

Perineal tear and childbirth-related posttraumatic stress: A prospective cohort study

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Abstract

Objective: Quantitative studies examining the occurrence of childbirth-related posttraumatic stress disorder (CB-PTSD) following severe perineal rupture are lacking. The objective of this population-based study was to investigate the prospective associations between the degree of perineal tear during childbirth and CB-PTSD symptoms, when adjusting for known covariates (maternal age, years of school education, premature birth, and parity). We hypothesized that women with different degrees of perineal tear will differ regarding (1) the level of CB-PTSD symptoms at 8 weeks and 2 years postpartum and (2) the rate of change in CB-PTSD symptoms from 8 weeks to 2 years postpartum.

Method: Secondary data analysis from the Akershus Birth Cohort, a large population-based prospective cohort study using self-report questionnaires and hospital record data.

Results: The degree of perineal tear was significantly associated with CB-PTSD symptoms at 8 weeks and 2 years postpartum. However, the degree of perineal tear was not significantly associated with the change in CB-PTSD symptoms over time. Similar patterns were found for both total CB-PTSD symptoms as well as for avoidance and intrusion symptoms only.

Antje Horsch and Susan Garthus-Niegel contributed equally as last authors.

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Conclusion: Results seem to support a dose–response model, suggesting that the higher the severity of the perineal tear, the higher the posttraumatic morbidity.

KEYWORDS

childbirth, cohort, perineal tear, posttraumatic stress disorder, prospective, PTSD

1 | INTRODUCTION

Childbirth is a very common and anticipated event but also one that is extremely physically demanding, with potential obstetric complications and physical injuries that may arise.¹ Perineal rupture can occur during vaginal birth when injury is sustained to the perineum (area between the vagina and the anal sphincter). Severe perineal rupture means that the perineum is injured with trauma extending to the anal sphincter complex (third or fourth degree tear).² The incidence of severe perineal rupture ranges between 5% and 10%.³ If the injury to the perineum involves the external and internal anal sphincter complex and anorectal mucosa, a fourth degree tear has occurred.⁴ Severe perineal rupture can cause damage to the pelvic floor muscles, disruption of the anal sphincter complex, and extensive scarring of the perineum and anal sphincter.⁴ As a consequence, women may experience urinary, flatus and faecal incontinence, and dyspareunia (painful sexual intercourse).^{5,6} Following obstetric anal sphincter repair, local protocols are implemented regarding the use of antibiotics, laxatives, examination, and follow-up of women. Physiotherapy is recommended, and women are usually reassessed at 6–12 weeks postpartum. Women who experience incontinence or pain at follow-up are usually referred to a specialist gynecologist or colorectal surgeon.⁴

In addition to the physical complications following severe perineal rupture, women may also experience multiple psychosocial challenges.^{7,8} Qualitative studies identified experiences of social isolation and marginalization linked to ongoing physical complications, particularly urinary and faecal incontinence, and perineal pain.⁹ Qualitative studies have also described how women may experience a change in their identity as a sexual being, as their physical complications after severe perineal rupture may interfere with their ability to engage in sexual activities. Evidence shows that women are likely to experience lower levels of libido, fewer orgasms and satisfaction, and more pain during intercourse.¹⁰ This in turn may impact on their relationship with their partner and their sense of self.^{7,8,11} Evidence also shows that primiparous women (i.e., first-time mothers) after severe perineal trauma may be less likely to have a subsequent baby.¹²

Significant outcomes

- Degree of perineal tear was associated with childbirth-related (CB) PTSD symptoms at 8 weeks and 2 years postpartum.
- Degree of perineal tear was not associated with change in CB-PTSD symptoms over time.
- Results support a dose–response model for tear severity and posttraumatic morbidity.

Limitations

- CB-PTSD symptoms were self-reported and did not cover the entire list of DSM-5 PTSD symptoms.
- The sample was relatively homogeneous and there was a slight social gradient associated with participation in the study.
- There was somewhat selective attrition during the longitudinal course of the study.

