Severe recalled labor pain and elective cesarean section in a subsequent delivery: a cohort study of Norwegian parous women

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Abstract

Introduction: Some women keep on recalling intense labor pain experienced at childbirth to a degree that may negatively affect their life during the postpartum period or lead them to request a cesarean section (CS) in the subsequent delivery. This longitudinal study aimed to assess the impact of severe recalled labor pain from the previous birth on the preference for and delivery by an elective CS in the subsequent delivery. Furthermore, we investigated whether co-occurring maternal demographic, somatic and mental health factors related to the previous and subsequent delivery, explain parts of a potential association.

Material and methods: The study sample comprised 1135 parous women from the Akershus Birth Cohort. Severe recalled labor pain was assessed on a numeric rating scale at pregnancy week 17, and at pregnancy week 32, the preference for an elective CS for the subsequent delivery was assessed. Information on actual delivery by elective CS in the subsequent delivery was retrieved from the electronic birth record. Logistic regression analyses were conducted to examine the impact of severe recalled labor pain on elective CS.

Results: Severe recalled labor pain at the previous birth was associated with a preference for an elective CS (odds ratio [OR] 3.57, 95% confidence interval [CI] 2.25–5.67) and actual delivery by elective CS (OR 4.71, 95% CI 2.32–9.59). This association remained statistically significant for the preference for an elective CS (adjusted OR [aOR] 2.12, 95% CI 1.24–3.62) but diminished for delivery by elective CS (aOR 2.30, 95% CI 0.99–5.35) when adjusting for a variety of covariates. Factors related to previous childbirth such as number of years since previous birth, assisted vaginal delivery, anal sphincter lesions, overall birth experience and fear of childbirth were also linked to preference for and delivery by an elective CS.

Conclusions: Women with severe recalled labor pain were about twice as likely to prefer an elective CS compared with women without severe recalled pain. For actual...
delivery, the significant association with severe recalled pain diminished after adjustment for covariates. However, sample size was small and, irrespective of severe recalled labor pain, preference for an elective CS was statistically significantly associated with actual delivery by elective CS.

**KEYWORDS**
birth, cesarean section, delivery, labor pain, preference, recall

### Key message

Women with severe recalled labor pain have a twofold increased risk of preferring elective cesarean section in a subsequent birth. Irrespective of severe recalled pain, preference for elective cesarean section is significantly related to actual delivery by elective cesarean section.

### 1 | INTRODUCTION

For many women, labor pain may be quickly forgotten and thereby harmful memories are reduced. However, women with a negative childbirth experience do not seem to report decreasing labor pain scores over time. Also, some women may keep recalling intense labor pain experienced at childbirth and may suffer from anxiety to the degree that may negatively affect their life during the postpartum period and their ability to take care of their child. Women with negative birth experiences or fear of labor pain have fewer subsequent children and longer intervals to their next pregnancies, and pregnant women may have considerable worries about the subsequent delivery and may request a cesarean section (CS).

The continuous rise of CS rates in almost all Western countries is well documented and is an issue of concern. In Norway, CS rates increased from 2.5% in 1972 to 16.2% in 2020. The World Health Organization (WHO) has recommended a CS rate of 10–15%. CS rates >10% are not associated with a reduction of mortality rates for the mother and the child, and the WHO stated that CS should only be performed when medically necessary. However, an increasing number of elective CS is undertaken upon maternal request, without medical indication.

While fear of labor pain and catastrophizing are documented reasons for the preference for elective CS, there is, to the best of our knowledge, a lack of studies examining the role of the recall of labor pain for the preference for and actual delivery by elective CS in parous women.

Therefore, the overall aim of this study was to examine whether severe recalled labor pain from the previous birth has an impact on the preference for and delivery by an elective CS in a subsequent delivery. We hypothesized that severe recalled labor pain is associated with elective CS. Furthermore, we wanted to investigate whether a potential association may be explained by co-occurring maternal demographic, somatic and mental health factors related to the previous and subsequent delivery.

