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The influence of postpartum PTSD on breastfeeding:

a longitudinal population-based study

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Abstract

Background

In most western countries, breastfeeding rates are lower than what is recommended by the World Health Organization. Depression has been shown to influence breastfeeding outcomes; however, there is very little research on the role of postpartum posttraumatic stress disorder (PTSD).

This study examined to what extent maternal postpartum PTSD predicted breastfeeding initiation, exclusive breastfeeding during the first six months, and continuation up to one and two years.

Methods

The study is part of the large, population based Akershus Birth Cohort. Data from the hospital's birth record and questionnaire data from 8 weeks and 2 years postpartum were used (n=1,480). All breastfeeding variables significantly correlated with postpartum PTSD were entered into stepwise logistic regression analyses.

Results

Although most mothers (97.1%) initiated breastfeeding, considerably fewer adhered to the World Health Organization's breastfeeding guidelines regarding exclusive breastfeeding during the first 6 months (13.4%) or continued breastfeeding for 12 or 24 months postpartum (37.7% and 4.2%, respectively). Even after adjustment for important confounding variables, maternal postpartum PTSD was significantly associated with not initiating breastfeeding (adjusted odds ratio (*aOR*) 5.98; 95% confidence interval (*CI*) 1.79-19.97). Postpartum PTSD was also significantly related to not continuing breastfeeding up to 12 months, although this association did not hold after adjusting for confounding variables.

Conclusion

Identifying women at risk of not initiating breastfeeding is crucial to prevent a negative impact on infant development and the development of the mother-infant bond. Early screening and treatment of women at risk of developing postpartum PTSD might be a way forward.

Key words: Postpartum posttraumatic stress disorder; breastfeeding; Akershus Birth Cohort

INTRODUCTION

Breastfeeding is the optimal infant feeding method.[1] Guidelines published by the World Health Organization recommend exclusive breastfeeding in the first six months postpartum.[2] In addition, the World Health Organization recommends continuation of breastfeeding for two years or more.[1]

Health benefits for the infant include a diminished risk of infectious diseases,[3] obesity, and decreased blood pressure.[4] Breastfeeding is related to a number of positive developmental outcomes, such as brain development, [5] improved performance in intelligence tests,[6] and language and motor development.[7,8] Furthermore, breastfeeding is negatively associated with behavioural and mental health problems.[9-12] Breastfeeding has also many health benefits for the mother.[13] Despite those benefits, the rate of exclusive breastfeeding at six months is low throughout America and in European countries, even in those with high initiation rates.[14,15] Therefore, researchers have sought to identify women at risk of not initiating breastfeeding or of ceasing breastfeeding early.[16-18] In fact, previous studies have shown that there appears to be an association between maternal mental health and breastfeeding. For instance, some evidence suggests an association between maternal anxiety and shorter breastfeeding duration.[19,20] In addition, the association between peripartum depression and breastfeeding has been intensely studied and a recent systematic review[21] concluded that both antepartum and postpartum depression were associated with shorter breastfeeding duration. Breastfeeding outcomes are also associated with other maternal factors, such as educational level, body mass index, and cesarean section or with child factors, such as infant temperament.[22-26]

Following childbirth, women may also develop posttraumatic stress disorder (PTSD). Meta-analyses show that PTSD after birth affects approximately 3% of all postpartum women and 16% of women in high-risk groups, like those with severe complications in pregnancy.[27] This means that in the European Union and the United States of America about 153,000 and 118,000 women, respectively, may be affected every year.[28,29] Symptoms of PTSD include re-

experiencing, avoidance and emotional numbing, hyperarousal, and negative cognitions and mood.[30] There is some evidence for a negative association between postpartum PTSD and breastfeeding. One prospective study of Israeli women reported that significantly fewer women with postpartum PTSD symptoms breastfeed their infant six to eight weeks postpartum.[31] However, breastfeeding was only measured as a dichotomous variable and no further details were provided, such as whether women breastfed exclusively. Furthermore, a prospective study from the United States found that women with higher postpartum PTSD scores were significantly less likely to breastfeed their infant for as long as they wanted, and were significantly less likely to exclusively breastfeed at one month postpartum.[32] The authors called for more quantitative studies on postpartum PTSD and breastfeeding that measure breastfeeding initiation and duration of breastfeeding beyond one month postpartum.[32]

