The effect of peer support on breast-feeding duration among primiparous women: a randomized controlled trial

Cindy-Lee Dennis,[*] Ellen Hodnett,[*] Ruth Gallop,[*] Beverley Chalmers[†]

Abstract

Background: Most mothers stop breast-feeding before the recommended 6 months post partum. A systematic review showed that breast-feeding support programs by health care professionals did not substantially improve breast-feeding outcomes beyond 2 months post partum. We conducted a randomized controlled trial to evaluate the effect of peer (mother-to-mother) support on breast-feeding duration among first-time breast-feeding mothers.

Methods: We recruited 256 breast-feeding mothers from 2 semi-urban community hospitals near Toronto and randomly assigned them to a control group (conventional care) or a peer support group (conventional care plus telephone-based support, initiated within 48 hours after hospital discharge, from a woman experienced with breast-feeding who attended a 2.5-hour orientation session). Follow-up of breast-feeding duration, maternal satisfaction with infant feeding method and perceptions of peer support received was conducted at 4, 8 and 12 weeks post partum.

Results: Significantly more mothers in the peer support group than in the control group continued to breast-feed at 3 months post partum (81.1% v. 66.9%, $p = 0.01$) and did so exclusively (56.8% v. 40.3%, $p = 0.01$). Breast-feeding rates at 4, 8 and 12 weeks post partum were 92.4%, 84.8% and 81.1% respectively among the mothers in the peer support group, as compared with 83.9%, 75.0% and 66.9% among those in the control group ($p \leq 0.05$ for all time periods). The corresponding relative risks were 1.10 (95% confidence interval [CI] 1.01–2.72) at 4 weeks, 1.13 (95% CI 1.00–1.28) at 8 weeks and 1.21 (95% CI 1.04–1.41) at 12 weeks post partum. In addition, when asked for an overall rating of their feeding experience, significantly fewer mothers in the peer support group than in the control group were dissatisfied (1.5% v. 10.5%) ($p = 0.02$). Of the 130 mothers who evaluated the peer support intervention, 81.6% were satisfied with their peer volunteer experience and 100% felt that all new breast-feeding mothers should be offered this peer support intervention.

Interpretation: The telephone-based peer support intervention was effective in maintaining breast-feeding to 3 months post partum and improving satisfaction with the infant feeding experience. The high satisfaction with and acceptance of the intervention indicates that breast-feeding peer support programs, in conjunction with professional health services, are effective.

Rates of new mothers initiating breast-feeding have increased from 24% during the 1960s[1] to 83% or greater today.[2] In Canada, national surveys have shown initiation rates of about 79%,[3] with geographic variations ranging from 31%[4] in eastern Newfoundland to 83% in Ontario.[2] Unfortunately, breast-feeding rates rapidly decline in the initial 4 to 8 weeks post partum: in one survey less than 35% of mothers were exclusively breast-feeding at 4 months,[2] and in another survey only 30%–40% of mothers continued any form of breast-feeding until 6 months post partum.[5] The breast-feeding duration rates among socially disadvan-

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From the Faculties of *Nursing and †Medicine, University of Toronto, Toronto, Ont.

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taged women are even lower.[4,6] Thus, most mothers do not breast-feed for the 6 to 12 months recommended by the Canadian Paediatric Society[7] and the American Academy of Pediatrics[8] or the 2 years suggested by the World Health Organization.[9] A major reason for this premature discontinuation is difficulty with breast-feeding rather than maternal choice.[2,10]

To address this issue, postpartum breast-feeding support programs have been developed by health care professionals. However, a meta-analysis of 13 trials evaluating these programs failed to show significant improvements in breast-feeding outcomes beyond 2 months post partum.[11] In these trials, over 3600 women from 7 countries were involved in programs that were individualized, varied in intensity and incorporated diverse forms of professional assistance (e.g., breast-feeding clinics and telephone hotlines). The failure of such trials to show consistent improvements may indicate that, although professional assistance is important, this type of support alone (regardless of the quality and quantity) is insufficient to improve breast-feeding outcomes, especially among socially disadvantaged mothers.