Severe perineal rupture meets diagnostic criteria for a traumatic event, which is defined as the “exposure to actual or threatened death, serious injury or sexual violation (...)”, (Ref. 13, p. 271). As a consequence, women may develop posttraumatic stress disorder, which consists of four symptom clusters (re-experiencing, avoidance, hyperarousal, and negative cognitions and mood) and can be diagnosed at least 1 month after the traumatic stressor occurred.¹³ According to the DSM-5, PTSD as a consequence of childbirth, or childbirth-related PTSD (CB-PTSD), is not a specific diagnosis, although it has recently been proposed as a new subtype of PTSD.¹⁴ Clinical characteristics of CB-PTSD and PTSD are slightly different, with mothers with CB-PTSD reporting more intrusion symptoms than mothers with PTSD related to other stressors.¹⁵ Psychometrics studies investigating the latent structure of CB-PTSD identified two symptom clusters: childbirth-related symptoms (e.g., flashbacks, avoidance) and general symptoms (e.g., low mood, anhedonia).^{16–22}

Childbirth-related PTSD affects approximately 5% of mothers,²⁹ with greater prevalence rates (around 12%) found for sub-clinical post-traumatic stress symptoms²⁹ and for those exposed to higher stressor intensity, such as those who have premature births, stillbirths, or severe obstetric complications (16–19%).^{32,33} CB-PTSD may negatively impact not only on those giving birth, but also on fathers or co-parents, the infant, and potentially the whole family.^{29,34} The diathesis-stress model proposes that interactions between three etiological pathways (situational stressor, ecological diatheses, and biological diatheses) may lead to the development of PTSD. In particular, a traumatic stressor severe enough to activate the diatheses may trigger PTSD and lead to an individual's "breaking point".²³ Previous studies have identified risk-factors of CB-PTSD that can be classed as situational stressor, ecological diatheses, or biological diatheses.^{24–30} For example, obstetric complications during birth, such as premature birth (stressor severity), less years of education (ecological diathesis), lower maternal age, and higher parity (biological diatheses) were associated with the severity of self-reported CB-PTSD symptoms^{25,31} and will therefore be taken into account in this study.

Whilst CB-PTSD has been investigated as a consequence of childbirth in general, quantitative studies examining its occurrence specifically following severe perineal rupture are lacking. Two recent cross-sectional studies measured the prevalence of CB-PTSD symptoms up to 1 year postpartum and their relationship with perinatal variables.^{30,31} Having a third or fourth degree perineal tear was identified as a risk factor for CB-PTSD symptoms, with an odds ratio of 2.73³¹ or 6.70,³⁰ respectively.

The objective of this study was to investigate the prospective associations between the degree of perineal tear during childbirth and CB-PTSD symptoms, when adjusting for known covariates. The following hypotheses were tested:

We hypothesized that women with different degrees of perineal tear will differ regarding (1) the level of self-reported CB-PTSD symptoms at 8 weeks and 2 years postpartum and (2) the rate of change in CB-PTSD symptoms from 8 weeks to 2 years postpartum.

2 | MATERIAL AND METHODS

2.1 | Study design

This study presents data from the Akershus Birth Cohort (ABC), a large population-based prospective cohort study. The Regional Committees for Medical and Health Research Ethics approved the ABC study (S-08013a).

Written informed consent was observed from all participants.

2.2 | Participants and procedure

Participants were recruited during the routine fetal ultrasound examination at 17 weeks of gestation. All women scheduled to give birth at Akershus University Hospital between 11/2008 and 04/2010 were eligible. Women with insufficient Norwegian language skills were excluded. Participants were asked to complete self-report questionnaires at time of recruitment, gestation week 32, 8 weeks postpartum, and 2 years postpartum. Additionally, information on the pregnancies and births was obtained from the electronic birth records, completed by the doctor or midwife in charge of the birth. The classification of tears was carried out by birth assistants who were present at the birth. In Norway, minor tears are assessed by midwives, while more serious tears are assessed and treated by experienced obstetricians. This means that the classification is based on clinical judgement.

As described in more detail elsewhere,^{35,36} 80% of all eligible women invited to the study ($n = 3752$) agreed to participate and returned the first questionnaire. Of those, 63% ($n = 2936$) returned the questionnaire at gestation week 32, 48% ($n = 2217$) at 8 weeks postpartum, and 32% ($n = 1480$) at 2 years postpartum. The sample analyzed in this study was composed of women who provided self-report data either at T3 or at T4 ($n = 2630$), excluding women who had an elective caesarean section ($n = 123$) or had a stillbirth ($n = 0$).

2.3 | Measures

Childbirth-related PTSD symptoms were assessed via self-report at 8 weeks and 2 years postpartum using the Impact of Event Scale (IES).³⁷ The IES consists of 15 items asking for the frequency of avoidance and intrusion symptoms related to childbirth, each scored on a 4-point scale (0 = not at all/1 = rarely/3 = sometimes/5 = often). A validation study comparing the Impact of Event Scale with the Impact of Event Scale-Revised, which includes hyperarousal symptoms, concluded that the addition of hyperarousal symptoms did not improve the quality of the scale, but rather reduced its psychometric properties, because symptoms of arousal could be affected by normal physiological changes and fatigue after childbirth.^{38,39} Therefore, in the Akershus Birth Cohort Study we considered it most appropriate to use the 15-item version of the Impact of Event Scale.

