

Factors influencing the reasons why mothers stop breastfeeding

Catherine R.L. Brown, MSc,¹ Linda Dodds, PhD,^{1,2} Alexandra Legge, MD,³ Janet Bryanton, RN, PhD,⁴ Sonia Semenic, RN, PhD⁵

ABSTRACT

OBJECTIVES: To explore the reasons why women stop breastfeeding completely before their infants are six months of age and to identify the factors associated with cessation and the timing of cessation.

METHODS: For all singleton live newborns born between January 1, 2008 and December 31, 2009 in two district health authorities in Nova Scotia, Canada, mother's self-reported breastfeeding status was collected at hospital discharge and at five follow-up visits until infants were six months of age. Mothers who stopped breastfeeding before six months were also questioned about the time of weaning and the reason they discontinued all breastfeeding. Eleven categories were created from the open-ended responses women provided. These data were linked with the Nova Scotia Atlee Perinatal Database in order to obtain information on maternal and neonatal characteristics. The relationship between maternal, obstetrical, and neonatal characteristics and each reason for stopping breastfeeding completely were examined.

RESULTS: Of the 500 mothers who stopped breastfeeding completely before six months and provided a reason for discontinuing, the majority (73.6%) stopped within the first six weeks. The most common reasons cited were inconvenience or fatigue associated with breastfeeding (22.6%) and concerns about milk supply (21.6%). Return to work or school was associated with length of time that infants were breastfed: 20% of women who stopped after six weeks citing this as the reason. Most of the reasons, however, were not found to be associated with a specific duration of breastfeeding or with the examined maternal and infant characteristics.

CONCLUSION: This study highlights factors associated with the reasons why women stop breastfeeding completely before six months and how these reasons varied with weaning age. The results will help inform future research aimed at identifying interventions to reduce early breastfeeding cessation.

KEY WORDS: Breastfeeding; infant; weaning; lactation

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

Can J Public Health 2014;105(3):e179-e185.

Breast milk is the best food source for optimal infant growth and development.^{1,2} Despite compelling evidence that exclusive breastfeeding provides long-term health benefits to both infant and mother, less than one-quarter of Canadian mothers meet the World Health Organization and the Canadian Infant Feeding Joint Working Group's recommendation that infants should exclusively breastfeed for the first six months of life.³⁻⁵ Breastfeeding is a complex health behaviour influenced by interactions among biological, psychosocial, demographic and social factors. Given the gap between exclusive breastfeeding practices and recommendations, understanding not only why a mother chooses to initiate breastfeeding, but also why she may choose to discontinue any breastfeeding before the recommended six months is important for health care providers and policy-makers to better support mothers and their newborns.

The 2009-2010 Canadian Community Health Survey reports that the top three reasons why Canadian mothers stop breastfeeding are insufficient milk supply (26.1%), infant being ready for solid food (18.9%) and infant having self-weaned (13.1%).⁶ In the same survey, about 9% of mothers also indicated that they stopped breastfeeding to return to school or work.⁶ Evidence suggests that the reason why a mother stops breastfeeding varies with the age of the child at breastfeeding cessation.^{7,8} Williams et al. found that the primary reason mothers chose to wean before three months was concern for the baby's nutrition, whereas the primary reason they gave for weaning after six months was a decision to return to work.⁹

Similarly, Li et al. reported that mothers' concerns about lactation and nutrition issues were the most cited reasons for stopping breastfeeding during the first two months of life, whereas self-weaning reasons became most important after three months.¹⁰

While there is a growing literature regarding the reasons why mothers cease breastfeeding earlier than recommended, there is a paucity of information about how those reasons are influenced by factors such as mother's education and income levels, her parity, lifestyle characteristics such as smoking, as well as obstetrical and neonatal factors. This hypothesis-generating study used a sample of Canadian mothers to identify reasons why women ceased breastfeeding completely before six months. Specifically, we highlight the influence of demographic, behavioural, and clinical characteristics on reasons for discontinuing all breastfeeding before six months.

Author Affiliations

1. Department of Community Health & Epidemiology, Dalhousie University, Halifax, NS
2. Departments of Obstetrics & Gynecology and Pediatrics, Dalhousie University, Halifax, NS
3. Faculty of Medicine, Dalhousie University, Halifax, NS
4. School of Nursing, University of Prince Edward Island, Charlottetown, PE
5. School of Nursing, McGill University, Montreal, QC

Correspondence: Dr. Linda Dodds, Perinatal Epidemiological Research Unit, IWK Health Centre, Room G7108, 5980 University Ave, PO Box 9700, Halifax, NS B3K 5R8, Tel: 902-470-7191, E-mail: l.dodds@dal.ca

Acknowledgements: We thank the Reproductive Care Program of Nova Scotia as well as Public Health Services in Cape Breton District Health Authority and Guysborough Antigonish Straights Health Authority for access to the data, and Dr. Colleen O'Connell for technical support.

Conflict of Interest: None to declare.

