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The significance of early breastfeeding experiences on breastfeeding self-efficacy one week postpartum

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Abstract

Many new mothers do not reach their breastfeeding goals. Breastfeeding self-efficacy is a modifiable determinant influenced by prior and new breastfeeding experiences. More knowledge about factors associated with early breastfeeding experiences and breastfeeding self-efficacy would allow us to qualify breastfeeding counselling and increase breastfeeding duration. This study aimed to identify prevalence and factors associated with early negative breastfeeding experience, low breastfeeding self-efficacy in the first week postpartum, and drop in self-efficacy from late pregnancy to early postpartum period. A prospective longitudinal study was performed in Denmark from 2013 to 2014, including 2, 804 mothers.

Results showed that 1 week postpartum almost 10% of mothers had negative breastfeeding experiences, 36% had low breastfeeding self-efficacy, and 26% drop in self-efficacy from pregnancy. Negative breastfeeding experiences were significantly associated with epidural analgesia, interrupted skin-to-skin contact immediately postpartum, short previous breastfeeding duration, and lacking social support. Low breastfeeding self-efficacy was associated with low breastfeeding intention, short previous breastfeeding duration, and negative breastfeeding experiences in the first week postpartum. Finally, significant associations of drop in breastfeeding self-efficacy from late pregnancy were no or short education, early negative breastfeeding experiences, prior short breastfeeding duration, and low general breastfeeding self-efficacy in pregnancy. Negative breastfeeding experiences in the first week postpartum is crucial for maternal breastfeeding self-efficacy 1 week following birth. It is important to identify and support mothers at risk of negative breastfeeding experiences in the first week following birth and address factors that might increase the probability of early successful breastfeeding experiences.

KEYWORDS

breastfeeding experience, breastfeeding self-efficacy, skin-to-skin contact

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1 | INTRODUCTION

Breastfeeding ensures a healthy growth of the infant and benefits both short- and long-term health outcomes for mother and infant (Victora et al., 2016). Hence, breastfeeding contributes positively to public health and is considered superior to existing alternatives (Victora et al., 2016). World Health Organization recommends that infants should be exclusively breastfed for the first 6 months and continue to be breastfed after complementary foods are introduced until 2 years of age or beyond (World Health Organization, 2003).

Denmark has a strong tradition for breastfeeding, and 97–98% of mothers initiate breastfeeding after birth (Bruun et al., 2016; Kronborg, Foverskov, & Væth, 2014). However, one in five stop breastfeeding within the first 5 weeks postpartum, even though they intended to breastfeed for a longer period (Kronborg, Foverskov, & Væth, 2014; Kronborg & Vaeth, 2004). Socio-demographic factors like low maternal age, short educational background, and single status are associated with shorter breastfeeding duration (Victora et al., 2016). Moreover, psycho-social factors such as little breastfeeding knowledge, low intention to breastfeed, no support, and low breastfeeding self-efficacy (BSE) are associated with shorter breastfeeding duration (de Jager, Skouteris, Broadbent, Amir, & Mellor, 2013). Yet, these determinants are modifiable compared with socio-demographic factors (Skouteris et al., 2017). A recent review concludes that interventions, which include Bandura's concept of self-efficacy, are found to be effective to increase breastfeeding duration (Skouteris et al., 2017). However, in a Danish setting, several intervention studies, which included Bandura's concept of self-efficacy, succeeded to increase breastfeeding duration, but failed to increase the level of BSE, even though a high level of BSE was found to be associated with longer breastfeeding duration (Kronborg, Væth, Olsen, Iversen, & Harder, 2007; Nilsson et al., 2017). Possible explanations for this might be related to inadequate implementation of the self-efficacy concept as part of the interventions, methodological issues, as the BSE scale was not developed or validated in a Danish setting and a strong ceiling effect of the BSE score by using Dennis' short BSE scale (Dennis, 2003). Other explanations could be related to competing factors that impact BSE negatively. The measure of self-efficacy is often expressed in certainty or uncertainty about the person's perception of being able to defeat the barriers and succeed in performing the behaviour, in this case breastfeeding (Dennis, 1999). According to Bandura, experience is an essential facet of self-efficacy (Bandura, 1997). In a breastfeeding framework, it is known that self-efficacy is associated with previous breastfeeding experiences (Aluş Tokat, Okumuş, & Dennis, 2010; Dennis, 2006), social support (Dennis, 2006; Kingston, Dennis, & Sword, 2007), maternity hospital practices, such as delayed initiation of breastfeeding, and no rooming in (Koskinen, Aho, Hannula, & Kaunonen, 2014) and satisfaction with perinatal care (Dennis, 2006). Moreover, it is known that maternal BSE is especially unstable in the early postpartum period where breastfeeding is established (de Jager et al., 2013). More knowledge of factors influencing early negative breastfeeding experiences and BSE might help inform health professionals to identify mothers in need of early breastfeeding support and how support could be provided and thereby contribute to a successful breastfeeding initiation. This study aims to identify the prevalence and factors associated with early negative breastfeeding experience, low general BSE in the first week following birth, and drop in general BSE from late pregnancy to early postpartum period, respectively.