The degree of perineal tear (without, 1st, 2nd, 3rd, and 4th degree tear) was obtained from the electronic birth records. Due to small cell occupation, 3rd degree tear ($n = 77$) and 4th degree tear ($n = 4$) were summarized to one category.

Covariates included the mother's age at childbirth, years of school education (less than 12 years/12 or more years), premature birth, and parity (primiparous/parous) obtained from the electronic birth records.

2.4 | Statistical analysis

Latent state models and latent change models with categorical factor indicators were estimated using a robust weighted least squares mean and variance (WLSMV) estimator and Mplus version 8.8.⁴⁰ Comparative fit index (CFI) and root mean square error of approximation (RMSEA) were used to evaluate model fit. CFI values ≥ 0.95 and RMSEA values ≤ 0.06 indicated close fit to the data. Models were estimated using all available data.

Data were analyzed stepwise. In step 1, a longitudinal confirmatory factor analysis model (latent state model) with correlated state factors was estimated (Figure 1A). It provided estimates for latent state factors representing the “true” level of CB-PTSD symptoms at 8 weeks postpartum and 2 years postpartum, respectively. Each latent state factor was measured by multiple observed factor indicators (i.e., observed scores of the IES items). The factor loadings and

thresholds were held equal over time to ensure strong measurement invariance. The degree of perineal tear was regressed on the latent state factors to test its effect on CB-PTSD symptoms at 8 weeks and 2 years postpartum, respectively. In step 2, the latent state model from step 1 was reformulated as a latent change model as depicted in Figure 1B. It provided estimates for a latent state factor representing the initial level of CB-PTSD symptoms and a latent change factor representing the “true” change in CB-PTSD symptoms from 8 weeks to 2 years postpartum. In steps 3 and 4, age, school education, premature birth, and parity were added as covariates to the latent state model and the latent change model, respectively. Finally, steps 1 to 4 were repeated for the IES avoidance subscale and the IES intrusion subscale, respectively. Odds ratios (ORs) with 95% confidence intervals (CIs) and p -values are presented. p -values below 0.05 were considered statistically significant.

3 | RESULTS

3.1 | Sample characteristics

As shown in Table 1, the final sample consisted of 2630 women with a mean age of 31.19 years (standard deviation [SD] = 4.65) at childbirth. About half of the women did not sustain a tear ($n = 1408$, 53%), 1st or 2nd degree tear occurred in 1141 women (44%), and 3rd or 4th degree tear occurred in 81 women (3%). The mean IES