There are a number of ways in which PTSD might affect breastfeeding in a negative way. For example, women are more likely to develop postpartum PTSD after birth complications and/or stressful labour, or after having experienced uncontrollable pain during childbirth, all of which are risk factors for delayed lactogenesis (initiation of plentiful milk secretion).[33] Nevertheless, a qualitative study of women in the United States also found that traumatic birth facilitated breastfeeding, with themes of: a sense of wanting to prove oneself as a mother (after "failing" at giving birth); making up for a traumatic arrival: atonement to the baby; and seeing breastfeeding as a way to help heal oneself mentally.[34]

To date, no research has quantitatively investigated the relationship between maternal postpartum PTSD and breastfeeding initiation in addition to exclusive breastfeeding, and breastfeeding continuation beyond the first month postpartum. This study therefore aimed to answer the following research questions: (1) To what extent does maternal postpartum PTSD predict (a) breastfeeding initiation, (b) exclusive breastfeeding during the first six months, as well as (c) continuation up to one and two years? (2) Does a potential association hold after

adjusting for important maternal and child factors? We predicted a negative association between maternal postpartum PTSD and breastfeeding outcomes and hypothesized that these associations would hold even when important maternal and child factors had been adjusted for.

METHODS

Design and study population

The Akershus Birth Cohort study is a prospective cohort study which targeted all women scheduled to give birth at Akershus University Hospital, Norway. The overall aim was to study risk factors for fear of childbirth and, whether fear of childbirth affects mode of delivery, labour, and child outcomes. Recruitment took place from November 2008 to April 2010. Women were recruited for the study during their routine fetal ultrasound examination and asked to complete questionnaires at 17 weeks gestation, 32 weeks gestation, eight weeks postpartum and two years postpartum. Of the eligible women, 80.5% (n=3,752) agreed to participate and returned the first questionnaire. Response rates were 81.1% (32 weeks gestation), 79.0% (eight weeks postpartum) and 73.3% (2 years postpartum) respectively. Detailed information regarding participation and drop out has been published elsewhere.[35]

For the present study, we used questionnaire data from eight weeks and two years postpartum as well as data obtained from the hospital's birth record. Data for the birth record were electronically recorded by hospital staff. At the respective two points in time, 1,480 women completed the questionnaires, had data in the birth record, and thus were included in the analyses. As less than 50% of the original participants were included in the current sample, we performed attrition analyses. More specifically, we included relevant socio-demographic and mental health variables (i.e., maternal age, education and symptoms of depression, anxiety and general PTSD symptoms) assessed at 17 weeks of gestation and the hospital birth record simultaneously as predictors of drop-out within two years postpartum in multiple logistic regression analyses. The results showed that women with higher education (odds ratio (*OR)* .57, 95% confidence interval (*CI)* .49-.66, $p<.001$), and older age (*OR* .97, 95% *CI* .95-.98, $p<.001$) were less likely to drop out of the study, whereas women with symptoms of depression (*OR* 1.05, 95% *CI* 1.02-1.07, $p<.001$) were somewhat more likely to drop out. Symptoms of anxiety and PTSD were not significantly related to drop-out ($p>.05$).

The Akershus Birth Cohort study obtained ethical approval from the Regional Committees for Medical and Health Research Ethics (approval number S-08013a), and all participants provided written informed consent.

Variables

The categorization of breastfeeding was largely carried out in accordance with the World Health Organization classification system.[36] Several breastfeeding variables were computed:

(1) *Initiation of breastfeeding* was measured at eight weeks postpartum. Women were asked whether they were currently breastfeeding. The variable was coded dichotomously as "Initiation" ("yes, child receives only breast milk"; "yes, child receives breast milk and formula"; "no, I have stopped breastfeeding") and "Non-initiation" ("no, I have not breastfed at all").

(2) *Exclusive breastfeeding* was measured retrospectively two years postpartum. Mothers reported (1) what type of milk or juice they had fed the child during the first week of life and at each month, and (2) whether and when they had introduced solid foods to the child. Exclusive breastfeeding was defined as breastfeeding without any supplements of other milk, juice, or solid food.