Key messages

- Breastfeeding self-efficacy is an important determinant for breastfeeding duration, and breastfeeding experiences influence breastfeeding self-efficacy. However, sparse knowledge exists on prevalence and factors associated with early breastfeeding experiences and self-efficacy.
- Compared with positive experiences, negative breastfeeding experiences 1 week postpartum increase odds for low breastfeeding self-efficacy by nine times and a drop in breastfeeding self-efficacy by three times.
- The association between negative breastfeeding experience and low breastfeeding self-efficacy is stronger among primiparous than multiparous women.
- Epidural analgesia and interrupted skin-to-skin contact following birth increase odds for negative breastfeeding experiences one week postpartum. First-time mothers, mothers with high body mass index, and mothers with no social support are at risk of negative breastfeeding experiences
- This study provides new insights into early negative breastfeeding experiences and general breastfeeding self-efficacy and emphasizes the importance of offering evidence-based breastfeeding support postpartum to prevent early negative breastfeeding experiences

2 | METHOD

2.1 | Design

In this prospective, longitudinal cohort study, we used data from a cluster randomized study, which aimed to test a new hospital-based breastfeeding support programme targeting mothers and infants during short-time hospitalization postpartum. More details on the effect evaluation is available elsewhere (Nilsson et al., 2017).

2.2 | Setting

In Denmark, antenatal care is a joined effort between the general practitioners and midwives or doctor at public hospitals. More than 98% of all births take place at a public hospital. Breastfeeding support are offered in the hospital setting by nurses and midwives, and after discharge, the health visitors (specially educated nurses) offers support at home. All public-funded health professionals are required to follow written evidence-based breastfeeding recommendations from The Danish Health Authority (Sundhedsstyrelsen [The Danish Health Authority], 2018) and thereby expected to be more or less uniform across the country and different types of health professionals. No hospital in Denmark is currently designated as baby friendly due to lack of funding since 2008.

Data was collected in nine maternity units in Denmark, with 500 to 3, 000 annual deliveries at each unit. These maternity units represented both rural and urban areas.

2.3 | Participants

Women were recruited around the 35th week of gestation by the midwife at the antenatal care visit and were provided with oral and written information about the study. Informed consent was given by accepting and filling in the questionnaires. Women were eligible if they intended to breastfeed, were expecting a healthy infant, and were able to understand and complete online questionnaires in Danish. Mothers who were expected to be hospitalized more than 50 hours postpartum due to pregnancy complications or clinical disease were excluded. The study population of the cluster randomized study included 3, 541 women. Only women with data on the three outcome variables—early negative breastfeeding experience; low general BSE in the first week following birth; and reduction of general BSE from the late pregnancy to the early postpartum period—participated in this present study (Figure 1).

2.4 | Data collection

The data were collected by self-administered questionnaires between April 2013 and August 2014, before this present study was planned. Mothers answered questionnaires online via an email with a personal link in the 35th week of gestation and 1 week postpartum. Data collected in the initial questionnaire consisted of baseline characteristics concerning socio-demographic and reproductive factors, breastfeeding intentions, general BSE, as well as previous breastfeeding experiences, social support, and expected length of hospitalization postpartum. In the questionnaire, 1 week postpartum mothers were asked about birth-related factors, early breastfeeding experiences, general BSE, postpartum care, and length of hospital stay. To reduce attrition, non-responders received up to three reminders together with a text messaging (sms) alert. The questionnaires primarily consisted of questions that had been tested and used previously (De Vet, Terwee, Mokkink, & Knol, 2011). Three experienced breastfeeding researchers reviewed the questionnaires, and six mothers with different socio-demographic background tested the questionnaires for comprehension and acceptability in a Danish setting. Moreover, data from the Danish Medical Birth Register (Bliddal et al., 2018) and the Danish National Patient Register were used to address potential systematic selection bias (Schmidt et al., 2015).