A growing trend in health care, and postpartum care in particular, is the use of lay support. To determine the effectiveness of lay assistance with breast-feeding, several studies have evaluated peer support with new mothers.[12–18] However, these findings should be interpreted with caution because of serious limitations, such as small samples, experimenter biases, analyses not based on intent to treat, high attrition rates and nonrandomized allocation to study groups. Furthermore, no study has specifically evaluated the effect of only telephone-based peer support. The purpose of our randomized controlled trial was to evaluate the effect of peer support on breast-feeding duration among primiparous breast-feeding mothers. We hypothesized that new mothers who receive telephone-based support from women experienced with breast-feeding would breast-feed longer and be more satisfied with their infant feeding experience than new mothers who did not receive such support.

Methods

Participants were recruited from 2 semi-urban community hospitals near Toronto between September 1997 and June 1998. These community hospitals had over 3300 deliveries per year and offered 24-hour access to anesthesia; one hospital had midwifery services. Neither hospital had completely implemented the 10 steps of the World Health Organization's Baby-Friendly Hospital Initiative.[19] Eligible participants were all in-hospital, primiparous, breast-feeding women who were at least 16 years of age, able to speak English, had a singleton birth at 37 weeks' gestation or later and resided in the surrounding region accessible by a local telephone call. Mothers were excluded if they had a factor that could significantly interfere with breast-feeding, such as serious maternal illness, infant congenital abnormality or an infant in the special care nursery who would not be discharged home with the mother. We also excluded mothers if they had enrolled prenatally with the participating volunteer breast-feeding organization.

After the participants completed the informed consent procedures approved by the University of Toronto and the ethical review boards at the Joseph Brant and Oakville-Trafalgar Memorial hospitals and a baseline questionnaire, they were randomly assigned to either a control or peer support group. Randomization was achieved using consecutively numbered, sealed, opaque envelopes containing randomly generated numbers constructed by a biostatistician who was not involved in the recruitment process. Women allocated to the control group had access to the conventional in-hospital and community postpartum support services such as those provided by hospital-based nursing and medical staff, a hospital-based breast-feeding clinic managed by lactation consultants, a telephone breast-feeding support line managed by hospital nursing staff, and support services provided by public health nurses at the local regional community health department and by community-based physicians and pediatricians. Women allocated to the peer support group had access to all of the preceding conventional support services in addition to being paired with a peer volunteer. A research assistant blinded to group allocation telephoned all participants at 4, 8 and 12 weeks post partum to collect data regarding current infant feeding status, breast-feeding problems encountered and health services used. At the end of the 12 weeks all participants evaluated their satisfaction with their infant feeding experience, and those in the experimental group answered questions regarding their peer support experience.

Peer volunteer support

We defined peer support as a specific type of social support that incorporates informational, appraisal (feedback) and emotional assistance. This lay assistance is provided by volunteers who are not part of the participant's family or immediate social network; instead, they possess experiential knowledge of the targeted behaviour (i.e., successful breast-feeding skills) and similar characteristics (e.g., age, socioeconomic status, cultural background, location of residence). To provide the intervention, an existing volunteer breast-feeding organization (Halton Breastfeeding Connections) was invited to participate as a community partner in the trial. This volunteer organization was established in 1993, initially in conjunction with the local regional health department, to provide mother-to-mother telephone-based support to new breast-feeding mothers.

To increase standardization of the intervention, new peer volunteers were recruited into the participating community organization specifically for the trial. Through the distribution of flyers, advertisements in the local newspaper and by word of mouth, 58 mothers volunteered and met the following selection criteria: previous breast-feeding experience of at least 6 months' duration, a positive breast-feeding attitude and completion of a 2.5-hour orientation session. The focus of the orientation session was to develop the peer volunteers' telephone support and referral skills; role playing and the verification of problem-solving skills were important components of the session. A 43-page handbook was distributed to all peer volunteers. The handbook outlined professional services available for referral and was to be used as a reference guide; it incorporated various topics such as volunteer role description, breast-feeding benefits, tips for effective telephone support, general breast-feeding information and principles, fact sheets and breast-feeding myths.

During the orientation sessions, the principal investigator (C.-L.D.) described the trial and answered questions. Peer volunteers who wanted to participate in the study were assigned a volun-

teer code number to promote confidentiality, were asked to complete a demographic form and were given activity logs, which included postage-paid, addressed envelopes. The activity logs enabled the peer volunteers to document their specific interactions with the trial participants. The majority of the peer volunteers who participated in the trial were born in Canada (77.6%) and had postsecondary education (89.6%); 51.7% were multiparous, and 46.5% were employed, either full time or part time, outside of the home. An experienced member of the participating community organization acted as the volunteer coordinator for the trial; her responsibilities included conducting the orientation sessions and matching trial participants with the appropriate peer volunteers.