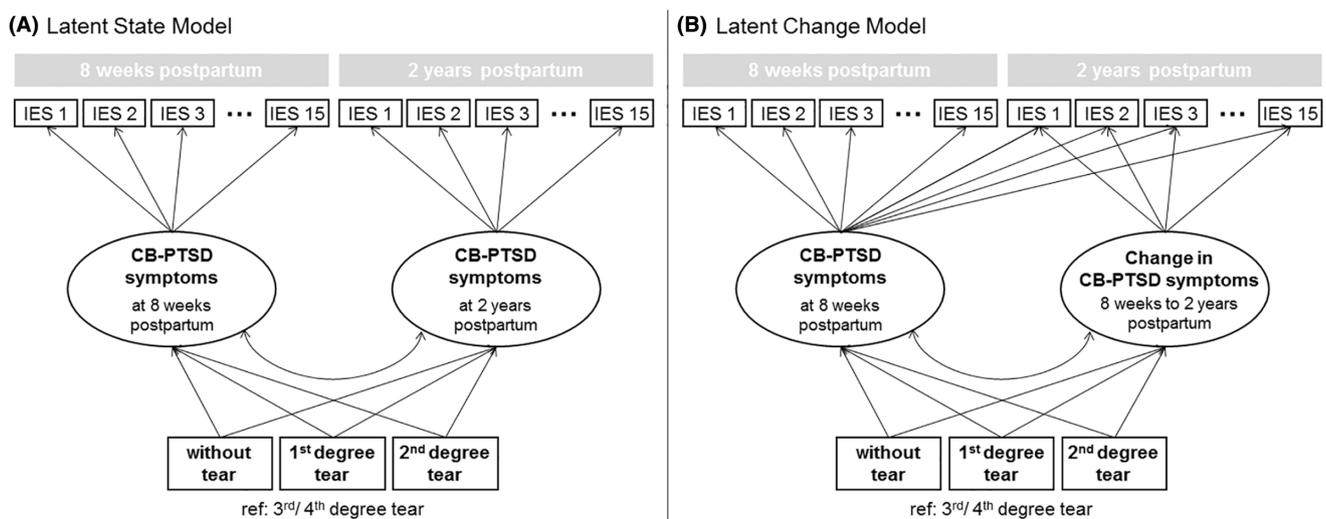


FIGURE 1 Path diagram for the latent state model (A) and the latent change model (B) used in this study (steps 1 and 2). Rectangles represent observed categorical variables, that is, scores of IES items and degree of perineal tear (dummy-coded). Ellipses represent latent factors, that is, level and change of childbirth-related posttraumatic stress disorder (CB-PTSD) symptoms. For simplicity, covariates are not shown (steps 3 and 4).

TABLE 1 Sample characteristics and CB-PTSD symptoms at 8 weeks and 2 years postpartum.

Variables	Total sample		Degree of perineal tear				Group comparison p-value ^a	
	N	M (SD)/n (%)	Without		1st degree M (SD)/n (%)	2nd degree M (SD)/n (%)		3rd/4th degree M (SD)/n (%)
			M (SD)/n (%)	M (SD)/n (%)				
Age in years	2609	31.19 (4.65)	31.09 (4.77)	31.82 (4.59)	30.96 (4.49)	30.62 (3.80)	0.005	
Years of school education	2520						<0.001	
Less than 12 years		823 (33%)	477 (36%)	145 (29%)	191 (32%)	10 (13%)		
12 or more years		1697 (67%)	863 (64%)	361 (71%)	405 (68%)	68 (87%)		
Parity	2630						<0.001	
Primiparous		1385 (53%)	775 (55%)	196 (37%)	350 (57%)	64 (79%)		
Parous		1245 (47%)	633 (45%)	327 (63%)	268 (43%)	17 (21%)		
Premature birth	2609						<0.001	
No		2449 (94%)	1272 (92%)	495 (95%)	601 (97%)	81 (100%)		
Yes		160 (6%)	115 (8%)	28 (5%)	17 (3%)	0 (0%)		
IES sum score								
at 8 weeks postpartum	2079	7.01 (8.23)	7.27 (8.54)	5.94 (7.34)	6.84 (7.86)	10.38 (9.86)	<0.001	
at 2 years postpartum	1930	5.77 (8.12)	5.95 (7.99)	4.93 (7.42)	5.64 (8.25)	8.73 (11.60)	<0.001	
Degree of perineal tear	2630							
Without tear		1408 (53%)						
1st degree tear		523 (20%)						
2nd degree tear		618 (24%)						
3rd/4th degree tear		81 (3%)						

Abbreviations: IES, Impact of Event Scale; M, mean; SD, standard deviation.

^aFrom Chi-squared test or analysis of variance.

TABLE 2 Associations of perineal tear with total CB-PTSD symptoms.

	Crude model (<i>n</i> = 2630)			Adjusted model (<i>n</i> = 2520 ^a)		
	OR	95% CI	<i>p</i> -value	OR	95% CI	<i>p</i> -value
CB-PTSD symptoms at 8 weeks postpartum						
3rd/4th degree tear	1.00			1.00		
2nd degree tear	0.69	0.55; 0.87	0.002	0.75	0.59; 0.95	0.016
1st degree tear	0.59	0.46; 0.75	<0.001	0.67	0.53; 0.86	0.001
Without tear	0.72	0.57; 0.90	0.003	0.78	0.62; 0.98	0.035
Age				1.00	0.98; 1.01	0.350
≥12 years school (ref. <12 years)				0.80	0.73; 0.88	0.023
Parous (ref. primiparous)				0.78	0.70; 0.86	<0.001
Premature birth (ref. no)				0.75	0.59; 0.95	0.016
CB-PTSD symptoms at 2 years postpartum						
3rd/4th degree tear	1.00			1.00		
2nd degree tear	0.69	0.53; 0.90	0.007	0.75	0.57; 0.99	0.044
1st degree tear	0.61	0.46; 0.80	<0.001	0.71	0.54; 0.95	0.020
Without tear	0.73	0.57; 0.95	0.018	0.79	0.61; 1.03	0.086
Age				1.00	0.99; 1.01	0.999
≥12 years school (ref. <12 years)				0.92	0.82; 1.03	0.132
Parous (ref. primiparous)				0.68	0.61; 0.76	<0.001
Premature birth (ref. no)				1.12	0.92; 1.37	0.264
Change in CB-PTSD symptoms from 8 weeks to 2 years postpartum						
3rd/4th degree tear	1.00			1.00		
2nd degree tear	1.00	0.80; 1.26	0.994	1.01	0.79; 1.27	0.968
1st degree tear	1.03	0.81; 1.31	0.794	1.06	0.82; 1.37	0.641
Without tear	1.02	0.83; 1.27	0.825	1.01	0.81; 1.27	0.905
Age				1.01	0.99; 1.02	0.457
≥12 years school (ref. <12 years)				1.03	0.91; 1.16	0.673
Parous (ref. primiparous)				0.88	0.78; 0.99	0.035
Premature birth (ref. no)				1.05	0.87; 1.26	0.632

