

Risk Factors for Cessation of Breastfeeding Prior to Six Months Postpartum among a Community Sample of Women in Calgary, Alberta

Heather L. Kehler, MSc,¹ Katie H. Chaput, MSc,² Suzanne C. Tough, PhD³

ABSTRACT

Objectives: To describe the rates of breastfeeding initiation and breastfeeding for at least six months and identify risk factors for failing to breastfeed for six months among a community sample of mothers in Calgary, Alberta.

Methods: A cohort of women (n=1737) who participated in a longitudinal study of prenatal support and who could be contacted when their child was three years old (n=1147) were invited to participate in a follow-up telephone questionnaire. Of these 1147 women, 780 (69% participating rate) participated and provided breastfeeding data. Risk factors for early cessation of breastfeeding prior to six months were identified using bivariate and multivariable strategies.

Results: Of the 780 women, 95.6% initiated breastfeeding and 71.6% continued to breastfeed for at least six months. Risk factors identified for early cessation included younger maternal age, obesity prior to pregnancy, lower maternal education, working full-time or intending to within the first year, history of depression, depression or anxiety during pregnancy, poor social support, and smoking during pregnancy (all p<0.05). Multivariable analysis revealed that working full-time or intending to within the first year, lower maternal education, obesity prior to pregnancy and anxiety during pregnancy most increased a woman's risk of early cessation (all p<0.05).

Conclusion: Nearly all mothers initiated breastfeeding and 70% continued to breastfeed for six months, although subgroups of women remained at an elevated risk of early cessation. Research to better understand breastfeeding decisions among women with the risk factors identified is needed to facilitate the development of more effective breastfeeding promotion strategies.

Key words: Breastfeeding; cessation; risk factors; epidemiology

La traduction du résumé se trouve à la fin de l'article.

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The benefits of breastfeeding for children and mothers are well established.¹ Children who are breastfed have a reduced risk of gastrointestinal infections,^{2,3} respiratory tract infections,⁴ asthma^{1,5} and obesity and diabetes later in life.⁶ Mothers who breastfeed lower their risk of breast and ovarian cancers and type 2 diabetes.¹ The strength of this evidence has led to global recommendations developed by the World Health Organization, and adopted by Health Canada for exclusive breastfeeding until six months of age and continued breastfeeding for up to two years.^{7,8} Data from the Canadian Community Health Survey conducted in 2003 found 84.5% of mothers in Canada initiate breastfeeding and 38.7% continue to breastfeed for at least six months.⁹

Studies conducted in developed countries have consistently reported younger maternal age,¹⁰⁻²¹ lower education,^{11,13,14,17,22} lower income,^{18,23,24} smoking,^{14,17,21-23,25} returning to work full-time,^{19,20} and higher body mass index²⁵⁻²⁷ as negatively associated with breastfeeding duration. In Canada, women are entitled to a 12-month maternity leave policy which ensures they can return to their job or an equal position and receipt of 55% of their salary up to a maximum of \$435 per week for those who have worked at least 600 insurable hours in the year prior to birth.²⁸ This policy may make it more feasible for women to breastfeed during the first postpartum year and the universal health care system may improve access to breastfeeding support services for lower-income women. Therefore, this study was undertaken to determine what factors contribute to the majority of women failing to breastfeed for at least six months in Canada.

The purpose of this study was to describe current rates of breastfeeding initiation and continuation for six months among mothers in Calgary, Alberta and to identify risk factors for early cessation of breastfeeding, defined as breastfeeding cessation prior to six months postpartum.

METHODS

Women who participated in the Community Perinatal Care study (CPC), a trial of increasing support during pregnancy, were contacted by telephone and asked to participate in a follow-up study when their child was three years of age. As part of the trial, women completed three telephone questionnaires, conducted at 1) study intake, 2) 32-36 weeks gestation, and 3) eight weeks postpartum. Comprehensive demographic, obstetric, lifestyle, mental health, psychosocial, parenting and resource use information was obtained, and was used for risk factor assessment in the current study. The methodology of the CPC study has been described in detail elsewhere²⁹ and adhered to the CONSORT statement. The trial inter-

Author Affiliations

1. Decision Support Research Team, Calgary Health Region, Calgary, AB
2. Department of Community Health Sciences, University of Calgary, Calgary, AB
3. Departments of Paediatrics and Community Health Sciences, University of Calgary, Calgary, AB

Correspondence and reprint requests: Heather Kehler, Child Development Centre, c/o 2888 Shaganappi Trail NW, Calgary, AB T3B 6A8, Tel: 403-955-7616, Fax: 403-955-5989, E-mail: heather.kehler@albertahealthservices.ca

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vention did not have a significant impact on breastfeeding initiation ($p=0.172$) and breastfeeding for at least six months ($p=0.075$) and therefore made appropriate a general analysis of all women who provided breastfeeding data.

