been found to predict heightened pain intensity and activity intolerance in pain-free individuals (Sullivan et al., 2002). However, even though catastrophizing preceded childbirth in our study, this does not necessarily infer a causal relationship between catastrophizing and outcomes.

The limitations of this study need to be considered. First, although the response rate was high in comparison with other studies about related topics (Van den Bussche et al., 2007), a substantial proportion of women giving birth in the county during this period were unable to participate because the questionnaires were only accessible in Swedish. This leads to a possible selection bias which might have influenced our results, as immigrant women make up about 10% of the women living in the county. Second, all measures used were subjective self-report inventories. A more objective measurement for rating physical recovery would have been appropriate, since the identified differences may be due to reporting differences rather than physical, i.e. the catastrophizers only rate their level of functioning as lower than the non-catastrophizers. One factor that may have influenced the rating is changes in cognition and mood that many women experience during late pregnancy and shortly after childbirth (Russell et al., 2001). Third, because there are large individual differences in labor pain, other factors may be influencing our results. One major determinant is prior births (Melzack, 1993). To minimize the impact of earlier experiences, possibly affecting both catastrophizing and pain, only women giving birth for the first time participated in the study. Another influencing factor is use of methods to relieve the pain. However, there were no marked differences between catastrophizing and non-catastrophizing women in use of analgesics. This replicates earlier findings where no difference was found between catastrophizers and non-catastrophizers in use of epidural analgesia (Van den Bussche et al., 2007), one of the most widespread and effective methods for relief of labor pain (Capogna et al., 1996).

Other medical factors (e.g. use of oxytocin/syntocinon) are important in relation to childbirth and postpartum recovery and may have influenced our results. However, since the main focus of this study was women’s experiences, we focused on their self-reports on standardized questionnaires. Fourth, among the women who did not answer the second questionnaire, five out of six were catastrophizers, and we do not know how this might have influenced the results. Fifth, the distinction between statistical and clinical significance should be addressed. The differences identified in this study have moderate to large effect sizes. Further studies are required to understand the impact of the findings in a clinical setting.

In this first study, pain catastrophizing was clearly associated with a heightened labor pain experience and a lower level of resumption of activities after childbirth. These findings suggest possibilities for identifying pregnant women with high levels of catastrophizing during the third trimester, for instance by using screening questionnaires. If further research confirms the role of catastrophizing in this group the next challenge will be to develop adequate interventions. In other populations, cognitive-behavioural therapy (CBT) is a successful method of treating catastrophizing and encourages better adjustment to pain (Keefe et al., 1990; Sullivan et al., 2001). One potential path is to investigate if CBT-techniques (e.g. imaginary exposure, cognitive restructuring) could be adapted as an early intervention for women who catastrophize about their labor pain. Hopefully, appropriate interventions
developed in collaboration with midwives may reduce women's pain perception during labor and hasten their recovery postpartum.

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