Note: Fit indices: CFI = 0.964 (crude)/0.958 (adjusted); RMSEA = 0.029 (crude)/0.028 (adjusted). Significant estimates shown in bold ($p < 0.05$).

Abbreviations: CI, confidence interval; OR, odds ratio; ref., reference group.

^a*N* = 110 participants were excluded from adjusted analysis due to missing covariate data.

sum score was 7.01 ($SD = 8.23$) at 8 weeks postpartum and 5.77 ($SD = 8.12$) at 2 years postpartum.

3.2 | Total childbirth-related posttraumatic stress disorder symptoms

Table 2 presents crude and adjusted estimates for the association of the degree of perineal tear with total CB-PTSD symptoms. Fit indices indicated good fit for the crude models (CFI = 0.964, RMSEA = 0.029) and adjusted models (CFI = 0.958, RMSEA = 0.028).

Adjustments made little difference and thus only adjusted results are reported below.

The degree of perineal tear was found to be associated with CB-PTSD symptoms at 8 weeks postpartum and at 2 years postpartum after adjustment for age, school education, parity, and premature birth. At 8 weeks postpartum, the odd ratios (ORs) for more severe versus less severe CB-PTSD symptoms for women without tear, with 1st degree tear, and with 2nd degree tear compared to women with 3rd or 4th degree tear were 0.78 (0.62 to 0.98), 0.67 (0.53 to 0.86), and 0.75 (0.59 to 0.95), respectively. At 2 years postpartum, the ORs for more severe

TABLE 3 Associations of perineal tear with CB-PTSD avoidance symptoms.

	Crude model (n = 2630)			Adjusted model (n = 2520 ^a)		
	OR	95% CI	p-value	OR	95% CI	p-value
CB-PTSD symptoms at 8 weeks postpartum						
3rd/4th degree tear	1.00			1.00		
2nd degree tear	0.78	0.66; 0.92	0.004	0.84	0.71; 0.99	0.036
1st degree tear	0.72	0.60; 0.86	<0.001	0.80	0.67; 0.95	0.012
Without tear	0.81	0.69; 0.95	0.012	0.87	0.74; 1.03	0.095
Age				1.00	0.99; 1.01	0.991
≥12 years school (ref. <12 years)				0.88	0.81; 0.94	0.001
Parous (ref. primiparous)				0.81	0.76; 0.88	<0.001
Premature birth (ref. no)				1.07	0.93; 1.23	0.341
CB-PTSD symptoms at 2 years postpartum						
3rd/4th degree tear	1.00			1.00		
2nd degree tear	0.80	0.66; 0.97	0.026	0.84	0.69; 1.03	0.094
1st degree tear	0.72	0.59; 0.88	0.002	0.80	0.65; 0.98	0.035
Without tear	0.82	0.68; 1.00	0.044	0.86	0.71; 1.04	0.124
Age				1.00	0.99; 1.01	0.662
≥12 years school (ref. <12 years)				0.91	0.84; 1.00	0.042
Parous (ref. primiparous)				0.75	0.69; 0.82	<0.001
Premature birth (ref. no)				1.09	0.93; 1.27	0.287
Change in CB-PTSD symptoms from 8 weeks to 2 years postpartum						
3rd/4th degree tear	1.00			1.00		
2nd degree tear	1.03	0.86; 1.23	0.761	1.01	0.85; 1.20	0.929
1st degree tear	1.00	0.83; 1.20	0.993	1.00	0.83; 1.21	0.985
Without tear	1.02	0.86; 1.20	0.847	0.99	0.83; 1.16	0.874
Age				1.00	0.99; 1.01	0.702
≥12 years school (ref. <12 years)				1.04	0.95; 1.15	0.378
Parous (ref. primiparous)				0.92	0.84; 1.01	0.096
Premature birth (ref. no)				1.01	0.88; 1.17	0.849

Note: Fit indices: CFI = 0.975 (crude)/0.970 (adjusted); RMSEA = 0.027 (crude)/0.026 (adjusted). Significant estimates shown in bold ($p < 0.05$).