### 2 | MATERIAL AND METHODS

The Akershus Birth Cohort (ABC), a large population-based prospective cohort study, recruited women between November 2008 and April 2010 during their routine fetal ultrasound examination at 17 weeks’ gestation at Akershus University Hospital, located near the capital of Oslo in Norway. All women able to complete the self-administered questionnaires in Norwegian were eligible for the study. Additional information was obtained by linkage to the electronic birth records. An overview of time points for data collection of relevant maternal characteristics is presented in Figure 1.

Of the eligible women, 2929 (78%) returned the first questionnaire in pregnancy week 17 and the second questionnaire in pregnancy week 32. For the present study, we excluded primigravida and mothers with a previous CS because their experience of labor pain might not be comparable to those who went through a vaginal delivery. In addition, we excluded women with missing information on recalled labor pain (n = 2), preference for CS in the following childbirth (n = 13), education (n = 80), marital status (n = 2), years passed since previous birth (n = 4), previous birth method (n = 16) and overall birth experience (n = 5). Furthermore, we excluded women with >20% missing items on the assessment tool for prenatal depression symptoms (n = 1), prenatal anxiety symptoms (n = 16) and fear of childbirth (n = 7). Figure 2 presents the recruitment and retention of the study sample in detail, which ultimately consisted of n = 1135 mothers.

The main predictor variable was recalled labor pain, reported in the first questionnaire at pregnancy week 17. Women were asked how much labor pain they felt during their previous birth. Response options ranged on a numeric rating scale from 0 (no pain) to 10 (the strongest pain you can imagine). The distribution of recalled labor pain reports deviated significantly from normality (Shapiro-Wilk normality test, p < 0.001). More than half of the women scored at least 8, with a score of 10 roughly representing the upper 25th percentile; we defined severe recalled pain as a score of 10.

The first outcome was the preference for an elective CS, based on the following question in the second questionnaire at pregnancy week 32: “If I could choose, I would prefer to deliver by cesarean section”. The original scale has four response options, ranging from highly agree to highly disagree. The answers were coded as yes (highly agree/agree) or no (disagree/highly disagree).
The second outcome, delivery by elective CS, was derived from the electronic birth record and was categorized as an elective CS vs another delivery method, vaginal, instrumental vaginal (vacuum or forceps-assisted), or emergency CS. Elective CS delivery included cesarean deliveries planned 8 hours or more before delivery and performed as planned.7

Information regarding maternal demographic factors such as age, educational level and marital status was retrieved from the electronic birth records. Educational level was coded as >12 years of education vs ≤12 years of education.16 Marital status was categorized as cohabitating/married vs single. Data on parity was coded as primiparous (woman has given birth once before) vs multiparous (woman has given birth more than once before) and was collected during pregnancy week 17.

Objective and subjective factors relating to the previous birth, such as years passed since previous birth, birth method, anal sphincter lesions, anesthesia used at last birth, overall birth experience and child health after birth, were drawn from the first questionnaire at pregnancy week 17. Years passed since previous birth were categorized into three groups (≤1, 2–5 and ≥6 years passed). Previous birth method was categorized into three groups (ie non-assisted vaginal delivery, assisted vaginal delivery and vaginal breech delivery). Anal sphincter lesions and the use of anesthesia during the previous birth, such as epidural anesthesia and nitrous oxide gas, as well as acupuncture, were assessed. Overall birth experience was measured using a numeric rating scale: “What was your overall experience of the birth?”, with response options ranging from 0 (very good) to 10 (extremely bad). We defined a negative overall birth experience as a numeric rating scale score ≥9, roughly representing the upper 10th percentile.2

Child health after birth was assessed by admission to the pediatric ward due to sickness immediately after birth and was coded as "child was healthy" (healthy) vs "child was sick" (admitted to the pediatric ward).