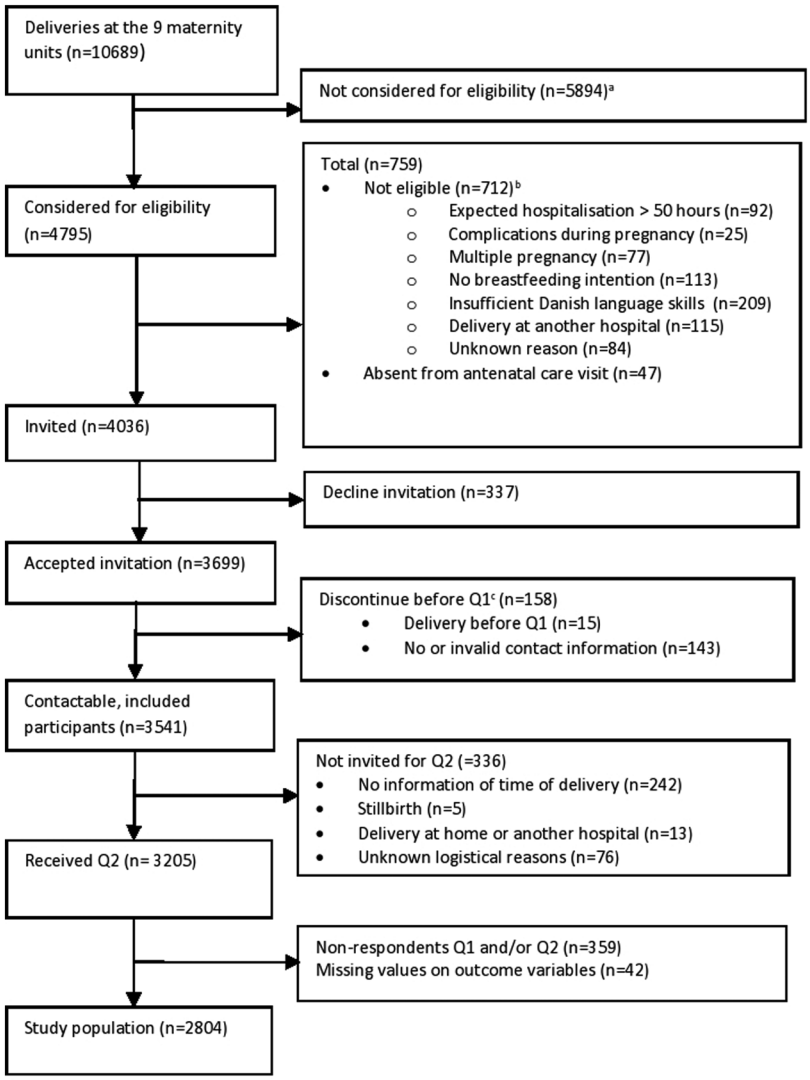
2.5 | Measurements

The outcome "negative breastfeeding experience in the first week postpartum" was measured by asking to what extent the participants agreed (disagreed, agreed to some extent, agreed to a high extent, and totally agreed) that breastfeeding went well in the first week postpartum. A dichotomized variable "Negative breastfeeding experiences" yes versus no was created. The category "yes" included the mothers who responded she disagreed, and "no" included all other response options, which included more or less agreement that breastfeeding went well.

The outcome "low general breastfeeding self-efficacy one week postpartum" was measured by asking the women how certain they were that they would breastfeed exclusively until 6 months postpartum, corresponding with the official Danish breastfeeding recommendations. Response options were a 5- point Likert scale (*very certain–very uncertain*). The variable was dichotomized into "low general breastfeeding self-efficacy, yes, " which included the two lowest values of certainty, representing uncertain and very uncertain and "low general breastfeeding self-efficacy, no, " which included the remaining three values, representing the neutral value, certain, and very certain. The outcome "a drop in general breastfeeding self-efficacy" was derived by combining the BSE variables measured at 35–36 weeks of gestation and 1 week postpartum. "A drop in general breastfeeding self-efficacy, yes" were mothers who had a lower general BSE postpartum than antepartum (Table S1). Included potential self-reported study variables are shown in Table 1. The exact wording of the questions to the mothers, response options, and subsequent categorization are presented in Table S2. The questions related to the psycho-social factors had been developed and face validated in relation to earlier studies (Kronborg & Vaeth, 2004). Details about definitions of psycho-social factors, the wording of the question, and the categorization of variables are found in Table S3.

2.6 | Data analysis

Initially, associations between the outcome, negative breastfeeding experiences and study variables, were analysed separately by Chi squared test. Subsequently, multiple logistic regression models were used to estimate the associations between negative breastfeeding experiences and the study variables. Factors included in Model 1 are presented in the footnotes of Tables 2, 3, and 4. The model



[a] Midwives did not register whether these women were eligible or not eligible for the study probably due to bustle or oblivion. This number is therefore a best possible estimation. Estimated on the basis of births recorded in the Danish Medical Birth Register at the nine maternity units in the inclusion period.
[b] The categories is not mutually exclusive, and some women might count in more than one category
[c] Q1 and Q2 = 1st and 2nd questionnaire

FIGURE 1 Flow profile for selection of study population

was then reduced to include only significant factors from Model 1, as well as the a priori decided upon socio-demographic variables: age, education, and marital status (Model 2). We supplemented this approach with a backwards elimination procedure (Andersen & Skovgaard, 2010). Primiparity was included as a subcategory in the two variables: parity and breastfeeding experience. In the multiple regression analyses, we therefore used breastfeeding experience instead of parity. We found no other collinearity among the explicative variables. To address the problem that the potential for a drop in BSE depends on the value of the baseline BSE, we adjusted for baseline BSE in the multiple regression analysis regarding the outcome "a drop in BSE." The reference group for the included variables was the subcategory with the highest frequency, which, according to Andersen and Skovgaard (2010), represents the most robust model. The same analysis procedure was used for the outcomes: low BSE 1 week postpartum and a drop in breastfeeding self-efficacy. A subgroup analyses for parity was performed of associations between negative breastfeeding experiences 1 week postpartum and low BSE 1 week postpartum and a drop in breastfeeding self-efficacy. Data were derived from a randomized controlled trial (RCT). Sensitivity analyses were therefore performed to see if there were any differences in the pattern of associations on the three outcomes between the intervention and control group. Likewise, sensitivity analyses were performed to check the robustness of results if we used another categorization of covariates such as maternal age and education (results not shown). The R software version 3.5.2. was used for the statistical analyses.