Table 1. Duration of any breastfeeding according to maternal and infant characteristics

	<1 week % (95% CI)	1-6 weeks % (95% CI)	>6 weeks % (95% CI)	p value
Overall (N=500*)	25.4 (21.6-29.5)	48.2 (43.7-52.7)	26.4 (22.6-30.5)	–
Maternal age (years)				0.002
<25 (n=161)	22.4 (16.2-29.6)	59.6 (51.6-67.3)	18.0 (12.4-24.8)	
25-29 (n=150)	26.0 (19.2-33.8)	39.3 (31.5-47.6)	34.7 (27.1-42.9)	
30-34 (n=128)	24.2 (17.1-32.6)	44.5 (35.7-53.6)	31.3 (23.4-40.0)	
35+ (n=61)	34.4 (22.7-47.7)	47.5 (34.6-60.7)	18.0 (9.4-30.0)	
Parity				0.508
Nulliparous (n=266)	23.7 (18.7-29.3)	48.1 (42.0-54.3)	28.2 (22.9-34.0)	
Multiparous (n=234)	27.4 (21.7-33.5)	48.3 (41.7-54.9)	24.4 (19.0-30.4)	
Pre-pregnancy BMI				0.482
Normal (n=217)	23.5 (18.0-29.7)	50.7 (43.8-57.5)	25.8 (20.1-32.2)	
Overweight (n=118)	20.3 (13.5-28.7)	53.4 (44.0-62.6)	26.3 (18.6-35.2)	
Obese (n=98)	30.6 (21.7-40.7)	43.9 (33.9-54.3)	25.5 (17.2-35.3)	
Smoking status				0.592
No (n=366)	24.6 (20.3-29.3)	48.1 (42.9-53.3)	27.3 (22.8-32.2)	
Yes (n=125)	28.8 (21.1-37.6)	47.2 (38.2-56.3)	24.0 (16.8-32.5)	
Marital status				0.201
Married (n=256)	25.0 (19.8-30.8)	44.5 (38.3-50.8)	30.5 (24.9-36.5)	
Single (n=153)	24.8 (18.2-32.5)	52.3 (44.1-60.4)	22.9 (16.5-30.4)	
Mode of delivery				0.395
Vaginal delivery (n=348)	25.0 (20.5-29.9)	46.8 (41.5-52.2)	28.2 (23.5-33.2)	
C-section (n=152)	26.3 (19.5-34.1)	51.3 (43.1-59.5)	22.4 (16.0-29.8)	
Preterm birth (<37 wks)				0.268
No (n=453)	25.8 (21.9-30.1)	48.3 (43.7-53.1)	25.8 (21.3-30.1)	
Yes (n=44)	15.9 (6.6-30.1)	50.0 (34.6-65.4)	34.1 (20.5-49.9)	
Infant sex				0.167
Female (n=254)	23.2 (18.2-28.9)	46.9 (40.6-53.2)	29.9 (24.4-36.0)	
Male (n=246)	27.6 (22.2-33.7)	49.6 (43.2-56.0)	22.8 (17.7-28.5)	
Residency				0.850
Urban (n=383)	25.3 (21.0-30.0)	48.8 (43.7-54.0)	25.8 (21.5-30.5)	
Rural (n=117)	25.6 (18.0-34.5)	46.2 (36.9-55.6)	28.2 (20.3-37.3)	
Neighbourhood income				0.374
Low (n=186)	28.0 (21.6-35.0)	48.9 (41.5-56.3)	23.1 (17.3-29.8)	
High (n=308)	24.4 (19.7-29.5)	47.1 (41.4-52.8)	28.6 (23.6-34.0)	
Maternal education level†				0.325
Low (n=204)	26.0 (20.1-32.6)	50.0 (42.9-57.1)	24.0 (18.3-30.5)	
High (n=246)	22.1 (17.0-27.9)	47.9 (41.4-54.4)	30.0 (24.3-36.2)	
Intention to breastfeed				0.094
No (n=30)	40.0 (22.7-59.4)	43.3 (25.5-62.6)	16.7 (5.6-34.7)	
Yes (n=435)	23.2 (19.3-27.5)	49.0 (44.2-53.8)	27.8 (23.7-32.3)	
SCN admission				0.035
No (n=420)	23.3 (19.4-27.7)	48.8 (43.9-53.7)	27.9 (23.6-32.4)	
Yes (n=80)	36.3 (25.8-47.8)	45.0 (33.8-56.5)	18.8 (10.9-29.0)	
Low birth weight (<2500 grams)				0.778
No (n=457)	24.9 (21.0-29.2)	48.8 (44.1-53.5)	26.3 (22.3-30.5)	
Yes (n=40)	30.0 (16.6-46.5)	45.0 (29.3-61.5)	25.0 (12.7-41.2)	

* Not all total 500 because of missing values for some variables.

† The NSAPD only began collecting data on maternal education level on April 1, 2008, therefore this information is missing for all mothers between January 1, 2008 and March 31, 2008.

CI=confidence interval; BMI=body mass index; SCN=special care nursery.

METHODS

This longitudinal cohort study used data obtained through a record linkage between the Nova Scotia Atlee Perinatal Database (NSAPD) and the Healthy Beginnings public health database. The NSAPD collects information from all hospitals and all registered midwives in Nova Scotia. Data are captured electronically through the information coded for the Canadian Institute for Health Information (CIHI) as well as abstraction of variables coded specifically for the NSAPD (i.e., variables that are not captured for CIHI). Therefore, because the Database uses CIHI information, we are assured that all hospital births are captured, as are all births attended by a regulated maternity care provider, regardless of the location.

The province-wide Healthy Beginnings public health database was designed to enable Nova Scotia Public Health Services to identify families facing challenges and to offer these families home visiting. At the time of this study, seven out of nine Nova Scotia district health authorities did not include population-based information on breastfeeding patterns; however, public health nurses in two district health authorities, Cape Breton

District Health Authority (CBDHA) and Guysborough Antigonish Straight Health Authority (GASHA), collected additional information on the breastfeeding patterns of all mothers in these two district health authorities as part of the Healthy Beginnings database. Public health nurses collected the breastfeeding data through telephone or face-to-face interviews. The information included mothers' self-reported breastfeeding status collected at the time of hospital discharge and at one week, six weeks, two months, four months, and six months after discharge. Information on breastfeeding duration and reasons for cessation were extracted from the Healthy Beginnings database and linked with the NSAPD in order to obtain information on client-specific maternal socio-demographic, prenatal, labour, delivery and neonatal factors.