Abbreviations: CI, confidence interval; OR, odds ratio; ref., reference group.

^aN = 110 participants were excluded from adjusted analysis due to missing covariate data.

versus less severe CB-PTSD symptoms for women with 1st degree tear and 2nd degree tear compared to women with 3rd or 4th degree tear were 0.71 (0.54 to 0.95), and 0.75 (0.57 to 0.99), respectively. Lower ORs were observed for women with 12 or more years of school (OR = 0.80, 95% confidence interval (CI): 0.73 to 0.88), multiparous women (OR = 0.78, 95% CI: 0.70 to 0.86), and women with premature birth (OR = 0.75, 95% CI: 0.59 to 0.95) at 8 weeks postpartum and for multiparous women (OR = 0.68, 95% CI: 0.61 to 0.76) at 2 years postpartum.

The severity of CB-PTSD symptoms tended to decrease from 8 weeks to 2 years postpartum, but the rate of change was not statistically significant. The degree of

perineal tear was not significantly associated with the change in CB-PTSD symptoms over time. Multiparous women had a lower OR for decreasing CB-PTSD symptoms over time (OR = 0.88, 95% CI: 0.78 to 0.99).

3.3 | Childbirth-related posttraumatic stress disorder avoidance symptoms

Perineal tear was found to be associated with CB-PTSD avoidance symptoms at 8 weeks postpartum and at 2 years postpartum (Table 3). The ORs for more severe symptoms at 8 weeks postpartum for women with 1st

TABLE 4 Associations of perineal tear with CB-PTSD intrusion symptoms.

	Crude model (<i>n</i> = 2630)			Adjusted model (<i>n</i> = 2520 ^a)		
	OR	95% CI	<i>p</i> -value	OR	95% CI	<i>p</i> -value
CB-PTSD symptoms at 8 weeks postpartum						
3rd/4th degree tear	1.00			1.00		
2nd degree tear	0.71	0.56; 0.89	0.004	0.75	0.59; 0.96	0.021
1st degree tear	0.59	0.46; 0.75	<0.001	0.65	0.51; 0.84	0.001
Without tear	0.72	0.57; 0.90	0.004	0.77	0.61; 0.97	0.028
Age				0.99	0.98; 1.00	0.074
≥12 years school (ref. <12 years)				0.97	0.88; 1.06	0.501
Parous (ref. primiparous)				0.83	0.75; 0.91	<0.001
Premature birth (ref. no)				1.04	0.88; 1.23	0.658
CB-PTSD symptoms at 2 years postpartum						
3rd/4th degree tear	1.00			1.00		
2nd degree tear	0.68	0.53; 0.89	0.005	0.75	0.57; 0.99	0.041
1st degree tear	0.62	0.47; 0.81	0.001	0.73	0.55; 0.96	0.027
Without tear	0.74	0.57; 0.95	0.017	0.80	0.62; 1.04	0.100
Age				1.00	0.99; 1.01	0.639
≥12 years school (ref. <12 years)				0.96	0.86; 1.07	0.446
Parous (ref. primiparous)				0.73	0.65; 0.81	<0.001
Premature birth (ref. no)				1.11	0.92; 1.34	0.291
Change in CB-PTSD symptoms from 8 weeks to 2 years postpartum						
3rd/4th degree tear	1.00			1.00		
2nd degree tear	0.97	0.76; 1.24	0.808	1.00	0.77; 1.29	0.995
1st degree tear	1.06	0.82; 1.36	0.661	1.12	0.85; 1.46	0.427
Without tear	1.02	0.81; 1.29	0.842	1.04	0.81; 1.34	0.738
Age				1.01	0.99; 1.02	0.314
≥12 years school (ref. <12 years)				0.99	0.88; 1.12	0.876
Parous (ref. primiparous)				0.88	0.78; 0.98	0.025
Premature birth (ref. no)				1.07	0.88; 1.28	0.509

Note: Fit indices: CFI = 0.962 (crude)/0.958 (adjusted); RMSEA = 0.039 (crude)/0.036 (adjusted). Significant estimates shown in bold (*p* < 0.05).

Abbreviations: CI, confidence interval; OR, odds ratio; ref., reference group.

^a*N* = 110 participants were excluded from adjusted analysis due to missing covariate data.

degree tear and 2nd degree tear compared to women with 3rd or 4th degree tear were 0.80 (0.67 to 0.95), and 0.84 (0.71 to 0.99), respectively. The OR for more severe symptoms at 2 years postpartum for women with 1st degree tear compared to those with 3rd or 4th degree tear was 0.80 (0.65 to 0.98). Lower ORs were observed for women with 12 or more years of school (8 weeks postpartum: OR = 0.88, 95% CI: 0.81 to 0.94; 2 years postpartum: OR = 0.91, 95% CI: 0.84 to 1.00) and multiparous women (8 weeks postpartum: OR = 0.81, 95% CI: 0.76 to 0.88; 2 years postpartum: OR = 0.75, 95% CI: 0.69 to 0.82).