(3) *Continued breastfeeding* was measured retrospectively at two years postpartum. Mothers reported whether they had breastfed the child when it was 11-12 months, 13-14 months, 17-20 months, and 21-24 months old. Based on this information continuation up to approximately one year (11-12 months) and/or two years (21-24 months) was defined. Children in this continued breastfed group had been breastfed for the entire first and/or second year of their lives, but might also have received other foods or fluids, as recommended by the World Health Organization.[37]

In addition to those breastfeeding variables, women who were not breastfeeding at eight weeks postpartum, were asked to provide their reasons by ticking off predetermined answers

("I do not want to breastfeed", "The child had a problem with sucking/did not want to breastfeed", "Sore nipples", "Have too little breastmilk", "Mastitis", "Have had breast surgery", "Using medication", "Other reasons").

As no context specific scale was available, when the Akershus Birth Cohort study was designed, the Impact of Event Scale (IES)[38] was used to measure postpartum PTSD at eight weeks postpartum. The instrument is a self-rating scale that measures symptoms of intrusion (7 items) and avoidance (8 items). The scale has four response categories with the following weightings: 0=not at all, 1=rarely, 3=sometimes, and 5=often. Summed scores may range from 0 to 75, with higher scores reflecting a greater degree of post-traumatic stress. Participants were instructed to complete this scale in relation to their childbirth. The IES has been previously validated in postpartum women.[39] Postpartum PTSD was defined as an IES total score>34.[40] Reliability in the present study was α =.84.

Depression was measured using the Edinburgh Postnatal Depression Scale (EPDS)[41] at eight weeks postpartum. The EPDS is a 10-item self-rating scale designed to identify postnatal depression and has been validated for detection of both major and minor depression. The scoring of each item ranges from 0 (absence of symptoms) to 3 (maximum severity of symptoms).[41] The sum EPDS score ranges from 0 to 30. Depression was defined as an EPDS score ≥12.[41,42] Reliability in the current study was α=.85.

Anxiety was measured using the 10-item anxiety scale of the Hopkins Symptom Check List (SCL-25) at eight weeks postpartum. Each item ranges from 'not at all' (score 1) to 'extremely' (score 4). The sum score for anxiety ranges from 10 to 40. Presence of anxiety was defined as SCL-anxiety score ≥18.[43,44] The Norwegian version of the SCL-25 has been validated against the criteria of the International Classification of Diseases edition for anxiety and depression.[45] Reliability in our sample was α=.80.

Age at delivery and maternal education were obtained from the hospital birth records. Educational level was coded as "1" (>12 years of education) and "0" (≤12 years of education). Paid employment was assessed two years postpartum by women's self-report. According to Norwegian definitions,[46] employment was defined as: (0) no paid employment, (1) part-time employment (between 1-36 h/week), and (2) full-time employment (≥37 h/week). Further, maternal body mass index at the time of delivery and information on delivery by emergency cesarean section was retrieved from the hospital birth record.

Information regarding child sex as well as the Apgar Score (1, 5, 10 minutes) was retrieved from the hospital birth record. Moreover, using the birth records, the birth was categorized as either term or preterm birth (born more than 3 weeks before the expected birth date).[47] If this information was unavailable, gestational age was computed based on the first day of the woman's last menstruation.

Infant temperament was measured with a 10-item adapted version of the "Fussy/Difficult" Subscale of the Infant Characteristics Questionnaire[48] at eight weeks postpartum. This scale assesses infant difficultness as perceived by the primary caregiver. Mothers rated their infants' usual mood and temperament on a 7-point rating scale, with higher scores reflecting greater infant difficultness. Reliability was α=.82.

Statistical analyses

Correlations between breastfeeding variables, postpartum PTSD and other maternal and child factors were estimated using bivariate Pearson (r) and phi coefficient (r_φ) correlations (between two binary variables). In order to differentiate the influence of avoidance and intrusion symptoms, correlational analyses were run for those two subscales of the IES separately. All breastfeeding variables that were significantly correlated with postpartum PTSD were entered into stepwise logistic regression analyses with forward

selection, together with the maternal and child factors that were significantly associated with the respective breastfeeding variables. In order to test for multicollinearity, variance inflation factors were computed in these multivariate models. Finally, we examined the bivariate associations between the reasons given by mothers why they were not currently breastfeeding (at eight weeks postpartum) and postpartum PTSD.