The study included mothers of all live singleton newborns in Nova Scotia who resided in CBDHA or GASHA between January 1, 2008 and December 31, 2009. Mothers who did not initiate breastfeeding or who continued to breastfeed, either exclusively or with supplementation, beyond the first six months of life were excluded. Also excluded were mothers who did not

Table 2. Reasons for stopping breastfeeding completely according to length of time that infants were breastfed

Reason*	Total (N=500) % (95% CI)	<1 wk (N=127) % (95% CI)	1-6 wk (N=241) % (95% CI)	>6 wk (N=132) % (95% CI)	p value†
Inconvenience/fatigue due to breastfeeding	22.6 (19.0-26.5)	22.8 (15.9-31.1)	24.5 (19.2-30.4)	18.9 (12.6-26.7)	0.472
Supply – not enough breast milk	21.6 (18.1-25.5)	19.7 (13.2-27.7)	23.2 (18.1-29.1)	20.5 (13.9-28.3)	0.684
Personal decision	14.8 (11.8-18.2)	19.7 (13.2-27.7)	8.3 (5.1-12.5)	22.0 (15.2-30.0)	<0.001
Returned to work/school	12.6 (9.8-15.8)	7.9 (3.8-14.0)	11.2 (7.5-15.9)	19.7 (13.3-27.5)	0.011
Medical condition in baby or mother	10.4 (7.9-13.4)	9.4 (5.0-15.9)	13.3 (9.3-18.2)	6.1 (2.7-11.6)	0.085
Difficulty with breastfeeding technique	8.8 (6.5-11.6)	7.9 (3.8-14.0)	12.9 (8.9-17.8)	–	0.002
Lack of support	7.6 (5.4-10.3)	7.9 (3.8-14.0)	9.1 (5.8-13.5)	4.5 (1.7-9.6)	0.277
Planned to stop breastfeeding at this time	7.2 (5.1-9.8)	7.9 (3.8-14.0)	6.2 (3.5-10.1)	8.3 (4.2-14.4)	0.711
Ready for solids/mother preference	7.0 (4.9-9.6)	8.7 (4.4-15.0)	5.8 (3.2-9.6)	7.6 (3.7-13.5)	0.568
Other	2.0 (1.0-3.6)	–	2.1 (0.7-4.8)	–	0.882
Child weaned him/herself	1.8 (0.8-3.4)	–	2.1 (0.7-4.8)	–	0.905

* Women could give more than one reason for breastfeeding cessation.

† Pearson chi square.

– Numbers suppressed because cell size <5.

state a reason for breastfeeding cessation or were lost to follow-up before six months.

When a mother stopped all breastfeeding before her child was six months old, she could indicate one of four forced-choice reasons: lack of support at home, lack of support in hospital, return to work, and other. Mothers were also able to provide a more detailed open-ended response for each reason. Public health nurses either paraphrased the mother's reason for stopping breastfeeding or quoted it directly. Eleven categories were created from the responses mothers provided: 1) "Supply" included any reference related to decreased milk supply (real or perceived), insufficient infant weight gain, or baby not satisfied with breastfeeding. 2) "Baby was ready for or preferred formula or solid foods" included any reference to preference for bottle or formula feeding. 3) "Inconvenience/fatigue due to breastfeeding" was related to breastfeeding being tiring or demanding for the mother as well as lack of time to breastfeed while caring for other children. 4) "Difficulty with breastfeeding" included poor latch, sore nipples, engorged breasts or mastitis. 5) "Medical condition in either baby or mother" included references to medical conditions not related to breastfeeding (e.g., Caesarean incision infection or congenital heart disease) as well as the advice of a doctor or health care professional. 6) "Planned to stop BF at this time" included references to mother feeling ready or deciding to stop. 7) "Child weaned him/herself" was related to baby biting or refusing mother's breast. 8) "Returned to work/school" included mother returning to work or school or planning to do so. 9) "Personal decision" referred to parent's decision with no further explanation. 10) "Lack of support in hospital or at home" included lack of support in these locations, as well as the mother's partner working away from home. 11) Finally, "other" included all other reasons not captured within the previous categories, such as baby in foster care or mother uncomfortable breastfeeding in public. More than one reason could be coded for mothers who reported several reasons for stopping.

Breastfeeding duration was the time, measured in weeks/months, between the infant's birth and when the infant stopped breastfeeding. Breastfeeding duration was categorized into breastfeeding duration of less than one week, one week to six weeks inclusive, and greater than six weeks. Maternal and newborn characteristics were all derived from the NSAPD and defined and categorized as follows. Mother's location of residence was dichotomized using Canada Post's forward sortation areas into urban (for forward sortation areas 1-9) and rural (for forward sortation area

0). Mother's postal code linked to Canadian census data was used as an approximation for income level, as has been done in previous studies.^{11,12} As it has been suggested that this method provides a valid approximation of individual-level household income when large categories of neighbourhood income are used, we grouped mothers in the lowest and lower-middle income quintiles as low income.¹³ Mother's highest level of education was dichotomized into low education level (no post-secondary education) and post-secondary education (inclusive of college and university). Maternal age was categorized as less than 25 years, 25-29 years, 30-34 years, and 35 years or older. Marital status was dichotomized into mothers with a partner (women who were married or in a common-law relationship) and single motherhood (women who were single, divorced, widowed, or separated). Mother's self-reported pre-pregnancy body mass index (BMI) was categorized as normal (<25 kg/m²), overweight (25-29.99 kg/m²), or obese (BMI >30 kg/m²). Mothers who reported smoking at least one cigarette at a prenatal visit or at hospital admission for labour/birth were considered smokers. Mode of birth was dichotomized into vaginal birth or Caesarean birth. Preterm birth was defined as delivery at less than 37 weeks' gestational age. Low birth weight was defined as a birth weight of less than 2500 grams. Mother's intention to breastfeed was collected during a prenatal visit. If the mother reported diabetes, hypertension, or hyperemesis gravidarum during her pregnancy, she was considered to have a health condition during pregnancy.