The volunteer coordinator paired each new mother with a peer volunteer based on location of residence and availability. No efforts were made to standardize the number of new mothers supported by a peer volunteer at one particular time or throughout the trial. Once a participant was enrolled in the trial, a peer volunteer was contacted and given the woman's information. Peer volunteers were asked to contact the new mother within 48 hours after hospital discharge and as frequently thereafter as the mother deemed necessary. Frequency of contact was not standardized in order to individualize the intervention to the mothers' specific needs and to give credibility to the peer volunteers' experiential knowledge. To enhance understanding of the peer support intervention and to monitor compliance, the activity logs distributed during the orientation session were reviewed in relation to the peer volunteer interactions.

Outcome measures

Participants in both groups completed confidential questionnaires before randomization and at 4, 8 and 12 weeks post partum. All questionnaires were developed by the principal investigator and reviewed for content validity by 23 experts (4 university professors, 12 health care professionals working with breast-feeding mothers and 7 peer volunteers). In addition, all questionnaires were tested with members of the target population to ensure that the phrasing of the items was clear and appropriate. Specific psychometric assessments for each questionnaire have been reported elsewhere.[20] The pre-intervention questionnaire assessed demographic and hospital variables, and the follow-up questionnaires assessed breast-feeding duration, maternal satisfaction with infant feeding method, breast-feeding problems encountered, health services utilization and perceptions of peer support. The description and results of the breast-feeding problems and health services utilization have been reported elsewhere.[20]

The primary outcome of this trial was self-reported breast-feeding (receipt by the infant of any breast milk) within the 24 hours preceding the 12-week telephone interview. During the telephone interview breast-feeding was further classified into 6 specific infant feeding categories: exclusive (breast milk only), almost exclusive (breast milk and other fluids [e.g., vitamins] but not formula), high (breast milk and less than 1 bottle of formula per day), partial (breast milk and at least 1 bottle of formula per day), token (breast given to comfort baby, not for nutrition) or bottle-feeding (no breast milk). These categories have been advocated by researchers to promote consistency in the definition of breast-feeding and to facilitate comparison of research results.[21] To ensure uniformity in breast-feeding categorization, an algorithm (available from the corresponding author upon request) was developed to aid the research assistant in appropriately determining the mother's breast-feeding behaviour.

Maternal satisfaction with the infant feeding method was measured with 2 sets of questions. The first set consisted of 12 items based on the Maternal Breastfeeding Evaluation Scale,[22] which was developed following a qualitative study of maternal descriptions of successful breast-feeding experiences. From that study 5 categories emerged and formed the content domain for the 12 selected items: infant health, infant satisfaction, maternal enjoyment, attainment of desired maternal role and lifestyle compatibility. Items were rated on a 5-point Likert scale (Cronbach's $\alpha = 0.81$) and summed to produce a total score, with higher scores reflecting a higher degree of maternal satisfaction with the infant feeding method. The second set of questions included 3 categorical and open-ended questions about satisfaction with infant feeding ("If you were to have another child, how would you feed your new baby?" and "What infant feeding method would you recommend to your friends?") and 1 question about overall satisfaction ("Overall, are you satisfied with how you are feeding your baby?").

Mothers in the experimental group were asked to rate 10 items using a 5-point Likert scale (Cronbach's $\alpha = 0.95$) to evaluate their perceptions of the support received from their peer volunteer. Items were derived from a peer support concept analysis conducted by one of us (C.-L.D.) and included content domains related to emotional, informational and appraisal assistance. The scores for all items were summed to produce a total score, with higher scores reflecting a higher degree of satisfaction with peer support. In addition, the questionnaire included 7 categorical and open-ended questions and 1 question regarding overall satisfaction. Sample questions included the following: Did your volunteer help you reach your breast-feeding goals? Do you feel you had enough contact with your volunteer to help you with breast-feeding? Were you able to speak to your volunteer when you had a problem or a question? Do you think all new breast-feeding mothers should be offered the services of a volunteer?

Data analysis

According to the local public health department's records, 60% of mothers in the study region were practising some form of breast-feeding at 3 months post partum. Thus, the sample size was calculated to find an increase from 60% to 80% in the number of women breast-feeding at 3 months. To detect a difference of 20 percentage points between the groups with a power of 90%, we required a sample of 252 women (126 per group), assuming a 2-tailed α error of 0.05. Discontinuation of the intervention by 1 mother did not entail the participant's exclusion from the study, and an intention-to-treat approach was used to analyze the data.