RESULTS

Mean maternal age at birth was 31.7 (standard deviation (*SD)*=4.5) years (see Table 1). The vast majority of women (97.8%) were married or living with a partner, and a majority (72.5%) had an educational level beyond high school; 51.8% reported that this was their first pregnancy.

Most women (97.1%) initiated breastfeeding, 89.4% still breastfed at at eight weeks postpartum (both exclusively and partially), but only 13.4% carried through with exclusive breastfeeding for the first six months of the infant's life; 37.7% of mothers continued breastfeeding for the first year, regardless of other foods or fluids during this time, and 4.2% continued throughout the second year of the life of the child (Table 1). Among the 10.6% of mothers who were not currently breastfeeding at eight weeks postpartum, the most frequently reported reason was their child having a problem with sucking (46.2%), followed by that they did have too little breastmilk (44.2%). Additional reasons (i.e., not wanting to breastfeed, mastitis, sore nipples, having had breast surgery, using medication, and other reasons) were reported by between 3.8 to 25.0% of women.

At eight weeks postpartum, 2.0% of all participating women had probable postpartum PTSD (scores above 34). The mean IES score was 7.01 (*SD*=8.37); mean scores for the subscales intrusion and avoidance were 4.39 (*SD*=4.96) and 2.53 (*SD*=4.11), respectively.

Women with postpartum PTSD were less likely to initiate breastfeeding ($p < .001$) (Table 2). Likewise, when examining PTSD intrusion and avoidance symptoms separately, both were significantly associated with non-initiation, although the association was somewhat stronger with avoidance symptoms (see Table 2). Regarding the other maternal factors, not initiating breastfeeding was also associated with maternal depression ($p < .05$), lower level of education ($p < .001$), body mass index ($p < .001$), and emergency cesarean section ($p < .001$). No significant associations with child factors were found.

Similarly, continuation of breastfeeding for one year was negatively associated with postpartum PTSD ($p < .05$). There was a significant association with PTSD avoidance symptoms for continuation up to one year ($p < .05$). No association with intrusion symptoms was found. Regarding the other maternal factors, not continuing breastfeeding up to one year was associated with maternal depression ($p < .01$) and anxiety ($p < .01$) at eight weeks postpartum, younger age ($p < .001$), lower level of education ($p < .001$), paid employment ($p < .05$), body mass index at time of delivery ($p < .001$), and emergency cesarean section ($p < .05$). No significant associations with child factors were found.

The remaining breastfeeding variables (exclusive breastfeeding during the first six months; continuation of breastfeeding at two years) were not significantly associated with postpartum PTSD (neither with intrusion or avoidance subscale scores only) (see Table 2).

Bivariate associations between the reasons given by mothers why they were not currently breastfeeding (at eight weeks postpartum) and postpartum PTSD showed that not wanting to breastfeed ($r_\varphi = 0.15^{***}$), the child having sucking problems ($r_\varphi = 0.11^{***}$), not having enough breast milk ($r_\varphi = 0.07^{*}$), having sore nipples ($r_\varphi = 0.06^{*}$), and other reasons ($r_\varphi = 0.06^{*}$) were significantly associated with postpartum PTSD.

In the multivariate regression model, non- initiation of breastfeeding was significantly predicted by postpartum PTSD (adjusted odds ratio (*aOR*) 5.98; 95% *CI* 1.79-19.97) (Table 3). Maternal body mass index (*aOR* 1.09; 95% *CI* 1.02-1.17) and emergency cesarean section (*aOR* 2.48; 95% *CI* 1.05-5.85) were further significant predictors.Depression andlevel of education, however, were no longer significantly associated with non- initiation of breastfeeding and thus excluded in the final model of the stepwise logistic regression analysis.