The reasons mothers stopped breastfeeding completely were analyzed using descriptive statistics and are reported as percentages with 95% confidence intervals. A chi-square test was used to compare reasons for breastfeeding cessation according to breastfeeding duration and to compare demographic and clinical characteristics according to breastfeeding duration. For each reason noted for breastfeeding cessation, logistic regression models were used to estimate unadjusted odds ratios (OR) and 95% confidence intervals (CI) for each covariate category. For instance, when analyzing the covariates associated with "insufficient supply", analyses were conducted with "insufficient supply", yes or no, as the dependent variable. All analyses were conducted using SPSS 17.0.

This study received data access approval from the Joint Data Access Committee of the Reproductive Care Program as well as the research ethic boards for the IWK Health Centre, McGill University, University of PEI, CBDHA, and GASHA. As per agreement with the Research Ethics Board, all cell sizes of under five were suppressed.

Table 3. Socio-demographic and pregnancy factors and their associations with reasons for stopping breastfeeding completely*

Characteristic	Lack of support OR (95% CI)	Personal reasons OR (95% CI)	Planned to stop OR (95% CI)	Return to work OR (95% CI)	Insufficient Supply OR (95% CI)	Difficulty OR (95% CI)	Medical reasons OR (95% CI)	Inconvenience OR (95% CI)	Solids introduced OR (95% CI)
Maternal age (years)									
<25	1.1 (0.5-2.7)	1.0 (0.6-1.9)	0.7 (0.3-1.9)	1.1 (0.6-2.0)	2.3 (1.3-4.0)	0.9 (0.4-2.2)	0.5 (0.2-1.2)	0.9 (0.5-1.5)	1.3 (0.5-3.1)
25-29	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
30-34	0.9 (0.4-2.4)	0.9 (0.5-1.8)	1.1 (0.4-2.6)	0.6 (0.3-1.2)	1.3 (0.7-2.5)	1.6 (0.7-3.6)	1.5 (0.7-3.0)	1.0 (0.6-1.8)	1.2 (0.5-3.1)
35+	2.1 (0.8-5.6)	0.5 (0.2-1.3)	1.4 (0.5-3.9)	0.8 (0.3-2.0)	1.5 (0.7-3.2)	1.9 (0.7-5.0)	1.3 (0.5-3.1)	0.7 (0.3-1.5)	1.4 (0.5-4.4)
Parity									
Nulliparous	0.7 (0.4-1.3)	0.9 (0.5-1.4)	0.7 (0.3-1.4)	1.3 (0.8-2.2)	1.7 (1.1-2.6)	0.9 (0.5-1.6)	0.7 (0.4-1.3)	0.7 (0.5-1.1)	1.3 (0.7-2.7)
Multiparous	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Maternal BMI									
Normal	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Overweight	1.5 (0.7-3.4)	0.6 (0.3-1.1)	2.6 (1.1-6.0)	1.7 (0.9-3.1)	0.9 (0.5-1.5)	0.6 (0.3-1.5)	0.9 (0.4-2.2)	0.9 (0.5-1.5)	0.6 (0.2-1.7)
Obese	1.5 (0.6-3.5)	0.7 (0.4-1.4)	1.6 (0.6-4.3)	0.6 (0.2-1.3)	0.7 (0.4-1.2)	1.0 (0.5-2.2)	3.2 (1.6-6.5)	1.0 (0.6-1.8)	1.2 (0.5-2.9)
Smoking									
No	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Yes	1.1 (0.5-2.2)	1.0 (0.6-1.8)	1.0 (0.4-2.1)	1.0 (0.5-1.8)	0.9 (0.6-1.5)	0.5 (0.2-1.3)	1.5 (0.8-2.9)	1.0 (0.6-1.6)	0.9 (0.4-2.0)
Marital status									
Married/partner	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Single	1.9 (0.9-3.8)	1.2 (0.7-2.2)	0.9 (0.4-2.1)	1.0 (0.5-1.8)	1.2 (0.8-2.0)	1.3 (0.6-2.6)	0.5 (0.2-1.0)	0.8 (0.5-1.3)	0.5 (0.2-1.2)
Mode of delivery									
Vaginal delivery	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
C-section	1.4 (0.7-2.7)	1.1 (0.6-1.8)	1.5 (0.7-3.0)	0.7 (0.4-1.3)	1.3 (0.8-2.0)	1.1 (0.6-2.1)	1.8 (1.0-3.2)	0.7 (0.5-1.2)	0.9 (0.4-1.9)
Gestational age									
Full-term	†	Referent	Referent	Referent	Referent	†	Referent	Referent	†
Pre-term	†	0.7 (0.3-1.9)	†	0.9 (0.3-2.3)	1.4 (0.7-2.8)	†	1.4 (0.6-3.6)	1.5 (0.7-2.9)	†
Education									
Low (1-2)	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
High (3-4)	1.2 (0.6-2.6)	0.9 (0.5-1.5)	0.9 (0.4-1.9)	1.2 (0.7-2.2)	0.9 (0.5-1.3)	1.5 (0.8-2.9)	0.5 (0.3-1.0)	0.7 (0.5-1.1)	1.0 (0.5-2.2)
Intent to BF									
No	†	Referent	†	Referent	Referent	†	†	Referent	†
Yes	†	0.5 (0.2-1.3)	†	0.7 (0.3-1.9)	0.9 (0.4-2.2)	†	†	0.7 (0.3-1.5)	†
SCN admission									
No	†	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Yes	†	0.9 (0.5-1.8)	0.8 (0.3-2.2)	1.0 (0.5-2.0)	1.2 (0.7-2.0)	†	1.7 (0.8-3.4)	1.3 (0.7-2.2)	1.3 (0.6-3.2)
Low birth weight									
No	†	Referent	†	Referent	Referent	†	Referent	Referent	†
Yes	†	0.8 (0.3-2.2)	†	1.2 (0.5-3.1)	1.2 (0.6-2.6)	†	2.3 (1.0-5.4)	1.5 (0.8-3.1)	†
Infant sex									
Female	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Male	1.5 (0.7-2.9)	1.3 (0.8-2.1)	1.2 (0.6-2.3)	0.6 (0.4-1.1)	0.8 (0.5-1.2)	0.8 (0.4-1.4)	1.3 (0.8-2.4)	1.1 (0.7-1.7)	0.9 (0.4-1.7)
Residency									
Urban	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Rural	1.6 (0.8-3.2)	0.4 (0.2-0.8)	0.6 (0.3-1.6)	1.2 (0.7-2.3)	0.98 (0.6-1.6)	1.8 (0.9-3.5)	1.0 (0.5-1.9)	1.0 (0.6-1.7)	1.3 (0.6-2.9)
Neighbourhood income									
Low (1,2)	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
High (3-5)	1.1 (0.6-2.3)	0.6 (0.4-1.1)	0.7 (0.4-1.5)	1.7 (0.9-3.1)	1.7 (1.1-2.7)	0.9 (0.5-1.6)	0.9 (0.5-1.6)	0.9 (0.6-1.3)	0.9 (0.4-1.8)
Maternal health condition in pregnancy									
No	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent	Referent
Yes	0.8 (0.2-3.3)	0.8 (0.3-2.3)	0.8 (0.2-3.6)	0.7 (0.2-2.3)	1.0 (0.4-2.3)	1.1 (0.3-3.6)	2.6 (1.1-6.3)	0.3 (0.1-1.1)	2.0 (0.7-6.0)