In total, 1,737 women participated in the original CPC study. Women who had experienced a pregnancy or infant loss, did not speak English, had given their child up for adoption or did not live in the city of Calgary at follow-up were excluded. Attempts were made to contact 1,147 mothers who had serviceable phone numbers; of these, 791 women were recruited (69% participation rate). Breastfeeding initiation and duration data were available for 780 women (99% of the sample). Computer-assisted telephone interview (CATI) was used to administer the 15-20 minute questionnaire which included questions about breastfeeding initiation and duration of breastfeeding. Data collection commenced on November 30, 2005 and was completed on March 27, 2006. The study received ethical approval from the Conjoint Health Research Ethics Board, Faculty of Medicine, University of Calgary, Calgary, AB.

Women who answered yes to "Was your child ever breastfed or fed breast milk?" during the follow-up questionnaire were classified as having initiated breastfeeding. Duration of breastfeeding was determined by asking women, "How long was your child breastfed or fed breast milk?". A duration of less than six months constituted early cessation.

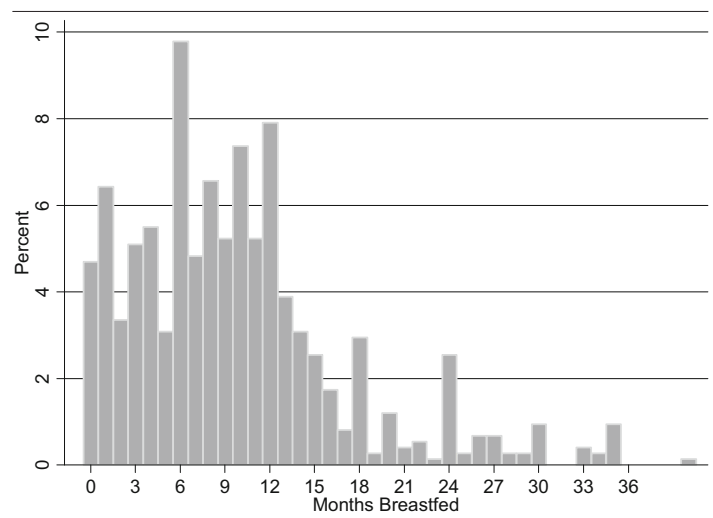
Potential risk factors were examined for an association with early cessation based on the literature, the data available and the research team's hypotheses. Biologic risk factors investigated included young maternal age (less than 25 years of age at delivery), pre-pregnancy body mass index (calculated from self-reported height and weight and categorized into underweight <18.5 , normal $18.5-24.9$, overweight $25.0-29.9$ and obese ≥ 30.0 in accordance with Health Canada guidelines),³⁰ preterm (<37 weeks gestation), low birthweight (<2500 grams) and sex of infant. Socio-demographic factors investigated were lower maternal education (12 years of education or less), low income ($<\$40,000/\text{year}$), returning to work or intending to within the first postpartum year, foreign born (born outside Canada) and no stable partner (single, separated or divorced). Psychosocial risk factors included a history of depression (self-report), depression during pregnancy (Symptom Questionnaire Depression score >8.30),³¹ anxiety during pregnancy (Symptom Questionnaire Anxiety score >11.58),³¹ poor social support during pregnancy (lower 33rd percentile of scores on Social Support Index),³² low self-esteem during pregnancy (lower 33rd percentile of scores on Rosenberg Self Esteem Scale),³³ history of abuse (self-report) and postpartum depression (Edinburgh Postnatal Depression Scale score ≥ 13).³⁴ Lifestyle risk factors included any alcohol, smoking or drug use during pregnancy (all self-report).

All analyses were conducted using Stata/SE version 9.2 (Statacorp, College Station, TX). All tests were two-tailed, with p-values of less than 0.05 considered statistically significant. Descriptive statistics were used to describe the participant characteristics and the number and percentage of women who initiated breastfeeding and breastfed for at least six months. Pearson Chi-square tests (or Fisher's Exact Chi-square test when expected cell counts were less than five) were used to examine the relationships between potential risk factors and early cessation of breastfeeding. To provide an estimate of the effect size, unadjusted odds ratios were calculated for all sig-