Data were entered into a data management system twice, by 2 research assistants blinded to group allocation, and logic and range checks were used to verify the accuracy of the data. A computer program was developed to specifically detect inconsistencies between the 2 datasets. Any discrepancies were checked against the original data forms.

The data are presented using descriptive statistics (means, standard deviations [SDs] or proportions). The Pearson χ^2 test (supplemented, where necessary, by the Fisher exact test) was used to examine differences between the 2 groups for categorical data; independent 2-sample *t*-tests were conducted for data at the interval level of measurement. Pearson's correlations were used to examine the relation between the frequency of peer volunteer contacts and the infant feeding category. To assess the relation between the frequency of peer volunteer contacts and the per-

ception of peer support within the experimental group, Spearman's rank order correlation coefficients were calculated. Relative risks (RRs) and corresponding 95% confidence intervals (CIs) were estimated.

Results

Of the 631 primiparous mothers screened, 359 were eligible. The most common reasons for exclusion were bottle-feeding (28.3%) and residence not in the specified study region (27.2%). Of the eligible mothers, 101 (28.1%) declined enrolment, the most common reason being sufficient support from their current support network (reported by 48.5%). Thus, the acceptance rate for enrolment was 71.9%. No significant baseline differences were found in the following characteristics between mothers who participated in the trial and those who were eligible to participate but refused: delivery hospital, age, marital status, education level, mode of delivery and analgesia. Of the 258 participants, 2 (both in the control group) were lost to follow-up (Fig. 1).

Characteristics of the participants are presented in Table 1. There were no statistically significant differences between the 2 groups except the timing of the decision to breast-feed: significantly more mothers in the peer support group than in the control group decided to breast-feed before pregnancy (73.5% v. 58.9%). In addition, fewer women in the experimental group than in the control group had a cesarean section (18.9% v. 27.4%); although this difference is not statistically significant, it is clinically important.

Significantly more mothers in the peer support group than in the control group were breast-feeding at 3 months post partum ($p = 0.01$) and at all other follow-up periods (Table 2). We conducted a logistic regression analysis to assess the effect of the peer intervention on breast-feeding at 4, 8 and 12 weeks post partum, after controlling for all baseline characteristics evident in Table 1. The results indicated that the intervention significantly predicted breast-

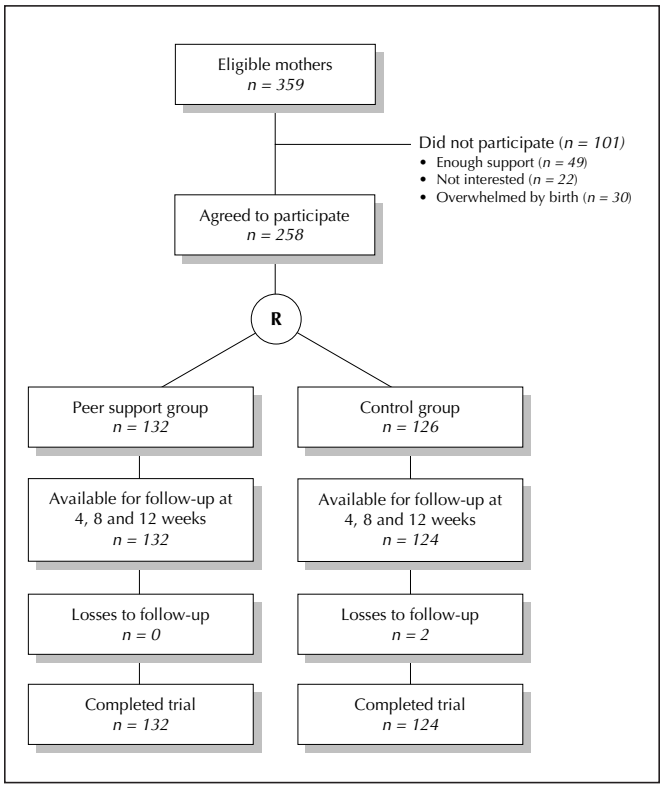

Fig. 1: Profile of trial. R = randomization.