Maternal mental and somatic health were assessed by several variables. Symptoms of prenatal depression were measured at pregnancy week 17 by 10 items of the Hopkins Symptom Checklist.18 The scale has four response categories ranging from 1 to 4; thus, the sum score can range from 10 to 40. Presence of prenatal anxiety symptoms was defined as a score ≥18.19 Fear of childbirth was measured by the Wijma Delivery Expectancy/Experience Questionnaire, Version A,20 at pregnancy week 32. It consists of 33 items, all of which are rated on a 6-point Likert scale, ranging from 0 to 5. Sum scores range from 0 to 165. As suggested in the literature, participants with sum scores ≥85 were defined as suffering from severe fear of childbirth.5,15 Data purporting maternal somatic health status during pregnancy (eg stomach pain, back pain, pain in arms/legs/joints, pain during sexual intercourse, headaches, chest pain, dizziness, fainting spells, feeling your heart pound/race, shortness of breath, constipation/loose bowels/diarrhea, feeling tired/low energy, trouble sleeping, gynecological complaints)22 were retrieved from the second questionnaire at pregnancy week 32. An index was computed with three categories: no problem, 1–2 problems, ≥3 problems.

2.1 Statistical analyses

Missing values on the psychometric scales (symptoms of prenatal depression, symptoms of prenatal anxiety and fear of childbirth) were replaced as in previously published ABC-based research by the mean values of each case if the number of missing items was ≤20%.16,17 Frequencies and percentages of the study variables according to preference and actual delivery mode were calculated. The Exact chi-square test was used to test for associations between all study variables and the two outcomes, that is, preference for elective CS and delivery by elective CS. The variables significantly associated (p < 0.05) with at least one of the two outcomes, were included in bivariate and multivariate logistic regression analyses. The Hosmer–Lemeshow test was applied to evaluate the model’s goodness of fit. Additionally, Exact chi-square tests were conducted.
to examine significant associations between the two main outcomes preference for elective CS and delivery by elective CS, first including all women and secondly only women with severe recalled labor pain.

### 2.2 Ethical approval

The Akershus Birth Cohort Study was approved by the Regional Committees for Ethics for Medical Research in Norway (S-08013a) on 12 February 2008. All participants signed an informed consent form.

### 3 RESULTS

A total of 1135 mothers, with an average age of 32.7 years (SD = 4.2 years), were included in the study. Most of the women (75.1%) were pregnant with their second child. The women’s recalled labor pain perception ranged from no pain at all (0) to the most intense pain imaginable (10). Mean recalled labor pain perception for all women was 8.1 (SD = 2.0), and severe recalled labor pain (ie a score of 10) was reported by nearly one-third of all women (30.0%). Further characteristics of the sample are presented in Table 1. Of 1135 women, 81 (7.1%) reported a preference for elective CS, and 35 women (3.1%) actually delivered by elective CS. Among women with severe recalled pain, 13.8% (47 out of 341) preferred elective CS, and 6.7% (23 of 341) actually delivered by elective CS. About 40% (19 of 47) of the women with severe recalled labor pain who preferred elective CS also delivered by elective CS. Finally, preference for elective CS, irrespective of whether the women recalled their labor pain as severe or not, was highly statistically significantly ($p < 0.001$) associated with delivery by elective CS (Figure 3).

As shown in Table 1, educational level, years passed since previous birth, birth method, anal sphincter lesions, epidural anesthesia, overall birth experience, symptoms of prenatal anxiety, fear of childbirth and maternal somatic health were significantly associated with a preference for elective CS and were therefore included in the logistic regression models. Apart from educational level, epidural anesthesia and maternal somatic health, the same factors were associated with delivery by elective CS and were statistically significant.