Table 1. Participant Demographic Characteristics

Characteristic	N (%)
Maternal age at delivery	
<25 years	81 (10.2)
≥ 25 years	710 (89.8)
Marital status	
Married or common law	751 (94.9)
Single, separated or divorced	40 (5.1)
Maternal education	
Less than 12 years of education	25 (3.2)
Graduated high school	116 (14.7)
At least some post secondary	648 (82.1)
Household income	
$<\$40,000$ per year	119 (15.8)
$\geq \$40,000$ per year	635 (84.2)
Maternal country of birth	
Canada	655 (82.8)
Outside Canada	136 (17.2)
Maternal main language spoken at home	
English	723 (91.4)
Not English	68 (8.6)

Figure 1. Distribution of the duration of breastfeeding in weeks



nificant risk factors. Multivariable logistic regression modeling was used to identify the risk factors most predictive of early cessation of breastfeeding. Significant biologic risk factors were entered one at a time into the regression model, followed by significant socio-demographic, psychosocial and lifestyle risk factors. Variables that remained significant were retained in the model.

RESULTS

The majority of participants were older than 25, had a stable partner, some post-secondary education, a household income of at least \$40,000 per year, were born in Canada and spoke English in their homes (Table 1).

Almost all women initiated breastfeeding (95.6%) and most women continued to breastfeed for at least six months (71.6%). Figure 1 displays the distribution of breastfeeding duration in weeks.

Early cessation occurred in 28.4% of the sample. Significant risk factors for early cessation included younger maternal age, obesity prior to pregnancy, lower maternal education, working full-time or intending to within the first year, history of depression, depression or anxiety during pregnancy, poor social support, and smoking during pregnancy (Table 2). Using multivariable logistic regression, four independent risk factors for early cessation were identified (Table 3).

RISK FACTORS FOR BREASTFEEDING CESSATION

Table 2. Associations between Potential Risk Factors and Breastfeeding Cessation prior to 6 Months Postpartum

Risk Factor	Breastfed ≥6 months n=534 (71.6%) n (%)	Breastfed <6 months n=212 (28.4%) n (%)	OR (95% CI)
Biologic Risk Factors			
Maternal age at delivery			
<25 years	38 (54.3)	32 (45.7)	2.32 (1.41 – 3.83)
≥25 years	496 (73.4)	180 (26.6)	Reference
Pre-pregnancy BMI*			
Underweight (<18.5)	23 (71.9)	9 (28.1)	1.22 (0.55 – 2.71)
Normal weight (18.5-24.9)	353 (75.7)	115 (24.3)	Reference
Overweight (25.0-29.9)	114 (67.9)	54 (32.1)	1.47 (1.00 – 2.18)
Obese (≥30.0)	48 (56.5)	37 (43.5)	2.39 (1.48 – 3.88)
Infant gestation			
Preterm (<37 weeks)	30 (62.5)	18 (37.5)	1.66 (0.90 – 3.06)
Term (≥37 weeks)	482 (73.5)	174 (26.5)	Reference
Infant birthweight			
<2500 grams (low birthweight)	18 (62.1)	11 (37.9)	1.67 (0.77 – 3.61)
≥2500 grams	495 (73.2)	181 (26.8)	Reference
Infant sex			
Female	283 (72.9)	105 (27.1)	1.15 (0.84 – 1.58)
Male	251 (70.1)	107 (29.9)	Reference
Socio-demographic Risk Factors			
Maternal education			
≤12 years of education	67 (53.6)	58 (46.4)	2.63 (1.77 – 3.90)
Some post secondary	467 (75.2)	154 (24.8)	Reference
Household income			
<\$40,000/year	78 (71.6)	31 (28.4)	1.04 (0.66 – 1.64)
≥\$40,000/year	435 (72.4)	166 (27.6)	Reference
Working full-time or intending to work full-time in first postpartum year			
Yes	89 (57.4)	66 (42.6)	2.26 (1.56 – 3.27)
No	445 (75.3)	146 (24.7)	Reference
Maternal country of birth			
Outside Canada	91 (69.5)	40 (30.5)	1.13 (0.75 – 1.71)
Canada	443 (72.0)	172 (28.0)	Reference
Marital status			
Single, separated, divorced	508 (71.7)	11 (29.7)	1.07 (0.52 – 2.20)
Married or common law	26 (70.3)	201 (28.4)	Reference
Psychosocial Risk Factors			
History of depression (self-report)			
Yes	104 (65.0)	56 (35.0)	1.48 (1.02 – 2.15)
No	429 (73.3)	156 (26.7)	Reference
Depression during pregnancy†			
Yes	48 (60.0)	32 (40.0)	1.80 (1.12 – 2.91)
No	486 (73.0)	180 (27.0)	Reference
Anxiety during pregnancy‡			
Yes	62 (62.6)	37 (37.4)	1.61 (1.03 – 2.51)
No	472 (73.0)	175 (27.1)	Reference
Social support§			
Lower social support	122 (63.9)	69 (36.1)	1.62 (1.14 – 2.31)
Higher social support	411 (74.2)	143 (25.8)	Reference
Self-esteem			
Lower self-esteem	113 (66.9)	56 (33.1)	1.34 (0.92 – 1.93)
Higher self-esteem	421 (73.0)	156 (27.0)	Reference
History of domestic abuse (self-report)			
Yes	168 (67.7)	80 (32.3)	1.32 (0.95 – 1.84)
No	366 (73.5)	132 (26.6)	Reference
Postpartum depression¶			
Yes	14 (77.8)	4 (22.2)	0.77 (0.25 – 2.37)
No	441 (72.9)	164 (27.1)	Reference
Lifestyle Risk Factors			
Drank any alcohol during pregnancy			
Drank alcohol	141 (75.4)	46 (24.6)	0.78 (0.53 – 1.14)
Did not drink alcohol	391 (70.5)	164 (29.6)	Reference
Any smoking during pregnancy			
Smoked	58 (52.7)	52 (47.3)	2.68 (1.77 – 4.06)
Did not smoke	463 (74.9)	155 (25.1)	Reference
Any drug use during pregnancy			
Used drugs	8 (66.7)	4 (33.3)	1.26 (0.38 – 4.24)
Did not use drugs	526 (71.7)	208 (28.3)	Reference