TABLE 1 Psycho- social factors associated to negative breastfeeding experiences, low general breastfeeding self- efficacy, and drop in general breastfeeding self- efficacy 1 week postpartum

Characteristics	Total *N* (%) 2, 804 (100)	Negative bf experience 1 week pp *n* (%) 265 (100)	Low general bf self- efficacy 1 week pp *n* (%) 995 (100)	Drop in general bf self- efficacy *n* (%) 735 (100)
Psycho- social factors				
Bf intention				
≤1 month	33 (1.2)	9 (3.4)	28 (2.8)	3 (0.4)
>1– 4 months	853 (30.4)	85 (32.1)	491 (49.4)	157 (21.4)
>4 months	1,918 (68.4)	171 (64.5)	476 (47.8)	575 (78.2)
Knowledge of bf				
Little–nothing	1,077 (38.4)	141 (53.2)	434 (43.6)	308 (41.9)
A lot	1,727 (61.6)	124 (46.8)	561 (56.4)	427 (58.1)
Parity and previous bf experiences				
First time mothers	1,221 (43.5)	141 (53.2)	417 (42.0)	365 (49.7)
≤1 month	304 (10.8)	69 (26.0)	214 (21.5)	66 (9.0)
>1– 4 months	570 (20.3)	32 (12.1)	275 (27.6)	131 (17.8)
>4 months	709 (25.3)	23 (8.7)	89 (8.9)	173 (23.5)
Social support				
No	109 (3.9)	19 (7.2)	31 (3.1)	23 (3.1)
Yes, friends	79 (2.8)	5 (1.9)	25 (2.5)	19 (2.6)
Yes, family	732 (26.1)	64 (24.1)	248 (25.0)	174 (23.7)
Yes, both	1,884 (67.2)	177 (66.8)	691 (69.4)	519 (70.6)
Negative bf experience 1 week pp				
Yes	265 (9.5)		199 (20.0)	118 (16.1)
No	2,539 (90.5)		796 (80.0)	617 (83.9)
Low general self- efficacy at 35 weeks of gestation				
Yes	962 (34.3)	129 (48.7)	644 (64.7)	
No	1,842 (65.7)	136 (51.3)	351 (35.3)	
Low general self- efficacy 1 week pp				
Yes	995 (35.5)	199 (75.1)		462 (62.9)
No	1,809 (64.5)	66 (24.9)		273 (37.1)
Drop in general bf self- efficacy				
Yes	735 (26.2)	118 (44.5)	462 (46.4)	
No	2,069 (73.8)	147 (55.5)	533 (53.6)	

Abbreviations: bf, breastfeeding; pp, postpartum.

3 | RESULTS

In total, 2, 804 women were included in the present study (Figure 1). Only 45% of women delivering at the included maternity units were assessed to be eligible. Selection analyses showed that length of hospital stay postpartum and maternal age were comparable between mothers assessed and not assessed for eligibility. Other characteristics such as mode of delivery, birth weight, body mass index (BMI), and smoking pointed at slightly more healthy mothers and infants in the assessed group. The 8% of mothers who declined and those who accepted to participate were comparable according to baseline characteristics, except that the mothers who declined were more often smokers (Tables S4 and S5).

Almost 10% (*n* = 265) of the study population reported having negative breastfeeding experiences during the first week following birth (Table 1). Of these, three in four reported low BSE 1 week postpartum, and almost half had a drop in BSE. One third of mothers (*n* = 995) reported having low BSE 1 week postpartum, and almost half of these also had a drop in BSE. Moreover, one in four (*n* = 735) had a drop in BSE 1 week postpartum compared with antepartum (Table 1). In the crude analysis, all psycho-social factors were associated with all three outcome variables, except for social support, which was only associated with negative breastfeeding experiences (Table 1). Education was the only socio-demographic and health-related factor associated with all three outcomes, and BMI was associated with negative breastfeeding experiences and low BSE 1 week postpartum (Table 2).

TABLE 2 Characteristics associated to negative breastfeeding experiences, low general breastfeeding self- efficacy, and drop in general breastfeeding self- efficacy 1 week postpartum

Characteristics	Total *N* (%) 2, 804 (100)	Negative bf experience 1 week pp *n* (%) 265 (100)	Low general bf self- efficacy 1 week pp *n* (%) 995 (100)	Drop in general bf self-efficacy *n* (%) 735 (100)
Socio- demographic and health factors				
Maternal age (years)				
<25	359 (12.8)	34 (12.8)	121 (12.2)	120 (16.3)
25– 29	1,020 (36.4)	92 (34.7)	368 (36.9)	263 (35.8)
30– 34	1,001 (35.7)	103 (38.9)	371 (37.3)	260 (35.4)
>35	424 (15.1)	36 (13.6)	135 (13.6)	92 (12.5)
Education				
No/ short	1,323 (47.2)	146 (0.55)	497 (0.50)	384 (52.2)
Medium–long	1,481 (52.8)	119 (0.45)	498 (0.50)	351 (47.8)
Marital status				
Married/ cohabited	2,730 (97.4)	259 (97.7)	968 (97.3)	717 (97.6)
Single	74 (2.6)	6 (2.3)	27 (2.7)	18 (2.4)
BMI				
18.5– 24.9	1,655 (59.9)	129 (48.7)	547 (55.0)	416 (56.6)
25– 29.9	622 (23.6)	71 (26.8)	250 (25.1)	182 (24.8)
≥30	372 (13.2)	54 (20.4)	164 (16.5)	104 (14.1)
Missing	115 (4.1)	11 (4.1)	34 (3.4)	33 (4.5)
Smoking				
Yes	191 (6.8)	18 (6.8)	91 (9.1)	49 (6.7)
No	2,614 (93.2)	247 (93.2)	904 (90.9)	686 (93.3)
Birth factors				
Parity				
First	1,221 (43.5)	141 (53.2)	417 (41.9)	365 (49.7)
>1	1,583 (56.5)	124 (46.8)	578 (58.1)	370 (50.3)
Mode of delivery				
Vaginal birth	2,318 (82.7)	204 (77.0)	794 (79.8)	582 (79.2)
Caesarean section	486 (17.3)	61 (23.0)	201 (20.2)	153 (20.8)
Induction of labour				
Yes	723 (25.8)	87 (32.8)	281 (28.2)	229 (31.2)
No	2,060 (73.5)	176 (66.4)	705 (70.9)	500 (68.0)
Don't know	21 (0.7)	2 (0.8)	9 (0.9)	6 (0.8)
Epidural analgesia				
Yes	659 (23.5)	95 (35.8)	276 (27.7)	200 (27.2)
No	2,130 (76.6)	170 (64.2)	716 (72.0)	530 (72.1)
Don't know	15 (0.5)	0 (0.0)	3 (0.3)	5 (0.7)
Bleeding pp				
<500 ml	1,697 (60.5)	146 (55.1)	569 (57.2)	426 (58.0)
>500 ml	452 (16.1)	53 (20.0)	187 (18.8)	147 (20.0)
Don't know	655 (23.4)	66 (24.9)	239 (24.0)	162 (22.0)
Gestational age (weeks)				
34– 37	202 (7.2)	23 (8.7)	79 (7.9)	55 (7.5)
37 + 1 to 40	1,742 (62.1)	161 (60.8)	593 (59.6)	428 (58.2)
40 + 1 to 42	860 (30.7)	81 (30.5)	323 (32.5)	252 (34.3)