Table 2 displays the bivariate and multivariate associations between severe recalled labor pain and preference for and actual delivery by elective CS. The estimated crude odds ratios of preference for elective CS was 3.57 (95% confidence interval [CI] 2.25–5.67) and 4.71 (95% CI 2.32–9.59) for delivery by elective CS. After adjustment for covariates, severe recalled pain remained statistically
### TABLE 1
Frequencies and percentages of study variables according to preference for delivery and actual delivery mode among 1135 women

| Study variables (time point) | Preference | Delivery mode | Total |
|-----------------------------|------------|---------------|-------|
|                             | No elective CS | Elective CS | Vaginal delivery | Elective CS | p | n | % | p | n | % |
| Recalled labor pain (17th pregnancy week) |              |              |              |              | <0.001 | <0.001 |
| No severe recalled labor pain | 760 | 72.1 | 34 | 42.0 | 782 | 71.1 | 12 | 34.3 | 794 | 70.0 |
| Severe recalled labor pain    | 294 | 27.9 | 47 | 58.0 | 318 | 28.9 | 23 | 65.7 | 341 | 30.0 |
| Demographic factors          | 0.05 | 0.19 | 0.31 | 0.77 | <0.01 | 0.15 |
| Maternal age (birth) ≤25 years | 45 | 4.3 | 5 | 6.2 | 47 | 4.3 | 3 | 8.6 | 50 | 4.4 |
| 26-35 years                  | 748 | 71.0 | 47 | 58.0 | 775 | 70.5 | 20 | 57.1 | 795 | 70.0 |
| ≥36 years                    | 261 | 24.8 | 29 | 35.8 | 278 | 25.3 | 12 | 34.3 | 290 | 25.6 |
| Parity (17th pregnancy week) |              |              |              |              | <0.01 | 0.15 |
| 1 child                      | 795 | 75.4 | 57 | 70.4 | 825 | 75.0 | 27 | 77.1 | 852 | 75.1 |
| ≥2 children                  | 259 | 24.6 | 24 | 29.6 | 275 | 25.0 | 8 | 22.9 | 283 | 24.9 |
| Educational level (birth) >12 years | 702 | 66.6 | 42 | 51.9 | 725 | 65.9 | 19 | 54.3 | 744 | 65.6 |
| ≤12 years                    | 352 | 33.4 | 39 | 48.1 | 375 | 34.1 | 16 | 45.7 | 391 | 34.4 |
| Marital status (birth) Cohabiting/married | 1044 | 99.1 | 79 | 97.5 | 1088 | 98.9 | 35 | 3.1 | 1123 | 98.9 |
| Single                       | 10 | 0.9 | 2 | 2.5 | 12 | 1.1 | 0 | 0.0 | 12 | 1.1 |
| Objective and subjective factors related to previous childbirth |              |              |              |              | <0.001 | <0.001 |
| Years since previous birth (17th pregnancy week) | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| ≥6                           | 164 | 15.6 | 25 | 30.9 | 175 | 15.9 | 14 | 40.0 | 189 | 16.7 |
| 2-5                          | 757 | 71.8 | 50 | 61.7 | 788 | 71.6 | 19 | 54.3 | 807 | 71.1 |
| ≤1                           | 133 | 12.6 | 6 | 7.4 | 137 | 12.5 | 2 | 5.7 | 139 | 12.2 |
| Birth method (17th pregnancy week) |              |              |              |              | 0.02 | <0.001 |
| Not assisted vaginal delivery | 878 | 83.3 | 59 | 72.8 | 917 | 83.4 | 20 | 57.1 | 937 | 82.6 |
| Assisted vaginal delivery    | 152 | 14.4 | 21 | 25.9 | 158 | 14.4 | 15 | 42.9 | 173 | 15.2 |
| Vaginal breech delivery      | 24 | 2.3 | 1 | 1.2 | 25 | 2.3 | 0 | 0.0 | 25 | 2.2 |
| Anal sphincter lesions (17th pregnancy week) |              |              |              |              | <0.01 | <0.001 |
| No                           | 1015 | 96.3 | 73 | 90.1 | 1061 | 96.5 | 27 | 77.1 | 1088 | 95.9 |
| Yes                          | 39 | 3.7 | 8 | 9.9 | 39 | 3.5 | 8 | 22.9 | 47 | 4.1 |
| Epidural anesthesia (17th pregnancy week) | 0.001 | 0.09 | 0.001 | 0.09 | 0.001 | 0.09 |
| No                           | 697 | 66.1 | 39 | 48.1 | 718 | 65.3 | 18 | 51.4 | 736 | 64.8 |
| Yes                          | 357 | 33.9 | 42 | 51.9 | 382 | 34.7 | 17 | 48.6 | 399 | 35.2 |
| Nitrous oxide gas (17th pregnancy week) | 0.92 | 0.50 | 0.92 | 0.50 | 0.92 | 0.50 |
| No                           | 825 | 78.3 | 63 | 77.8 | 859 | 78.1 | 29 | 82.9 | 888 | 78.2 |
| Yes                          | 229 | 21.7 | 18 | 22.2 | 241 | 21.9 | 6 | 17.1 | 247 | 21.8 |
| Acupuncture (17th pregnancy week) | 0.60 | 0.13 | 0.60 | 0.13 | 0.60 | 0.13 |
| No                           | 858 | 81.4 | 64 | 79.0 | 897 | 81.5 | 25 | 71.4 | 922 | 81.2 |
| Yes                          | 196 | 18.6 | 17 | 21.0 | 203 | 18.5 | 10 | 28.6 | 213 | 18.8 |
| Overall birth experience (17th pregnancy week) | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Not negative overall experience | 1002 | 95.1 | 57 | 70.4 | 1040 | 94.5 | 19 | 54.3 | 1059 | 93.3 |
| Negative overall experience  | 52 | 4.9 | 24 | 29.6 | 60 | 5.5 | 16 | 45.7 | 76 | 6.7 |