Regarding breastfeeding continuation up to one year, postpartum PTSD was no longer a significant predictor after controlling for other factors (Table 4). In the final model of the second stepwise logistic regression analysis, only maternal age (*aOR* 0.94; 95% *CI* 0.91-

0.97), level of education (*aOR* 0.52; 95% *CI* 0.37-0.73), paid employment (*aOR* 1.35; 95% *CI* 1.06-1.72), body mass index (*aOR* 1.06; 95% *CI* 1.03-1.10), and emergency cesarean section (*aOR* 1.84; 95% *CI* 1.10-3.06) remained as significant predictors.

Variance inflation factors in the multivariate models were between 1.019 and 1.267, indicating no problem of multicollinearity.

DISCUSSION

This large-scale, population-based study investigated the longitudinal impact of postpartum PTSD on a range of breastfeeding outcomes (breastfeeding initiation, exclusive breastfeeding during the first six months, and breastfeeding continuation up to one and two years). As predicted, even after adjusting for important confounding variables, maternal postpartum PTSD was significantly associated with non-initiating breastfeeding, i.e., the risk of mothers with postpartum PTSD to not initiate breastfeeding was nearly six times higher than in mothers without postpartum PTSD. In addition, postpartum PTSD was significantly related to non-continuation of breastfeeding up to one year, although this association did not hold after adjusting for confounding variables. Interestingly, the effect size of postpartum PTSD was greater than that for postpartum depression in the multivariate analyses.

To our knowledge, only one other study has investigated the association between postpartum PTSD and breastfeeding.[31] The results of this Israeli study, which showed an association between postpartum PTSD and breastfeeding continuation at six to eight weeks postpartum, are comparable to those from our study. However, our study included longer follow-up and additional breastfeeding outcomes, such as initiation and exclusiveness.

A key finding is that PTSD avoidance symptoms were more strongly related to non-initiation of breastfeeding or non-continuation of breastfeeding up to one year than intrusion symptoms, or maternal depression and anxiety. One possible explanation is that breastfeeding requires physical closeness to the infant, who may serve as a reminder of traumatic childbirth.

A physiological explanation for the mechanisms underlying the relationship between postpartum PTSD and breastfeeding may be that high cortisol levels experienced during the traumatic birth might counteract the oxytocin release that facilitates the let-down reflex of breastfeeding; this in turn might interfere with breastfeeding. The most important reason mothers gave for not breastfeeding was that they had too little breast milk; this is in line with

evidence showing that birth complications, stressful labour, and uncontrollable pain during childbirth (all of which are linked to higher rates of postpartum PTSD) are risk factors for delayed lactogenesis.[33]

Maternal factors significantly associated with both not initiating breastfeeding and not continuing breastfeeding up to one year were maternal depression, lower level of education, body mass index, and emergency cesarean section. Previous studies also reported the importance of these factors.[21-25] Our finding that maternal anxiety was significantly related to not continuing breastfeeding is in line with other studies.[19,20] However, we did not find associations between breastfeeding outcomes and infant temperament, as reported by other studies.[26] This may be partly because other studies compared breastfeeding with different modes of infant feeding and found that bottle-fed infants were perceived as having a more challenging temperament. However, our study did not compare different modalities of infant feeding but only focused on different breastfeeding outcomes.

Why was postpartum PTSD no longer a significant predictor of breastfeeding continuation up to one year after controlling for maternal confounders? Our results showed that only maternal age, level of education, paid employment, body mass index, and emergency cesarean section remained significant predictors. It is possible that maternal PTSD declined over time, due to natural recovery or professional help. Furthermore, infants would have increasingly received other foods or fluids. This would have lessened dependence on physical closeness with the infant, thus triggering less PTSD avoidance symptoms in the mother.