* Two categories (Child weaned him/herself and Other) not included because of too few subjects.
 † Not analyzed because cell size <5.
 OR=odds ratio; CI=confidence interval; BMI=body mass index; BF=breastfeed.

Table 4. Comparison of factors between women with a reason for stopping breastfeeding completely and women with no reason, Public Health Database

	No reason N (%)	Reason given N (%)	p value
Overall (N=1,202*)	n=702	n=500	
Maternal age (years)			
<25	186 (26.5)	161 (32.2)	0.021
25-29	190 (27.1)	150 (30.0)	
30-34	211 (30.0)	128 (25.6)	
35+	115 (16.4)	61 (12.2)	
Parity			
Nulliparous	303 (43.2)	266 (53.2)	0.0006
Multiparous	399 (56.8)	234 (46.8)	
Pre-pregnancy BMI			
Normal	240 (50.5)	217 (50.1)	0.585
Overweight	117 (24.6)	118 (27.3)	
Obese	118 (24.9)	98 (22.6)	
Smoking status			
No	543 (78.6)	366 (74.5)	0.104
Yes	148 (21.4)	125 (25.5)	
Marital status			
Married	387 (71.7)	256 (62.6)	0.003
Single	153 (28.3)	153 (37.4)	
Mode of delivery			
Vaginal delivery	491 (69.9)	348 (69.6)	0.898
C-section	211 (30.1)	152 (30.4)	
Preterm birth (<37 wks)			
No	656 (94.4)	453 (91.1)	0.03
Yes	39 (5.6)	44 (8.9)	
Infant sex			
Female	351 (50.0)	254 (50.8)	0.785
Male	351 (50.0)	246 (49.2)	
Residency			
Urban	577 (82.2)	383 (76.6)	0.017
Rural	125 (17.8)	117 (23.4)	
Neighbourhood income			
Low	230 (33.5)	186 (37.6)	0.144
High	456 (66.5)	308 (62.4)	
Maternal education level			
Low	189 (32.5)	204 (45.9)	<0.0001
High	392 (67.5)	240 (54.1)	
Intention to breastfeed			
No	31 (4.8)	30 (6.5)	0.226
Yes	618 (95.2)	435 (93.5)	
SCN admission			
No	594 (84.6)	420 (84.0)	0.772
Yes	108 (15.4)	80 (16.0)	
Low birth weight (<2500 grams)			
No	674 (96.1)	457 (91.9)	0.002
Yes	27 (3.9)	40 (8.1)	

* Includes women who initiated breastfeeding and were breastfeeding at the time of discharge from hospital, but did not continue breastfeeding to six months.

BMI=body mass index; SCN=special care nursery.

RESULTS

Of all women residing in CBDHA or GASHA who gave birth to a live singleton infant between January 1, 2008 and December 31, 2009, there were 1,500 women who initiated breastfeeding and were breastfeeding at discharge from hospital, and 1,207 women who stopped breastfeeding completely before their infant reached six months of age. Among those who were known to have weaned by six months, 500 mothers provided a reason for their cessation of breastfeeding and were included in this study. Of these 500 women, 127 (25.4%) women stopped breastfeeding within the first week postpartum, 241 (48.2%) women breastfed their infant for one to six weeks, and 132 (26.4%) breastfed their infant for at least six weeks (Table 1).

Table 1 shows the duration of breastfeeding according to a number of demographic, behavioural, and clinical characteristics. Only a few of the maternal and infant characteristics included in the analysis were associated with breastfeeding duration. The mothers of infants who required admission to a special care

nursery were more likely to discontinue breastfeeding within the infant's first week of life (36.3%) when compared with mothers of infants who did not require such an admission (23.3%). Women 35 years of age or older were more likely to stop breastfeeding within their infant's first week of life (34.4%) than women who were 30-34 years of age (24.2%).