Table 1: Baseline characteristics of mothers randomly assigned to either usual care (control) or to usual care plus peer volunteer support to assist with breast-feeding (peer support)

Characteristic	Group; no. (and %) of subjects: Peer support *n = 132*	Control *n = 124*
Age, yr		
16–24	19 (14.4)	16 (12.9)
25–34	99 (75.0)	92 (74.2)
≥ 35	14 (10.6)	16 (12.9)
Marital status		
Married	119 (90.2)	115 (92.7)
Other	13 (9.8)	9 (7.3)
Education level		
High school	34 (25.8)	31 (25.0)
College or undergraduate university	83 (62.9)	82 (66.1)
Postgraduate university	15 (11.4)	11 (8.9)
Decided to breast-feed		
Before pregnancy*	97 (73.5)	73 (58.9)
During pregnancy	34 (25.8)	51 (41.1)
At or after birth	1 (0.8)	0
Had family or friend who had breast-fed	123 (93.2)	113 (91.1)
Attended prenatal class	97 (73.5)	84 (67.7)
Attended prenatal breast-feeding class	18 (13.6)	19 (15.3)
Smoked cigarettes		
Before pregnancy	36 (27.3)	34 (27.4)
During pregnancy	24 (18.2)	19 (15.3)
Born in North America	113 (85.6)	108 (87.1)
Annual household income, $†		
≤ 39 999	23 (18.5)	18 (15.5)
40 000–79 999	52 (41.9)	49 (42.2)
≥ 80 000	49 (39.5)	49 (42.2)
Delivered by cesarean section	25 (18.9)	34 (27.4)
Time of first breast-feeding, h after delivery		
≤ 1	45 (34.1)	43 (34.7)
2–10	75 (56.8)	68 (54.8)
≥ 11	12 (9.1)	13 (10.5)
Used hospital formula	67 (50.8)	58 (46.7)
Did not use supplementation	65 (49.2)	66 (53.2)

*$p < 0.02$ for difference between groups.
†Denominators varied because of missing income data (for 8 participants in each group).

feeding duration at 4 weeks (odds ratio [OR] 2.5, 95% CI 1.04–6.00; $p = 0.04$), 8 weeks (OR 2.4, 95% CI 1.15–4.83; $p = 0.01$) and 12 weeks (OR 2.5, 95% CI 1.33–4.78; $p < 0.001$). This finding suggests that mothers who received the peer support intervention were about 2.5 times more likely than those in the control group to continue to breast-feed at all follow-up periods. Furthermore, significantly more mothers in the peer support group than in the control group were exclusively breast-feeding at 4 weeks ($p = 0.03$) and at 12 weeks ($p = 0.01$) (Table 3).

Over 50% of the participants were practising some form of supplementation at 12 weeks post partum. The top 5 reasons given were insufficient milk supply ($n = 55$), convenience ($n = 22$), problems with infant behaviour (i.e., fussing and frequent crying) ($n = 19$), feeding problems (e.g., latching or feeding frequently) ($n = 19$) and returning to work ($n = 15$). The most common reasons given by mothers in the almost exclusive and high breast-feeding categories (no or little formula) were infant behavioural problems, not having expressed breast milk and "to see if the infant would take formula or a bottle." In contrast, mothers in the partial breast-feeding category (at least 1 bottle of formula) cited insufficient milk supply, convenience and returning to work as the main reasons. Finally, mothers in the token and bottle-feeding categories (little or no breast milk) stated insufficient milk supply, feeding difficulties and infant physical health problems as reasons for stopping breast-feeding. There were no important group differences in relation to rationales for supplementing or discontinuing breast-feeding. In particular, the same proportion of mothers in the peer support group as in the control group cited insufficient milk supply.

Table 2: Prevalence of breast-feeding at follow-up

Follow-up interval	Group; no. (and %) of mothers breast-feeding		Relative risk (and 95% CI)	*p* value
	Peer support	Control		
4 wk	122 (92.4)	104 (83.9)	1.10 (1.01–2.72)	0.03
8 wk	112 (84.8)	93 (75.0)	1.13 (1.00–1.28)	0.05
12 wk	107 (81.1)	83 (66.9)	1.21 (1.04–1.41)	0.01

Note: CI = confidence interval.