(Continues)
significant for preference for CS (adjusted odds ratio [aOR] 2.12, 95% CI 1.24–3.62), whereas the association with actual delivery by elective CS became considerably weaker and the significance vanished (aOR 2.30, 95% CI 0.99–5.35).

Fear of childbirth was a particularly strong risk factor for preference for elective CS (aOR 7.04, 95% CI 3.73–13.27) and was strongly linked to actual delivery by elective CS (aOR 3.99, 95% CI 1.64–9.72). Previous negative overall birth experience was also associated with both preference for elective CS (aOR 2.66, 95% CI 1.32–5.36) and delivery by elective CS (aOR 4.19, 95% CI 1.68–10.45).

Objective factors related to previous birth such as anal sphincter lesions and assisted vaginal delivery were strongly related to actual delivery by elective CS (aOR 5.64, 95% CI 2.00–15.89 and aOR 3.02, 95% CI 1.29–7.06, respectively), but not to preference for elective CS (aOR 2.13, 95% CI 0.85–5.33 and aOR 1.30, 95% CI 0.69–2.46).

Interestingly, women with fewer years passed since the previous birth were less likely to prefer elective CS and to have an actual delivery by elective CS (Table 2). The Hosmer–Lemeshow test proved a good fit for the logistic regression analyses, as the results were not significant.

### DISCUSSION

In this study, we found that women with severe recalled labor pain were twice as likely to prefer elective CS. This association remained statistically significant when adjusting for educational level, objective and subjective factors related to the previous childbirth, and maternal mental and somatic health factors. On the other hand, delivery by elective CS was not significantly associated with severe recalled labor pain after controlling for the same confounders. Nevertheless, preference for an elective CS was significantly
TABLE 2  Crude and adjusted odds ratios with 95% confidence intervals for preference for elective cesarean section and delivery by elective cesarean section according to recalled labor pain and significantly associated factors among 1135 women