(Continues)

TABLE 2 (Continued)

Characteristics	Total *N* (%) 2, 804 (100)	Negative bf experience 1 week pp *n* (%) 265 (100)	Low general bf self- efficacy 1 week pp *n* (%) 995 (100)	Drop in general bf self-efficacy *n* (%) 735 (100)
Postpartum care factors				
Interrupted skin-to- skin contact				
Yes	842 (30.0)	118 (44.5)	347 (34.9)	251 (34.1)
No	1,896 (67.6)	139 (52.5)	626 (62.9)	467 (63.5)
Don't know	66 (2.4)	8 (3.0)	22 (2.2)	17 (2.3)
Hospitaliation pp (hr)				
0– 12	931 (33.2)	62 (23.4)	285 (28.6)	204 (27.8)
>12	1,873 (66.8)	203 (76.6)	710 (71.4)	531 (72.2)

Abbreviation: BMI, body mass index; pp, postpartum.

All birth and postpartum care factors were associated with two or all three outcome variables except gestational age, which was only associated with a drop in BSE 1 week postpartum.

In the multivariate analysis, mothers with early negative breastfeeding experiences were characterized by being 30– 34 years old, with a BMI of more than 30, having epidural analgesia during delivery, interruption of skin-to-skin contact (SSC) immediately following birth, no social support, and very low BSE in late pregnancy (Table 3). Moreover, mothers with prior breastfeeding duration of 1 month or less and first-time mothers had higher odds for negative breastfeeding experiences 1 week postpartum compared with mothers with prior breastfeeding duration of more than 1 month and multiparous, respectively (Table 3).

Low BSE 1 week postpartum was strongly associated with several of the included psycho-social factors. Hence, both intentions to breastfeed less than 1 month and negative breastfeeding experiences in the first week following birth increased the odds for low BSE by nine times. The pattern of associations reflected a dose response; as for instance, women who intended to breastfeed for longer durations had lower odds, and the lowest odds were among women intending to breastfeed for a minimum of 6 months. Breastfeeding their previous child less than 1 month increased odds for low BSE 1 week postpartum by 3.5 times, compared with first-time mothers, and women who had previously breastfed a child for minimum 4 months had the lowest odds. Additionally, smoking was significantly associated with higher odds of low BSE 1 week postpartum (Table 4).

Mothers with a drop in BSE compared with no drop had more often no or a short education, short prior breastfeeding duration, negative breastfeeding experiences in the first week following birth, and higher general BSE in pregnancy (Table 5). When stratifying by parity, results showed that the association between negative breastfeeding experiences and low BSE as well as a drop in BSE, respectively, was much stronger for primiparous than multiparous mothers (Table 6).

Changing the categorization of maternal age and education in the multiple regression models and the use of backward elimination to select variables did not change our findings (results not shown). Finally, when stratifying by randomization group, we found that results of the multiple regression models were comparable between the groups (results not shown).

4 | DISCUSSION

The aim of this study was to identify the prevalence and factors associated with early negative breastfeeding experience, low general BSE in the first week following birth, and drop in general BSE from late pregnancy to early postpartum period, respectively. Almost a tenth of the mothers had negative breastfeeding experiences 1 week following birth, and these mothers were more likely to have a higher BMI, have epidural analgesia, experience interrupted SSC, have short prior breastfeeding duration, and to be first-time mothers. One third of the study population reported having low BSE 1 week postpartum, which was associated with psycho-social factors such as low intention to breastfeed, short prior breastfeeding duration, and negative breastfeeding experiences in the first week. Finally, one fourth of the mothers in this study experienced a drop in breastfeeding self-efficacy. These mothers were more likely to have had a caesarean section and negative experiences of breastfeeding in the first week postpartum.

In this study, 10% of the mothers reported having negative early breastfeeding experiences 1 week postpartum, and around 50% reported having breastfeeding problems (reported elsewhere; Nilsson et al., 2017). This indicates that only some of the mothers' breast feeding problems impact her general experience of breastfeeding negatively. Other studies investigating early breast feeding concerns or problems report a prevalence between 13% and 92% (Feenstra, Jørgine Kirkeby, Thygesen, Danbjørg, & Kronborg, 2018; Häggkvist et al., 2010; Wagner, Chantry, Dewey, & Nommsen-Rivers, 2013).