As shown in Table 2, the most frequent reasons cited for early cessation of breastfeeding were "inconvenience/fatigue due to breastfeeding" (22.6%) and "insufficient supply" (21.6%). Most reasons cited by women were not found to be associated with a specific duration of breastfeeding (Table 2). However, women were more likely to cite "difficulty with breastfeeding technique" as a reason for cessation if they stopped breastfeeding within the first week postpartum (7.9%) or within one to six weeks (12.9%) than if they breastfed their infant for six weeks or more before stopping. More women were likely to cite "return to work/school" as a reason for breastfeeding cessation if their infant was six weeks of age or greater.

Table 3 shows the relationship between various maternal or infant characteristics and the odds of providing specific reasons as important in the decision to stop breastfeeding. The majority of cited reasons were not found to be significantly associated with any of the characteristics evaluated. We found, however, that young mothers (<25 years) were more likely to cite "insufficient supply" as a reason for cessation of breastfeeding when compared with mothers in the 25-29 year age group (OR 2.3, 95% CI: 1.3-4.0). Additionally, primiparous mothers were more likely than multiparous mothers to cite "insufficient supply" as an important reason for their decision to stop breastfeeding (OR 1.7, 95% CI: 1.1-2.6). Women residing in high-income neighbourhoods were also more likely to cite supply concerns as a reason for breastfeeding cessation (OR 1.7, 95% CI: 1.1-2.7).

According to Table 3, "medical reasons" was more likely to be cited as a reason for breastfeeding cessation among obese women (OR 3.2, 95% CI: 1.6-6.5) and among women who reported a known health condition during their pregnancy (OR 2.6, 95% CI: 1.1-6.3). Women with postsecondary education were less likely than those without to cite medical reasons for discontinuing breastfeeding (OR 0.5, 95% CI: 0.3-1.0). Additionally, single women were less likely than married women to cite medical reasons for breastfeeding cessation (OR 0.5, 95% CI: 0.2-1.0).

A comparison of socio-demographic factors and infant factors for the 500 women who provided a reason for breastfeeding cessation and those who did not provide a reason is shown in Table 4. Women with a reason for cessation tended to be younger, nulliparous, and unmarried and to have a lower education than women who did not have a reason for stopping breastfeeding recorded in the database. As well, the infants of women who had a reason recorded were more likely to be preterm or low birth weight.

DISCUSSION

Our data and those of others have suggested that the first six weeks postpartum are when women are at greatest risk of early breastfeeding cessation.¹⁴⁻¹⁸ Prenatal and postpartum interventions designed to prolong breastfeeding duration may be particularly beneficial if they target this particularly vulnerable post-delivery period. We attempted to identify maternal socio-

demographic and pregnancy factors associated with women who stop breastfeeding early. Surprisingly few factors were significantly related to the timing of breastfeeding cessation. Women whose infants required admission to a special care nursery, however, had higher rates of breastfeeding cessation in the first week after birth, which is consistent with findings from a recent national survey of Canadian women.¹⁹ These findings suggest that additional support may be necessary to specifically target this subset of women whose infants require special medical care.

Among mothers who stopped breastfeeding during the first six months of their infant's life, concerns about milk supply were frequently cited as an important reason for their decision to stop breastfeeding, regardless of breastfeeding duration. Supply concerns have been consistently reported as a key contributor to early breastfeeding cessation in several previous studies.^{7,8,10,17,20} However, studies examining milk intake and infant weight gain in exclusively breastfed infants have demonstrated that less than 5% of mothers are actually unable to produce adequate milk to meet their infant's nutritional needs in the first four months of life.^{18,20-23} Young mothers (<25 years) and primiparous mothers were more likely to cite "not enough breast milk" as a reason for cessation, suggesting that perceptions of low milk supply may be linked to a lack of knowledge about breastfeeding or lack of previous breastfeeding experience. A recent Cochrane review of support for breastfeeding mothers with healthy term babies found that support from both professionals and lay supporters increased the duration; however, support offered reactively, which was initiated only after women sought out contact instead of on an ongoing, scheduled basis, was not effective.²⁴ They concluded that face-to-face support at scheduled visits was optimal.

As reported elsewhere,⁷⁻¹⁰ we found that the reasons provided by mothers for their decision to stop breastfeeding varied according to the age of the infants when they were weaned. Women were more likely to stop breastfeeding because of difficulties with breastfeeding technique within the first six weeks postpartum. Again, this emphasizes the importance of early breastfeeding interventions. In an Australian study, 85%-100% of first time mothers indicated that they required lactation support at two weeks after delivery.²⁵ Access to lactation consultants and other types of breastfeeding support early in the postpartum period may help prevent early breastfeeding cessation among women experiencing technical difficulties with lactation, although more research is needed. While technical difficulties were more likely to occur early in the breastfeeding experience, women were more likely to cite their return to work or school as a reason for breastfeeding cessation in the period beyond six weeks. Programs such as flexible working schedules for breastfeeding mothers and easy access to a private lactation room have been shown to prolong breastfeeding duration among mothers returning to school or work.²⁶

A Canadian study concluded that in-hospital supplementation interfered with maternal milk production and infant suckling behaviours, and it was associated with perceived breastfeeding problems as well as lower breastfeeding self-efficacy at both baseline and six weeks.²⁷ Although the literature generally indicates that supplementation is negatively associated with

breastfeeding duration,²⁷⁻²⁹ it is unclear whether breastfeeding problems occur first, leading to supplementation, or whether supplementation occurs first, leading to breastfeeding problems. Unfortunately, we did not have access to data on some key variables that are known to influence breastfeeding duration, such as in-hospital formula supplementation.