| Maternal factors | Preference for elective CS | Delivery by elective CS |
|------------------|-----------------------------|-------------------------|
|                  | OR 95% CI p | aOR 95% CI p | OR 95% CI p | aOR 95% CI p |
| Recalled labor pain | | | | |
| No severe recalled labor pain | 1.0 | 1.0 | 1.0 | 1.0 |
| Severe recalled labor pain | 3.57 2.25–5.67 <0.001 | 2.12 1.24–3.62 <0.01 | 4.71 2.32–9.59 <0.001 | 2.30 0.99–5.35 0.05 |
| Demographic factors | | | | |
| Educational level | | | | |
| >12 years | 1.0 | 1.0 | 1.0 | 1.0 |
| ≤12 years | 1.85 1.18–2.92 <0.01 | 1.58 0.94–2.65 0.08 | 1.63 0.83–3.20 0.16 | 1.19 0.54–2.64 0.67 |
| Objective and subjective factors related to previous childbirth | | | | |
| Years since previous birth | | | | |
| ≥6 | 1.0 | 1.0 | 1.0 | 1.0 |
| 2–5 | 0.43 0.26–0.72 0.001 | 0.49 0.28–0.88 0.02 | 0.30 0.15–0.61 0.001 | 0.29 0.13–0.68 <0.01 |
| ≤1 | 0.30 0.12–0.74 <0.01 | 0.34 0.12–0.93 0.04 | 0.18 0.04–0.82 0.03 | 0.24 0.05–1.20 0.08 |
| Birth method | | | | |
| Not assisted vaginal delivery | 1.0 | 1.0 | 1.0 | 1.0 |
| Assisted vaginal delivery | 2.06 1.21–3.48 <0.01 | 1.30 0.69–2.46 0.42 | 4.35 2.18–8.68 <0.001 | 3.02 1.29–7.06 0.01 |
| Vaginal breech delivery | 0.62 0.08–4.66 0.64 | 0.96 0.12–7.74 0.97 | n.a. | n.a. |
| Anal sphincter lesions | | | | |
| No | 1.0 | 1.0 | 1.0 | 1.0 |
| Yes | 2.85 1.29–6.33 0.01 | 2.13 0.85–5.33 0.10 | 8.06 3.44–18.88 <0.001 | 5.64 2.00–15.89 0.001 |
| Epidural anesthesia | | | | |
| No | 1.0 | 1.0 | 1.0 | 1.0 |
| Yes | 2.10 1.34–3.31 0.001 | 1.69 1.00–2.84 0.05 | 1.78 0.90–3.48 0.10 | 1.05 0.49–2.34 0.90 |
| Overall birth experience | | | | |
| No negative overall experience | 1.0 | 1.0 | 1.0 | 1.0 |
| Negative overall experience | 8.11 4.67–14.10 <0.001 | 2.66 1.32–5.36 <0.01 | 14.60 7.15–29.81 <0.001 | 4.19 1.68–10.45 <0.01 |
| Maternal mental and somatic health | | | | |
| Perinatal anxiety symptoms | | | | |
| No | 1.0 | 1.0 | 1.0 | 1.0 |
| Yes | 2.81 1.51–5.24 0.001 | 0.92 0.42–1.99 0.83 | 3.19 1.35–7.53 <0.01 | 1.28 0.44–3.75 0.69 |

(Continues)
associated with the delivery by elective CS, irrespective of whether the women recalled their labor pain as severe.

A major strength of this study is its long-term, prospective data collection using validated psychometric instruments complemented by data from birth records, which for the first time allowed us to investigate the link between severe recalled labor pain and elective CS in 1135 parous women. The study had a high participation rate (78.1%) and recruited women at the routine examination, indicating that selection bias was low.

However, some limitations should be noted. The generalizability of the results may be limited because only Norwegian-speaking women were included, which resulted in a relatively homogeneous sample. Different results might be obtained for other ethnic groups. Furthermore, women who had epidural anesthesia seemed to a larger degree to remember labor pain at its peak and, therefore, might report higher pain scores than other women. However, epidural anesthesia was only significantly associated with the preference for elective CS and this association remained significant after controlling it. Also, even though numerous of confounders were controlled for, some confounders, which we did not measure (eg previous severe birth complications or postpartum hemorrhage) could possibly play a role.

Women who prefer elective CS often express fear of labor pain or have negative experiences from a prior birth. Fear of labor pain has been found to be an independent predictor of the preference for an elective CS and may be mediated by catastrophizing. Memory of labor pain experience can be influenced by affective factors like anxiety or distress and could, therefore, lead to an overestimation of recalled labor pain intensity. Thus, it is conceivable that in women with severe recalled labor pain, a negative cognitive-affective response to recalling labor pain might be a reason for the preference for an elective CS.