TABLE 3 Adjusted associations between characteristics and negative breastfeeding experience at 1 week postpartum (only significant covariates are presented), *N* = 265

Characteristics	Adjusted OR (95 % CI)[a]
Socio- demographic and health factors	
Maternal age (years)	
<25	0.85 (0.55, 1.31)
25– 29	1
30– 34	1.39* (1.01, 1.91)
>35	1.18 (0.76, 1.82)
BMI	
18.5– 24.9	1
25– 29.9	1.21 (0.88, 1.67)
≥30	1.54* (1.07, 2.23)
Missing	1.38 (0.70, 2.72)
Birth and postpartum care factors	
Epidural analgesia	
Yes	1.50* (1.23, 2.01)
No	1
Interrupted skin- to- skin contact[b]	
Yes	1.66* (1.26, 2.18)
No	1
Don't know	1.56 (0.71, 3.43)
Psycho- social factors	
Bf experiences[c]	
First- time mothers	1
≤1 month	1.65* (1.12, 2.43)
>1– 4 months	0.40* (0.26, 0.61)
>4 months	0.29* (0.18, 0.48)
Social support	
No	2.66* (1.52, 4.67)
Yes, friends	0.73 (0.28, 1.89)
Yes family	0.92 (0.67, 1.26)
Yes, both	1
General bf self- efficacy at 35– 36 weeks of gestations	
Very high	0.97 (0.59, 1.58)
High	0.91 (0.60, 1.40)
Neutral	1
Low	1.06 (0.69, 1.62)
Very low	1.73* (1.19, 2.49)

Abbreviations: bf, breastfeeding; CI, confidence interval; OR, odds ratio.
[a]Study variables included in Model 1: psycho- social factors from Table 1 (bf intention, bf knowledge, previous bf experience, social support, and general bf self-efficacy at 35 weeks of gestation) and all factors presented in Table 2 except parity. Subsequently, significant variables were adjusted for socio-demographic variables. Factors in Model 2: maternal age, education, marital status, epidural pain- killer, interrupted skin- to- skin contact, bf experiences, social support, and bf self- efficacy at 35– 36 weeks of gestation.
[b]Interruption of skin- to- skin contact until the infant latched on for the first time following birth.
[c]Bf duration of exclusive bf of the previous child.
* = significant estimates.

TABLE 4 Adjusted associations between characteristics and low general breastfeeding self- efficacy 1 week postpartum (only significant covariates are presented), *N*=995

Characteristics	Adjusted OR (95 % CI)[a]
Maternal health factors	
Smoking	
Yes	1.56* (1.11, 2.20)
No	1
Psycho- social factors	
Bf intention (month)	
≤1	9.42* (3.24, 7.34)
>1– 4	3.19* (2.61, 3.89)
>4– 6	1
>6	0.50* (0.32, 0.79)
Bf experiences[b]	
First- time mothers	1
≤1 month	3.38* (2.49, 4.59)
>1– 4 months	1.64* (1.29, 2.08)
>4 months	0.47* (0.35, 0.62)
Bf went well in the first week	
Disagree (negative bf experiences)	9.38* (6.69, 13.15)
Agreed to some extent	2.82* (2.20, 3.60)
Agreed to a high extent	1.52* (1.21, 1.90)
Totally agreed	1

Abbreviations: bf, breastfeeding; CI, confidence interval; OR, odds ratio.
[a]Study variables included in Model 1: psycho- social factors from Table 1 (bf intention, bf knowledge, previous bf experience, social support, and general bf self- efficacy at 35 weeks of gestation) and all factors presented in Table 2, except parity. Subsequently significant variables were adjusted for socio- demographic variables. Factors in Model 2: maternal age, education, marital status, smoking, bf intention, bf experiences, bf experience in the first week following birth.
[b]Bf duration of exclusive bf of the previous child.
* = significant estimates.

Different definitions of early breastfeeding problems may explain the variation in prevalence and thereby make it difficult to compare results between existing studies.

A possible explanation for the association between early negative breastfeeding experience and higher BMI in this study may be an increased risk of delayed lactogenesis postpartum among overweight women (Mok et al., 2008; Preusting, Brumley, Odibo, Spatz, & Louis, 2017). The shown association between early negative experiences and having had epidural analgesia corresponds with the findings in a review, where 12 studies report a negative impact of epidural analgesia on the newborn's early spontaneous breast-seeking- and breastfeeding behaviour and later breastfeeding duration (French, Cong, & Chung, 2016). Likewise, interrupted SSC has been shown to interfere with the newborn's breastfeeding behaviour (Robiquet et al., 2016). Suboptimal breastfeeding behaviour might therefore explain these associations of negative experience of breastfeeding. This is supported by a qualitative study that found

TABLE 5 Associations between characteristics and a drop in general self- efficacy from 36 weeks of gestation until 1 week postpartum (only significant covariates are presented), *N* = 735

Characteristics	Adjusted OR (95 % CI)[a]
Socio- demographic factors	
Education	
No/ short	1.29* (1.05, 1.57)
Medium–long	1
Psycho- social factors	
Bf experience	
First- time mothers	1
≤1 month	2.24* (1.51, 3.32)
>1– 4 months	1.40* (1.07, 1.85)
>4 months	0.69* (0.53, 0.89)
Bf went well in the first week	
Disagree (negative bf experiences)	6.90* (4.80, 9.93)
Agreed to some extent	2.55* (1.97, 3.31)
Agreed to a high extent	1.45 (1.14, 1.84)
Totally agreed	1
General bf self- efficacy at 35– 36 weeks of gestations	
Very high	2.90* (2.20, 3.83)
High	2.12* (1.65, 2.71)
Neutral	1
Low	0.85 (0.64, 1.12)
Very low	unestimable