Perineal tear was not significantly associated with the change of avoidance symptoms over time.

3.4 | Childbirth-related posttraumatic stress disorder intrusion symptoms

Perineal tear was found to be associated with intrusion symptoms at 8 weeks postpartum and at 2 years postpartum (Table 4). The ORs for more severe versus less severe symptoms at 8 weeks postpartum for women without tear, with 1st degree tear, and with 2nd degree tear compared to women with 3rd or 4th degree tear were 0.77 (0.61 to 0.97), 0.65 (0.51 to 0.84), and 0.75 (0.59 to 0.96), respectively. The ORs for more severe symptoms at 2 years postpartum for women with 1st degree tear and 2nd degree tear compared to women with 3rd or 4th

degree tear were 0.73 (0.55 to 0.96) and 0.75 (0.57 to 0.99), respectively. Lower ORs were observed for multiparous women at 8 weeks postpartum (OR = 0.83, 95% CI: 0.75 to 0.91) and at 2 years postpartum (OR = 0.73, 95% CI: 0.65 to 0.81).

Perineal tear was not significantly associated with the change in intrusion symptoms over time. Multiparous women had a lower OR for decreasing symptoms over time (OR = 0.88, 95% CI: 0.78 to 0.98).

4 | DISCUSSION

This prospective, population-based cohort study found that the degree of perineal tear was significantly associated with CB-PTSD symptoms at 8 weeks and 2 years postpartum. However, the degree of perineal tear was not significantly associated with the decrease in CB-PTSD symptoms over time. Similar patterns were found for both total CB-PTSD symptoms as well as for avoidance and intrusion symptoms only. Our first results seem to support a dose-response model, suggesting that the higher the objective level of exposure (i.e., the severity of the perineal tear), the higher the posttraumatic morbidity. Our findings are consistent with previous quantitative, albeit cross-sectional, research showing that a severe perineal tear is a risk factor for developing PTSD symptoms.^{30,31} Similarly, a recent qualitative study found that fourth-degree perineal tears can be highly distressing, and some participants reported suffering from postpartum depression and PTSD.⁴¹ It should also be noted that the degree of perineal tears was very recently found to be a predictor of fear of childbirth⁴² – a factor that is often associated with risk for CB-PTSD.⁴³

Interestingly, tear level was not associated with recovery from CB-PTSD symptoms over time. Thus, while tear level does predict symptom severity, it was not related to the temporal course of symptoms. This may indicate that natural recovery from CB-PTSD symptoms is the norm for the vast majority of women following childbirth, regardless of birthing circumstances. Natural recovery has been shown in numerous PTSD studies among a variety of populations.⁴⁴ Another explanation for the lack of association between tear level and PTSD change over time may be that several other factors may affect the temporal course of the disorder, thus overshadowing the role of this factor. Factors that may play a role in this regard include, for example, the level of social and familial support available to the childbearing woman, the experience of motherhood and child-rearing, and more.^{45,46}

Several potential mechanisms could explain our findings. One factor that is inherently related to perineal

tears is physical pain.⁹ The mutual maintenance model of trauma and physical pain suggests a bidirectional dynamic between psychological and somatic distress. Thus, on the one hand, the cognitive, affective, and behavioral components of pain can both exacerbate as well as maintain PTSD symptoms. Likewise, the physiological, affective, and behavioral components of PTSD can aggravate and sustain pain.⁴⁷ For postpartum women, the sensations of perineal pain may not only cause discomfort and distress in and of themselves, but they can also serve as a constant reminder of the birth trauma. Affected women may therefore develop an attentional bias towards the sensation of pain, which can lead to an amplification of the pain experience. Furthermore, if the pain sensation is interpreted as a reminder of the birth trauma, it can trigger CB-PTSD symptoms, including an arousal response and attempts to avoid trauma reminders.⁴⁷ Further ongoing symptoms linked to perineal tears, such as urinary, flatus, and faecal incontinence and dyspareunia, as well as other problems like a lack of sexual satisfaction may also serve as reminders of the trauma and contribute to the maintenance of CB-PTSD.