Our study has important clinical implications. Identifying women at risk of not initiating breastfeeding or of early breastfeeding cessation is crucial. Early screening of women for postpartum PTSD might therefore be recommended, particularly for those women who also present with other risk factors identified in this study, such as maternal depression, lower level of education, higher body mass index, and emergency cesarean section. Early

identification and treatment of women with postpartum PTSD may also facilitate the development of the mother-infant bond and infant development.[49]

A key limitation of the study is the retrospective assessment of infant feeding, which may be subject to recall bias and the potential for social desirability. Other limitations are the relatively homogeneous, mainly Caucasian sample. Furthermore, as we have shown previously, there is reason to believe that there is a slight social gradient associated with participation in the study.[35,50] Likewise, there was somewhat selective attrition during the longitudinal course of the study, as demonstrated by attrition analyses. However, it is important to bear in mind that selection bias does not necessarily influence the results when associations between variables are investigated.[51] Also, we did not assess, whether the infants in our study were provided water during the first six months, which would constitute non-exclusive breastfeeding as well. Thus, the percentage of women breastfeeding their child exclusively during the first six months might even be lower than 13.4%. Finally, partner-related variables that may influence women's decision-making for infant feeding, were not available. The inclusion of relevant confounders and simultaneous consideration of other mental health problems represent an important strength of the study. Future studies should assess infant feeding prospectively, include more heterogeneous samples, and also take into account the importance of relationships and attitudes of partners regarding infant feeding methods.

CONCLUSION

This large-scale, population-based study showed that maternal postpartum PTSD was significantly associated with non-initiating of breastfeeding, even when adjusting for important maternal and infant variables. Postpartum PTSD was also significantly related to not continuing breastfeeding up to 12 months, although this association did not hold after adjusting for confounding variables. Identifying women at risk of not initiating breastfeeding is crucial to prevent a negative impact on infant development and the development of the mother-infant bond.[52] Early screening and treatment of women at risk of developing postpartum PTSD might be a way forward.

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Table legend

Table 1. Demographic characteristics, breastfeeding outcomes, and other maternal and child factors for 1,480 women and their children, Akershus Birth Cohort Study, Norway, 2008- 12.

Table 2. Bivariate pearson (r) and phi coefficient (r_{φ}) correlations with all breastfeeding variables, Akershus Birth Cohort Study, Norway, 2008-12.

Table 3. Adjusted odds ratios and 95% confidence intervals for variables predicting non-initiation of breastfeeding, Akershus Birth Cohort Study, Norway, 2008-12.

Table 4. Adjusted odds ratios and 95% confidence intervals for variables predicting no continued breastfeeding during the first 12 months postpartum*, Akershus Birth Cohort Study, Norway, 2008-12.

Table 1. Demographic characteristics, breastfeeding outcomes, and other maternal and child factors for 1,480 women and their children, Akershus Birth Cohort Study, Norway, 2008- 12.

Characteristics *(time point measured)*	No. (%) or Mean ± SD
Breastfeeding	
Initiation of breastfeeding *(8 weeks postpartum)*	
Yes	1,429 (97.1)
No	43 (2.9)
Exclusive breastfeeding 6 months *(2 years postpartum)*	
Yes	198 (13.4)
No	1,277 (86.6)
Continued breastfeeding 1 year *(2 years postpartum)*	
Yes	558 (37.7)
No	922 (62.3)
Continued breastfeeding 2 years *(2 years postpartum)*	
Yes	62 (4.2)
No	1,418 (95.8)
Postpartum PTSD[1] (8 weeks postpartum)	
Yes	30 (2.0)
No	1,442 (98.0)
PTSD avoidance symptoms	2.5 ± 4.1
PTSD intrusion symptoms	4.4 ± 5.0
Maternal factors	

Depression *(8 weeks postpartum)*	
Yes	107 (7.3)
No	1,367 (92.7)
Anxiety *(8 weeks postpartum)*	
Yes	55 (3.8)
No	1,409 (96.2)
Age (years) *(at birth)*	31.7 ± 4.5
Educational level *(at birth)*	
>12	1026 (72.5)
≤12	389 (27.5)
Paid employment *(2 years postpartum)*	
Full-time employment	807 (61.7)
Part-time employment	456 (34.9)
No employment	45 (3.4)
BMI^2 *(at birth)*	29.5 ± 4.6
Emergency cesarean section *(at birth)*	
Yes	141 (9.5)
No	1,339 (90.5)
Child factors	
Sex *(at birth)*	
Female	706 (48.0)
Male	764 (52.0)
Apgar Score *(at birth)*	
1 minute	8.8 ± 1.2
5 minutes	9.6 ± 0.9

10 minutes	9.8 ± 0.8
Preterm birth *(at birth)*	
Yes	90 (6.1)
No	1380 (93.9)
Difficult infant temperament *(8 weeks postpartum)*	25.7 ± 9.1

*Due to missing values on some of the items n varied between 1,141 (BMI) and 1,480 (Continued breastfeeding 1 and 2 years).