OR = unadjusted odds ratio, CI = confidence interval, *BMI=body mass index, † Symptom Questionnaire depression subscale, ‡Symptom Questionnaire anxiety subscale, §Social Support Index, ||Rosenberg Self Esteem, ¶Edinburgh Postnatal Depression Scale

Table 3. Multivariate Model of Risk Factors for Breastfeeding Cessation prior to 6 Months Postpartum

Risk Factor	OR*	95% CI
Working full-time or intending to within first postpartum year	2.26	(1.40 – 3.62)
≤12 years of education	2.18	(1.42 – 3.36)
Obese prior to pregnancy (BMI >30.0)	2.13	(1.29 – 3.53)
Anxiety during pregnancy	1.80	(1.03 – 3.12)

OR=adjusted odds ratio, CI=confidence interval, *BMI=body mass index

DISCUSSION

The proportions of women who initiated breastfeeding (95.6%) and continued to breastfeed for at least six months (71.6%) are higher than previously reported from national statistics⁹ and an Alberta study.^{35,36} Despite these higher rates among our sample, subgroups of women remained at an elevated risk of early cessation and can be identified in the prenatal and early postpartum period.

Working full-time or intending to work full-time within the first postpartum year was a strong risk factor for early cessation, even with a national 12-month maternity leave policy. This finding suggests that the maternity leave benefits of 55% of a woman's salary up to a maximum of \$435 per week and only to those who have worked 600 insurable hours in the year prior to birth may be inadequate for women living on lower incomes or with larger families. In addition, depending on the type of employment, not all women may be eligible for these benefits, such as those who are in casual or part-time positions. Other women may be choosing to return to work for the benefit of their careers. Given the strength of the association between early cessation and returning to work, future research is needed to better understand why Canadian women are returning to work and to develop effective strategies to best address this risk factor. These may include implementation of breastfeeding-friendly workplaces, on-site childcare, flexible work schedules or universal maternity leave benefits for all women, regardless of income or hours worked.

A history of depression as well as depression, anxiety and low social support during pregnancy were significant risk factors for early cessation. Depression and anxiety are chronic mental illnesses whose symptoms are often triggered by stressful life events such as childbirth and worsened by an unsupportive environment.³⁷ Women who experience anxiety and depression in the early postpartum period often experience more breastfeeding difficulties which may lead to earlier cessation.³⁸ Early identification of women at risk of poor well-being in the early postpartum paired with appropriate mental health interventions and ongoing breastfeeding support may assist these women to persevere through breastfeeding difficulties.

Women younger than 25 and those with less than 12 years of education were also more likely to cease breastfeeding prior to six months. These findings are consistent with study findings in other Canadian populations.³⁹⁻⁴¹ Younger mothers with lower levels of education may be less informed about the benefits of breastfeeding, and therefore resources and support programs should ensure outreach to this vulnerable population.