In addition, factors related to body ownership and body boundaries may also play a role, as these have been commonly found to be associated with trauma.⁴⁸ Perineal tears represent an injury in one of the most intimate female body regions. Therefore, such injuries can pose a threat to physical integrity and entail feelings of loss of control over one's own body. A weakened sense of body ownership may be closely linked to feelings of helplessness.⁴⁹ It also increases the likelihood of peritraumatic dissociation (e.g., in the context of birth complications) and thus the likelihood of the development of PTSD symptoms.⁵⁰

Limitations of the study include the assessment of CB-PTSD symptoms. While the degree of perineal tear was obtained from electronic birth records, CB-PTSD symptoms were self-reported. In addition, we have used the IES-R, which does not cover the entire list of DSM-5 PTSD symptoms. Future studies should therefore replicate our findings using either standardized clinical interviews or the City Birth Trauma Scale, a specific measure of CB-PTSD according to DSM-5 criteria.¹⁶ Further, our sample was relatively homogeneous. As we have shown previously, there is reason to believe that there is a slight social gradient associated with participation in the study.⁵¹ Likewise, there was somewhat selective attrition during the longitudinal course of the study, as demonstrated before.⁵²

Despite these limitations, this population-based study has important strengths. Using a large sample, it is the first to prospectively look at the relationship between the degree of perineal tear during childbirth and CB-PTSD

symptoms, while adjusting for known covariates. By examining a specific peri-traumatic factor (i.e., severe perineal tear) during a specific type of event (childbirth), our study fills an important gap, as event-bound characteristics are very specific and often overlooked in the trauma literature. Our findings have several important theoretical and clinical implications. CB-PTSD has wide-reaching implications for the whole family, including reduced breastfeeding,^{53,54} poor child social-emotional development⁵² and child sleep problems,⁵⁵ strain on the couple relationship,^{56,57} and complications with the mother-infant relationship or bonding.^{54,58} Thus, identifying early predictors of CB-PTSD is of great importance, and may assist in developing novel diagnostic and therapeutic tools.

Our findings reveal the important role of childbirth-related procedures and physical sensations in predicting future CB-PTSD symptoms. More specifically, this study further highlights the need to carefully assess event characteristics, even if those seem to be common (like perineal tears). Such characteristics may in fact have a long-lasting effect on mental health. Furthermore, the psychological impact of ongoing and potentially long-lasting symptoms linked to perineal tears also needs to be taken into account and appropriately treated. This is especially important for third and fourth degree tears; apart from the pain linked to the wound, women might also suffer from having to take laxatives and from continued problems with defecation, as well as urinary, flatus, and faecal incontinence and dyspareunia.^{2,59}

From a clinical perspective, our findings show the need for early identification of high-risk women during and after childbirth. If perineal tears are indeed early markers of distress, medical staff is encouraged to treat them as such and base their assessments accordingly. In addition, it is critical to create a safe environment for women to disclose problems experienced due to perineal injuries, especially those related to mental health, as those tend to be overlooked. In addition, psychiatric and mental health interventions, and particularly trauma-focused interventions, should take into account the role of perineal tears in mental health. They may often be a hidden part of the woman's narrative regarding childbirth, as well as a major source of physical and emotional discomfort, shame, or distress. We thus encourage health professionals to attend to this often-underrecognized issue and explore it together with the woman.

Finally, based on these findings, one may integrate psychological and medical knowledge for the benefit of women. Haslinger et al. for example, found that positions at birth can be of importance for the occurrence of anal sphincter tears.⁶⁰ Thus, birth in a squatting or in kneeling position was associated with an elevated risk for perineal tears, while birth in water was not. These findings can be

implemented in prenatal lessons as well as incorporated into information presented to women.

In addition, some studies have shown that women may often know about perineal trauma risk, but do not know how to prevent it.⁶¹ For example, health education regarding pelvic floor muscle care during pregnancy and postpartum should be accessible to pregnant women, in order to take preventive measures.

From a research point of view, our findings highlight the need for more longitudinal studies in both the general area of CB-PTSD, and more specifically in the area of perineal tears. PTSD, and more specifically CB-PTSD, may have a complex temporal course.^{62,63} As our findings indicate, cross-sectional findings often differ from those indicated over a longer time period. Assessing women at various time points enables a better understanding of risk factors for posttraumatic distress and their role in distress and recovery.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The dataset is not publicly available due to data privacy restrictions and ethical restrictions established by the Norwegian Regional Committee for Medical and Health Research Ethics (REC), South-East. Data from this cohort, however, are available through application to the Ahus Birth Cohort study. All enquiries about access to data should be sent to the Ahus Birth Cohort steering group, attention: nina.vikslokken.odegard@ahus.no. All requests to access personal data will be handled in accordance with the procedures established by the REC.

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