Abbreviations: bf, breastfeeding; CI, confidence interval; OR, odds ratio.
[a]Study variables included in Model 1: psycho- social factors from Table 1 (bf intention, bf knowledge, previous bf experience, social support, and general bf self- efficacy at 35 weeks of gestation) and all factors presented in Table 2 except parity. Subsequently significant variables were adjusted for socio- demographic variables. Factors in Model 2: maternal age, education, marital status, mode of delivery, gestational age, bf intention, bf experience in the first week following birth.
* = significant estimates

that the baby's lack of knowledge of how to feed or the mother's lack of control of her body impact maternal experience of early breastfeeding (Burns, Schmied, Sheehan, & Fenwick, 2010). We found that first-time mothers were more likely to have negative breastfeeding experiences than mothers who had breastfed their previous child for more than 1 month. A possible explanation is that first-time mothers have no previous breastfeeding experiences and therefore might have unrealistic expectations contrary to mothers who have breastfed successfully before (Burns et al., 2010; Kronborg & Vaeth, 2004). According to these results, health professionals must be aware that mothers with high BMIs, mothers who have had epidural analgesia or interrupted SSC, mothers with short prior breastfeeding duration, and first-time mothers might need special support to promote the natural process of breastfeeding initiation.

A substantial portion of the new mothers were struggling with low confidence during the very early establishment phase postpartum. To our knowledge, this is the first quantitative study to report on prevalence of low BSE in this early period following birth. In Denmark, the tradition of breastfeeding is strong. At the time the BSE was measured, 82 % of the study population were breastfeeding exclusively (Nilsson et al., 2017). Countries with a less strong breastfeeding tradition might find a higher prevalence of women with low general BSE. Like several other studies (Hinic, 2016), we found that low intention to breastfeed, short prior breastfeeding duration, and negative experiences of breastfeeding in the first week following birth were associated with low BSE. The finding corresponds with Bandura's self-efficacy theory that describe intention and self-efficacy to be closely related. Low intention may impact on persistency and concentration in reaching the task and thereby it also may affect the expectation of self-efficacy in being able to perform the behaviour (Bandura, 1997). According to the theory, short prior duration and negative experiences of breastfeeding were expected to correlate with low BSE, as early experiences connected to perform the task play an essential role in the self-efficacy construction. Breastfeeding intention and prior breastfeeding duration only had a protective effect on low BSE for mothers who had breastfed her prior child for more than 4 months and for mothers who intended to breastfeed for more than 6 months. Mothers, who express low breastfeeding intention during pregnancy, short prior breastfeeding duration, and negative experience of breastfeeding in the early postpartum period might therefore benefit from extra support that enhance breastfeeding self-efficacy early after birth. This support could consist of additional skills training as suggested by Dennis (1999) in order to help the new mother to achieve positive early breastfeeding experiences, but this remains to be tested in an intervention study.

Around one fourth of the mothers in this study experienced a drop in BSE. According to Bandura (1997), perceived self-efficacy may change depending on how various personal and situational contributors are interpreted and given weight. Moreover, he stresses that recent experiences carry more weight. This might explain the result that maternal negative experiences of the present breastfeeding have higher odds for a drop in BSE than previous short breastfeeding duration. Negative breastfeeding experiences in the first week following birth seemed to have a greater negative impact on BSE and a drop in BSE for primiparous than multiparous. We have not been able to find other studies with comparable reporting. Given that negative breastfeeding experiences is the strongest associated factor of a drop in BSE from pregnancy to 1 week postpartum, it underlines the importance of early breast feeding support to enhance the perception of early breastfeeding success especially for primiparous women.

4.1 | Strengths and limitations

We used a longitudinal design. Data were collected prospectively, and the outcome variables were collected 5– 7 days postpartum.

TABLE 6 Adjusted odds ratios for the association between negative breastfeeding experiences and (a) low general breastfeeding experience 1 week postpartum, and (b) drop in general breastfeeding experience having negative breastfeeding experiences in the first week postpartum stratified by parity

Low bf self- efficacy one week postpartum			
	Primiparous[a] OR (95% CI) *n* = 417	**Multiparous[b] OR (95% CI) *n* = 578**	**All mothers[b] OR (95% CI) *n* = 995**
Bf went well in the first week			
Disagree (negative bf experiences)	14.91* (9.34, 23.80)	4.95* (3.00, 8.17)	9.38* (6.69, 13.15)
Agreed to some extent	3.31* (2.33, 4.71)	2.39* (1.68, 3.40)	2.82* (2.20, 3.60)
Agreed to a high extent	1.39 (0.99, 1.96)	1.65* (1.22, 2.23)	1.52* (1.21, 1.90)
Totally agreed	1	1	1
Drop in bf self- efficacy from 35 weeks of gestation to 1 week postpartum			
	Primiparous[a] OR (95% CI) *n* = 365	**Multiparous[c] OR (95% CI) *n* = 370**	**All mothers[c] OR (95% CI) *N* = 735**
Bf went well in the first week			
Disagree (negative bf experiences)	10.98* (6.73, 17.91)	3.40* (1.93, 6.02)	6.90* (4.80, 9.93)
Agreed to some extent	2.77* (1.92, 4.00)	2.35* (1.61, 3.43)	2.55* (1.97, 3.31)
Agreed to a high extent	1.50* (1.05, 2.14)	1.42* (1.02, 1.97)	1.45 (1.14, 1.84)
Totally agreed	1	1	1

Abbreviations: bf, breastfeeding; CI, confidence interval; OR, odds ratio.