[1]Posttraumatic stress disorder

[2]Body mass index

Table 2. Bivariate pearson (r) and phi coefficient (r_φ) correlations with all breastfeeding variables, Akershus Birth Cohort Study, Norway, 2008-12.

	Non-initiation of breastfeeding	No exclusive breastfeeding 6 months	No continued breastfeeding 1 year	No continued breastfeeding 2 years
Postpartum PTSD[1]	**0.15*****	0.02	**0.05***	0.03
PTSD avoidance symptoms	**0.12*****	0.05	**0.06***	0.02
PTSD intrusion symptoms	**0.06***	0.00	0.01	-0.03
Maternal factors				
Depression	**0.06***	0.00	**0.07****	0.02
Anxiety	0.01	0.03	**0.07****	0.02
Age (years)	0.03	**-0.08****	**-0.14*****	**-0.11*****
Educational level	**-0.09*****	**-0.05***	**-0.15*****	-0.04
Paid employment	-0.02	0.05	**0.06***	**0.06***
BMI[2]	**0.12*****	0.02	**0.12*****	0.01

Emergency cesarean section	**0.10*** **	0.01	**0.06***	0.03
Child factors				
Sex	0.02	-0.02	0.03	-0.04
Apgar Score 1 minute	0.01	-0.01	-0.03	-0.01
Apgar Score 5 minutes	-0.00	0.02	-0.01	-0.02
Apgar Score 10 minutes	-0.01	0.02	-0.03	-0.04
Preterm birth	0.04	0.02	0.02	-0.03
Difficult infant temperament	0.01	0.05	0.01	0.03

* p <.05, ** p<.01, *** p <.001

[1]Posttraumatic stress disorder

[2]Body mass index

Table 3. Adjusted odds ratios and 95% confidence intervals for variables predicting non-initiation of breastfeeding*, Akershus Birth Cohort Study, Norway, 2008-12.

Independent variable	Adjusted OR[1] (95% CI[2])
Model 1	
Postpartum PTSD[3]	8.43 (2.67-26.62)
Model 2	
Postpartum PTSD	6.51 (2.00-21.18)
BMI	1.10 (1.04-1.18)
Model 3	
Postpartum PTSD	5.98 (1.79-19.97)
BMI[4]	1.09 (1.02-1.17)
Emergency cesarean section	2.48 (1.05-5.85)

*The following variables were also included in stepwise logistic regression analysis (forward selection), but not retained in the final model: Depression and Educational level

[1]Odds ratio

[2]Confidence interval

[3]Posttraumatic stress disorder

[4]Body mass index

Table 4. Adjusted odds ratios and 95% confidence intervals for variables predicting no continued breastfeeding during the first 12 months postpartum*, Akershus Birth Cohort Study, Norway, 2008-12.

Independent variable	Adjusted OR[1] (95% CI[2])
Model 1	
Educational level	0.45 (0.33-0.62)
Model 2	
Educational level	0.48 (0.34-0.66)
BMI[3]	1.06 (1.03-1.10)
Model 3	
Age (years)	0.95 (0.92-0.98)
Educational level	0.55 (0.39-0.76)
BMI	1.07 (1.03-1.10)
Model 4	
Age (years)	0.95 (0.92-0.98)
Educational level	0.52 (0.37-0.73)
Paid employment	1.35 (1.06-1.72)
BMI	1.07 (1.03-1.10)
Model 5	
Age (years)	0.94 (0.91-0.97)
Educational level	0.52 (0.37-0.73)
Paid employment	1.35 (1.06-1.72)
BMI	1.06 (1.03-1.10)
Emergency cesarean section	1.84 (1.10-3.06)

[*]The following variables were also included in stepwise logistic regression analysis (forward selection), but not retained in the final model: Postpartum PTSD, Depression, and Anxiety

[1]Odds ratio

[2]Confidence interval

[3]Body mass index