The strengths of this study include the minimization of recall bias, as women were queried about their reasons for stopping breastfeeding shortly after their cessation. Access to a large number of maternal and infant variables in the NSAPD allowed for the comparison of breastfeeding duration and reasons for breastfeeding cessation across various demographic and clinical subgroups.

One limitation is that the Healthy Beginnings database was designed as a clinical public health database to help public health nurses enhance their perinatal programs and service through the Nova Scotia Enhanced Home Visiting Initiative.³⁰ Breastfeeding was one of many focuses of these visits, so women were not required to give reasons for breastfeeding cessation. As a result, we had information on the reasons for stopping for only 42% of the cohort. This underlines the limitation of using existing databases for research purposes, and in doing so increases the risk of selection bias in our study. In comparing demographic information for women with and without a reason for stopping breastfeeding, we found that women who did not have a reason associated with cessation were more likely to be married, more highly educated, multiparous, and older. This may reflect the public health nurses' effort to provide more intense follow-up (and, therefore, obtain more information) for those with a less favourable socio-demographic profile. Therefore, our findings may not be representative of the breastfeeding experience of all women who stopped breastfeeding before their infant was six months of age. Second, the study was limited by the use of the forced-choice reasons programmed into the public health database, and these do not align with previous studies that examined reasons why mothers ceased to exclusively breastfeed before six months, such as the 2009-2010 Canadian Community Health Survey.⁶ Also, the categorization of open-ended responses inevitably involved some degree of subjectivity in the interpretation of the reasons provided by women. Last, we conducted a number of analyses, and some of the statistically significant findings may be due to a type 1 error. We chose not to adjust for multiple comparisons because this was a hypothesis-generating exercise, and we did not want to miss potential associations.

CONCLUSIONS AND RECOMMENDATIONS

Despite current World Health Organization recommendations,¹ the majority of Canadian mothers do not exclusively breastfeed their infants for the first six months of life.^{6,19} Since this study found that over two-thirds of women stopped breastfeeding by six weeks and this finding has been noted in other studies,^{14-18,31} early postpartum interventions are likely to be an important factor in improving early breastfeeding cessation. Our study highlights the most frequently cited reasons for breastfeeding cessation, how these reasons change with infant weaning age, as well as how they vary across different maternal socio-demographic groups and with maternal and newborn medical

conditions. As this study is hypothesis-generating, further research is needed to test interventions that will help to reduce breastfeeding cessation for the commonly cited reasons. Our findings, however, may be helpful in informing health care providers and peer supporters offering lactation support to breastfeeding women and for researchers planning studies on breastfeeding cessation.