[a]Adjusted for maternal age, education, marital status, body mass index, smoking, mode of delivery, induction of labour, epidural pain killer, postpartum bleeding, gestational age, interrupted skin- to- skin contact, postpartum hospitalization, bf intention, knowledge of bf, social support.

[b]Adjusted for: maternal age, education, marital status, body mass index, smoking, mode of delivery, induction of labour, epidural pain killer, postpartum bleeding, gestational age, interrupted skin- to- skin contact, postpartum hospitalization, bf intention, knowledge of bf, social support, bf experience.

[c]Adjusted for: maternal age, education, marital status, body mass index, smoking, mode of delivery, induction of labour, epidural pain- killer, postpartum bleeding, gestational age, interrupted skin- to- skin contact, postpartum hospitalization, bf intention, knowledge of bf, social support, bf experience, bf self- efficacy at 35- 36 weeks of gestation

* = significant estimates

Hence, baseline data on socio-demography, health, and psychosocial characteristics in pregnancy were not influenced by maternal experiences around birth and in the postpartum period, and recall bias was not a problem. BSE was measured as a general level of self-efficacy towards breastfeeding. The question used for measuring BSE is consistent with Dennis' definition (Dennis, 1999), and has previously been used in a Danish setting (Kronborg & Vaeth, 2004; Nilsson et al., 2017). The BSE scale developed by Dennis had been used worldwide to measure BSE. However, a ceiling effect was detected for the instrument in this Danish study population (Nilsson et al., 2017). We therefore consider our outcome variable the best available proxy for measuring general BSE in this setting, even though not directly comparable with descriptive research results based on the BSE scale. The associations between BSE and intention, prior breastfeeding duration and breastfeeding experiences in the first week postpartum, all showed a dose-response relationship respectively, which strengthen the probability of a true association (Rothman, 2012).

Data were collected for an RCT where the intervention consisted of four evidence-based elements of breastfeeding establishment and communication based on Bandura's four sources to increase self-efficacy. We used data as one cohort, which might be problematic, when the intervention included a self-efficacy component and one of the outcome measures in this present study was BSE. However, we did not find any effect of the intervention on breastfeeding self-efficacy in the RCT, and the intraclass correlation factor on this outcome was less than 0.001 (Nilsson et al., 2017). In this present study, sensitivity analyses showed that the pattern of associations between covariate and the three outcomes were comparable when the control and intervention group were analysed separately.

Originally, only 45% were assessed for eligibility at the maternity units, and the assessed women tended to be healthier than the unassessed. Our results would be biased if this selection or self-selection depended on the characteristics as well as the outcome variables. However, BSE and negative breastfeeding experiences 1 week postpartum were not known at the time of recruitment. Hence, selection bias does not seem to be a major concern.

Lost to follow up is a limitation of a longitudinal design. In this study, 79% of the contactable women answered the two questionnaires, and only a few values on the included variables were missing. However, we missed a follow up on 21% of participants. Besides losing power, the occurrence of missing values if related to the outcome variable may bias the findings of the study (Andersen & Skovgaard, 2010). The estimated associations would be even stronger if the missing values in this study are explained by problems during the initiation of breastfeeding and thereby relate to negative experiences of breastfeeding in the first week or low BSE 1 week postpartum. We therefore consider that our conservative estimates of associations are

as trustworthy as the alternative of imputing new outcome data (Andersen & Skovgaard, 2010).

5 | CONCLUSION

This present study contributes with new and important knowledge for clinical practice on the close interrelationship between early negative breastfeeding experiences and BSE.

Early negative breastfeeding experiences are prevalent and impact maternal BSE negatively 1 week following birth. Likewise, it is an independent associated factor of a drop in BSE from late pregnancy until 1 week postpartum. As low BSE is associated with shorter breastfeeding duration, early negative breastfeeding experiences could be an important focal point for health professionals when supporting new parents during breastfeeding establishment. Factors associated with negative breastfeeding experiences were primiparity, previous short breastfeeding duration, no social support, and very low BSE in pregnancy. In order to impact early maternal breastfeeding experiences positively and thereby also BSE, it might be important to identify and support these mothers at risk of negative experiences in the first week following birth. Likewise, labour epidural analgesia and interrupted SSC were associated with negative breastfeeding experiences. Health professionals might enhance maternal experience of breastfeeding by addressing these factors in the immediate postpartum period.

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CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

CONTRIBUTIONS

IN, KR, and KSL designed the study. IN and HK developed the questionnaires with important input by KSL to all questionnaires. IN recruited the hospitals, pilot tested the questionnaires, and was responsible for the organization of the dissemination of questionnaires and collection of data. IN suggested the initial strategy for analysis of data, which was further planned in close cooperation with KSL and KR, and KR did the analyses. Interpretation of data, writing, and designing of tables and figures was suggested by IN in the first draft and developed further by IN in close cooperation with KSL, HK, and KR. All authors have contributed with substantial revisions to the manuscript and approved the final manuscript as submitted.

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