In accordance with previous studies, smoking during pregnancy and being obese prior to pregnancy increased women's risk of early cessation.^{39,41} Both smoking and obesity have reported biologic associations with early cessation. Smoking reduces the amount of the milk-stimulating hormone prolactin⁴² and there is some evi-

dence that nicotine excreted in breast milk increases crying among breastfed infants, leading some smoking mothers to prefer an alternative method of feeding.⁴³ A better understanding of breastfeeding perceptions among smoking mothers may facilitate the development of more effective breastfeeding promotion interventions in this population. Obesity is associated with delayed onset of lactation⁴⁴⁻⁴⁶ and a lower prolactin response⁴⁷ which may impact cessation decisions. Behavioural and psychological factors have also been found to impact overweight and obese women's breastfeeding decisions such as perceived insufficient milk supply, feeling uncomfortable with the idea of breastfeeding in public, and reluctance to seek support for breastfeeding.⁴⁸ Obese women may need additional breastfeeding assistance – particularly in the immediate postpartum period – to help them to overcome these breastfeeding challenges.

The multivariable analysis revealed that women most at risk of early cessation were those who returned to work within the first postpartum year, had no post-secondary education, were obese prior to pregnancy and had symptoms of anxiety disorder during pregnancy. This risk profile may be reflective of overall poorer health status, requiring holistic interventions which address a number of complex needs.

The distinction between exclusive breastfeeding and any breastfeeding was not made. As the WHO recommendation calls for exclusive breastfeeding until six months of age, future studies should describe rates of exclusive breastfeeding at six months and examine the risk factors for early cessation of exclusive breastfeeding. In addition, participants were asked to provide breastfeeding duration data when their child was three years old and therefore it would have been preferable to collect this data prospectively for accuracy.

The longitudinal design of this study resulted in some women being lost over time. Compared to mothers who were retained in the study, mothers who were eligible to participate but did not complete the study were more likely to be younger, to smoke and to have low self-esteem (all $p < 0.05$). Based on these characteristics, it is hypothesized that women who did not complete the follow-up study would be less likely to initiate and continue breastfeeding. Consequently, the breastfeeding rates reported in this study may overestimate the population rates.

CONCLUSIONS AND RECOMMENDATIONS

Early identification of women most at risk of early cessation of breastfeeding paired with implementation of effective breastfeeding promotion strategies may decrease early cessation of breastfeeding in Canada. Therefore, further research to better understand breastfeeding decisions among women with the risk factors identified will allow for future intervention and policy development to promote and support breastfeeding according to provincial and national goals.

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RÉSUMÉ

Objectifs : Décrire les taux d'initiation de l'allaitement maternel et d'allaitement pendant au moins six mois et cerner les facteurs de risque d'arrêt précoce de l'allaitement (avant six mois) dans un échantillon communautaire de mères vivant à Calgary (Alberta).

Méthode : Nous avons invité une cohorte de femmes (n=1 737) ayant pris part à une étude longitudinale sur le soutien prénatal et qui ont pu être contactées quand leur enfant a atteint l'âge de trois ans (n=1 147) à répondre à un questionnaire de suivi téléphonique. De ces 1 147 femmes, 780 (69 %) ont participé au suivi et fourni des données sur l'allaitement. Les facteurs de risque d'arrêt précoce de l'allaitement ont été cernés à l'aide d'analyses bivariées et multivariées.

Résultats : De ces 780 femmes, 95,6 % avaient allaité et 71,6 % avaient continué pendant au moins six mois. Les facteurs de risque d'arrêt précoce étaient la jeunesse de la mère, l'obésité antérieure à la grossesse, un faible niveau d'instruction maternel, le fait de travailler à plein temps ou d'avoir l'intention de le faire avant un an, des antécédents de dépression, la dépression ou l'anxiété durant la grossesse, un manque de soutien social et le tabagisme durant la grossesse (p<0,05 dans tous les cas). L'analyse multivariée a montré que le fait de travailler à plein temps ou d'avoir l'intention de le faire avant un an, un faible niveau d'instruction maternel, l'obésité avant la grossesse et l'anxiété durant la grossesse étaient les facteurs qui augmentaient le plus le risque d'arrêt précoce de l'allaitement (p<0,05 dans tous les cas).

Conclusion : Presque toutes les mères avaient allaité et 70 % avaient continué à le faire pendant six mois, mais certains sous-groupes présentaient un risque élevé d'arrêt précoce. Il faudrait pousser la recherche pour mieux comprendre les décisions liées à l'allaitement chez les femmes qui présentent les facteurs de risque cernés, afin de faciliter l'élaboration de stratégies de promotion de l'allaitement plus efficaces.

Mots clés : allaitement maternel; arrêt précoce; facteurs de risque; épidémiologie



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