REFERENCES

- Kramer MS, Kakuma R. The optimal duration of exclusive breastfeeding. *Cochrane Database Syst Rev* 2012;8:CD003517.
- World Health Organization. Global Strategy for Infant and Young Child Feeding. 2003. Available at: <http://whqlibdoc.who.int/publications/2003/9241562218.pdf> (Accessed August 25, 2013).
- Chalmers B, Levitt C, Heaman M, O'Brien B, Sauve R, Kaczorowski J and for the Maternity Experiences Study Group of the Canadian Perinatal Surveillance System, Public Health Agency of Canada. Breastfeeding rates and hospital breastfeeding practices in Canada: A national survey of women. *Birth* 2009;36:122-32.
- Callen J, Pinelli J. Incidence and duration of breastfeeding for term infants in Canada, United States, Europe and Australia: A literature review. *Birth* 2004;31:285-92.
- Infant Feeding Joint Working Group. Nutrition for Healthy Term Infants: Recommendations from Birth to Six Months. Available at: <http://www.hc-sc.gc.ca/fn-an/nutrition/infant-nourisson/recom/index-eng.php#a3> (Accessed February 16, 2014).
- Health Canada. Duration of Exclusive Breastfeeding in Canada: Key Statistics and Graphics (2009-2010). 2012. Available at: <http://www.hc-sc.gc.ca/fn-an/surveill/nutrition/commun/prenatal/exclusive-exclusif-eng.php> (Accessed November 4, 2013).
- Kirkland VL, Fein SB. Characterizing reasons for breastfeeding cessation throughout the first year postpartum using the construct of thriving. *J Hum Lact* 2003;19(3):278-85.
- Ahluwalia IB, Morrow B, Hsia J. Why do women stop breastfeeding? Findings from the Pregnancy Risk Assessment and Monitoring System. *Pediatrics* 2005;116(6):1408-12.
- Williams PL, Innis SM, Vogel AM, Stephen U. Factors influencing infant feeding practices of mothers in Vancouver. *Can J Public Health* 1999;90:114-19.
- Li R, Fein SB, Chen J, Grummer-Strawn LM. Why mothers stop breastfeeding: Mothers' self-reported reasons for stopping during the first year. *Pediatrics* 2008;122(S2):S69-76.
- Joseph KS, Liston RM, Dodds L, Dahlgren L, Allen AC. Socioeconomic status and perinatal outcomes in a setting with universal access to essential health care services. *CMAJ* 2007;177:S83-90.
- Luo ZC, Wilkins R, Kramer MS. Effect of neighbourhood income and maternal education on birth outcomes: A population-based study. *CMAJ* 2006;174:1415-20.
- Hanley GE, Morgan S. On the validity of area-based income measures to proxy household income. *BMC Health Serv Res* 2008;8:79.
- Bick DE, MacArthur C, Lancashire RJ. What influences the uptake and early cessation of breastfeeding? *Midwifery* 1998;14:242-47.
- Kronborg H, Vaeth M. The influence of psychosocial factors on the duration of breastfeeding. *Scand J Public Health* 2004;32:210-16.
- Lawson K, Tulloch MI. Breastfeeding duration: Prenatal intentions and postnatal practices. *J Adv Nursing* 1995;22:841-49.
- Sheehan D, Krueger P, Watt S, Sword W, Bridle B. The Ontario Mother and Infant Survey: Breastfeeding outcomes. *J Hum Lact* 2001;17(3):211-19.
- Dennis CL. Breastfeeding initiation and duration: A 1990-2000 literature review. *J Obstet Gynecol Neonatal Nurs* 2002;31:12-32.
- Al-Sahab B, Lanes A, Feldman M, Tamim H. Prevalence and predictors of 6-month exclusive breastfeeding among Canadian women: A national survey. *BMC Pediatrics* 2010;10:20.
- Hauck YL, Fenwick J, Dhaliwal SS, Butt J. A Western Australian survey of breastfeeding initiation, prevalence and early cessation patterns. *Mat Child Health J* 2011;15:260-68.
- Butte NF, Garza C, O'Brien E, Nichols B. Human milk intake and growth in exclusively breast-fed infants. *J Pediatr* 1984;104(2):187-95.
- Dewey KG, Heinig MJ, Nommsen LA, Lonnerdal B. Adequacy of energy intake among breastfed infants in the DARLING study: Relationship to growth velocity, morbidity, and activity levels. *J Pediatr* 1991;119(4):538-47.
- Neville MC, Keller R, Seacat J, Lutes V, Neifert M, Casey C, et al. Studies in human lactation: Milk volumes in lactating women during the onset of lactation and full lactation. *Am J Clin Nutr* 1988;48(6):1375-86.
- Renfrew MJ, McCormick FM, Wade A, Quinn B, Dowswell T. Support for healthy breastfeeding mothers with healthy term babies (Review). *Cochrane Database Syst Rev* 2012;5:CD001141.
- Cooke M, Stacey T. Differences in the evaluation of postnatal midwifery support by multiparous and primiparous women in the first two weeks after birth. *Aust Midwifery J* 2003;16:18-24.
- Shealy KR, Li R, Benton-Davis S, Grummer-Strawn L. The CDC Guide to Breastfeeding Interventions. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2005.
- Semenic S, Loiselle C, Gottlieb L. Predictors of the duration of exclusive breastfeeding among first-time mothers. *Res Nurs Health* 2008;31:428-41.
- Murray EK, Ricketts S, Dellaport J. Hospital practices that increase breastfeeding duration: Results from a population-based study. *Birth* 2007;34:202-11.
- Forster DA, McLachlan HL, Lumley J. Factors associated with breastfeeding at six months postpartum in a group of Australian women. *Int Breastfeed J* 2006;1:18.
- Nova Scotia Department of Health and the Healthy Beginnings: Enhanced Home Visiting Initiative Provincial Steering Committee. Healthy Beginnings: Enhanced Home Visiting Initiative Evaluation Framework. <http://novascotia.ca/dhw/healthy-development/documents/Healthy-Beginnings-Enhanced-Home-Visiting-Evaluation-Framework.pdf> Published 2004. (Accessed November 4, 2013).
- Brown CRL, Dodds L, Attenborough R, Bryanton J, Elliott Rose A, Flowerdew G, et al. Rates and determinants of exclusive breastfeeding in first 6 months among women in Nova Scotia: A population-based cohort study. *CMAJ Open* 2013;1(1):E9-E17.

Received: September 5, 2013

Accepted: March 14, 2014

RÉSUMÉ

OBJECTIFS : Étudier les raisons pour lesquelles les femmes cessent complètement d'allaiter avant que leurs nourrissons atteignent l'âge de six mois et répertorier les facteurs associés à l'arrêt et au moment de l'arrêt de l'allaitement maternel.

MÉTHODE : Pour tous les bébés uniques nés vivants entre le 1^{er} janvier 2008 et le 31 décembre 2009 dans deux districts sanitaires de la Nouvelle-Écosse, au Canada, nous avons recueilli les informations sur l'allaitement maternel autodéclarées par les mères à leur sortie de l'hôpital et lors de cinq visites de suivi, jusqu'à ce que leurs nourrissons aient six mois. Les mères ayant cessé d'allaiter avant six mois ont aussi été interrogées sur le moment du sevrage et la raison pour laquelle elles avaient complètement cessé d'allaiter. Nous avons classé les réponses des femmes à nos questions ouvertes en 11 catégories. Nous avons ensuite lié ces données à celles de la base de données périnatales Atlee de la Nouvelle-Écosse afin d'obtenir de l'information sur les caractéristiques maternelles et néonatales. Les liens entre les caractéristiques maternelles, obstétriques et néonatales et chaque raison d'avoir complètement cessé l'allaitement maternel ont été examinés.

RÉSULTATS : Sur les 500 mères ayant complètement cessé d'allaiter avant six mois et ayant partagé la raison de cet arrêt, la majorité (73,6 %) avaient cessé d'allaiter au cours des six premières semaines. Les raisons les plus communément citées étaient l'inconfort ou la fatigue associés à l'allaitement (22,6 %) et la crainte de ne pas avoir assez de lait (21,6 %). Le retour au travail ou aux études était associé à la durée de l'allaitement : 20 % des femmes ayant cessé d'allaiter après six semaines ont donné cette raison. La plupart des raisons invoquées, cependant, n'étaient pas associées à une durée d'allaitement particulière ni avec les caractéristiques disponibles sur les mères et les nourrissons.

CONCLUSION : Cette étude fait ressortir les facteurs associés aux raisons pour lesquelles les femmes cessent complètement d'allaiter avant six mois et le fait que ces raisons varient selon l'âge du sevrage. Les résultats obtenus permettront d'éclairer les recherches futures qui visent à trouver des interventions pour réduire l'arrêt précoce de l'allaitement maternel.

MOTS CLÉS : allaitement maternel; nourrisson; sevrage; lactation