In line with a pattern found by previous studies focusing on reasons for maternal request for elective CS, this study shows that fear of childbirth is an important predictor of preference for an elective CS. However, recalled labor pain from a previous birth is of additional importance for parous women, as indicated by the fact that after adjusting for fear of childbirth in our study, the odds for the association between severe recalled labor pain decreased slightly but remained significant.

In contrast, the association between severe recalled labor pain and the actual delivery by elective CS decreased considerably after controlling for covariates, and significance diminished, which underlines the involvement of maternal mental health and several subjective and objective factors related to previous childbirth. Severe recalled labor pain is associated with memories of obstetric interventions and with dissatisfaction with childbirth overall. Thus, previous anal sphincter lesions, assisted vaginal delivery, dissatisfaction with childbirth overall and resulting secondary fear of childbirth could have masked the association between severe recalled labor pain and the delivery by elective CS, because women with these experiences might recall more intense labor pain compared with those not experiencing such pain. In fact, the impact of medical risk factors, eg on the delivery by elective CS in a subsequent birth, has been confirmed in previous studies.

| Preference for elective CS | Fear of childbirth | Maternal somatic health |
|---------------------------|--------------------|------------------------|
| No                        | Yes                | No problems            |
| OR                        | 1.0                | 1.0                    |
| 95% CI                    | 0.99               | 0.99                   |
| p                         | 0.79               | 0.79                   |

The variables significantly associated (p < 0.05) with at least one of the two outcomes were included in bivariate and multivariate logistic regression analyses.
Still, the majority of the women (82.6%, 19 of 23) who preferred and delivered by elective CS also suffered from severe recalled labor pain. However, the sample size was small and preference for an elective CS was highly significantly associated with the delivery by an elective CS, irrespective of severe recalled labor pain (Figure 3). Similarly, in the Norwegian Mother and Child Cohort, multiparous women without a previous CS but with a preference for elective CS during the new pregnancy had a 26 times higher likelihood of delivery by an elective CS in the subsequent birth. Women who have given birth before and who prefer CS may be able to communicate their wishes and present their arguments for an elective CS more convincingly. The healthcare staff might also be more attentive to multiparous women because previous birth experience gives their preferences more credibility.26

Interestingly, women with fewer years passed since previous birth were less likely to prefer elective CS and to actually deliver by elective CS (Table 2). One possible explanation for this association might be that women with a traumatic delivery experience prolong the time to subsequent childbirth.27 Thus, women with a positive birth experience may have shorter intervals to the subsequent childbirth and prefer vaginal delivery again.27

5 | CONCLUSION

Parous women with severe recalled pain were twice as likely to prefer an elective CS. Also, the risk for delivery by elective CS in the subsequent birth was increased by severe recalled labor pain, although the significance diminished after adjustment for covariates. However, sample size was small and preference for elective CS was significantly associated with actual delivery by elective CS, irrespective of severe recalled pain.

First and foremost, healthcare staff should strive to provide women with a positive first birth experience, including adequate pain relief. In addition, severe recalled labor pain in parous women should already be addressed in pregnancy to avoid subsequent preference for and unnecessary actual delivery by elective CS. Affective factors of pain memory can be treated, for example, with crisis-oriented interventions or relaxation exercises.28 Still, medical reasons are a major factor in determining the actual birth method, thus practice guidelines that require a mandatory second opinion are also important to reduce CS.29 Further research is warranted to explore the decision-making process on birth method and especially the impact of severe recalled labor pain in more detail and in larger samples.

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CONFLICT OF INTEREST

The authors have stated explicitly that there are no conflicts of interest in connection with this article.

AUTHOR'S CONTRIBUTION

CJ performed the statistical analyses, drafted the initial manuscript, and reviewed and revised the manuscript. SG-N and TvS participated in the design of the current study, assisted with statistical analyses, and helped draft the manuscript. AS was involved in the organization of writing the manuscript and helped revise the manuscript’s content. ME-G designed the ABC study as a whole and acquired the funding.

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