Table 3: Infant feeding categories at follow-up

Follow-up interval; feeding category*	Group; no. (and %) of mothers		*p* value
	Peer support	Control	
4 weeks			
Exclusive breast-feeding	98 (74.2)	78 (62.9)	0.03
Almost exclusive breast-feeding	4 (3.0)	6 (4.8)	
High breast-feeding	6 (4.5)	2 (1.6)	
Partial breast-feeding	11 (8.3)	16 (12.9)	
Token breast-feeding	3 (2.3)	2 (1.6)	
Bottle-feeding	10 (7.6)	20 (16.1)	0.03
8 weeks			
Exclusive breast-feeding	83 (62.9)	68 (54.8)	0.08
Almost exclusive breast-feeding	5 (3.8)	4 (3.2)	
High breast-feeding	5 (3.8)	5 (4.0)	
Partial breast-feeding	18 (13.6)	14 (11.3)	
Token breast-feeding	1 (0.8)	2 (1.6)	
Bottle-feeding	20 (15.2)	31 (25.0)	0.03
12 weeks			
Exclusive breast-feeding	75 (56.8)	50 (40.3)	0.01
Almost exclusive breast-feeding	1 (0.8)	9 (7.3)	
High breast-feeding	3 (2.3)	8 (6.4)	
Partial breast-feeding	26 (19.7)	15 (12.1)	
Token breast-feeding	2 (1.5)	1 (0.8)	
Bottle-feeding	25 (18.9)	41 (33.1)	0.01

*Exclusive = breast milk only, almost exclusive = breast milk and other fluids (e.g., vitamins) but not formula, high = breast milk and less than 1 bottle of formula per day, partial = breast milk and at least 1 bottle of formula per day, token = breast milk given to comfort baby and not for nutrition, bottle-feeding = no breast milk.

The majority of participants (96.4%) were satisfied with their infant feeding experience. No significant difference in mean satisfaction scores was found between the peer support and control groups on the maternal satisfaction questionnaire (mean 53.81 v. 52.98; $p = 0.73$). However, when asked to rate their overall satisfaction with their infant feeding experience, significantly fewer mothers in the experimental group than in the control group reported dissatisfaction (1.5% v. 10.5%, $p = 0.02$). Although the majority of participants (96%) stated that they would breast-feed their next infant, significantly fewer mothers in the peer support group than in the control group indicated that they would breast-feed their next infant differently (23% v. 34%; $p = 0.05$). In particular, 24 mothers from both groups indicated that they would breast-feed longer, 16 would try different methods or strategies, 10 would refrain completely from formula supplementation, and 10 would bottle-feed.

Twice the volunteer coordinator telephoned peer volunteers who did not return their activity logs. Seventy-eight of 132 activity logs were returned, for a 59% response rate. Peer volunteer contacts were assessed and divided into either connections (the peer volunteer and the mother spoke on the telephone) or attempted connections (unsuccessful efforts to connect, such as leaving a message on the answering machine). From the 78 activity logs, it was found that the majority of mothers received 5 or more connections (mean 5.4 [SD 3.6]) and 3 attempted connections (mean 3.1 [SD 2.8]) from their peer volunteers during the 3-month study period.

Of the 411 connections made, 97% were telephone interactions and 3% were face-to-face meetings. The peer volunteers initiated most of the telephone contacts, with only 9.3% of all connections initiated by mothers. These interactions mainly comprised of conversations between the 2 women; however, 38 referrals to health care professional were made (9.3% of all interactions), and 16 contacts with professional breast-feeding services were initiated by peer volunteers for the mother they were supporting (3.9% of all interactions). Ninety-six percent of the initial contacts were

made within the first postpartum week, with 67% occurring within 48 hours after hospital discharge. Connections lasted from 2 to 65 minutes (mean 16.2 minutes [SD 12.2]), and relationships between a peer volunteer and a mother ranged from 1 to 121 days (mean 53.1 days [SD 30.9]). Although about one-third of the relationships did not last into the second month, 30.3% of the mothers continued to receive 2 or more contacts into the third month, and 19.7% of all the relationships actively continued past 3 months.

Of the 130 participants who received the peer support intervention and completed the peer volunteer evaluation questionnaire, 81.6% were satisfied with their experience. Furthermore, 111 (85.4%) of the mothers stated that they would have a peer volunteer again if they could repeat the experience. Of the 19 mothers (14.6%) who stated that they would prefer not to receive peer support again, 11 indicated they already had enough support, and only 3 mothers were dissatisfied with the support received; 5 mothers gave unrelated responses. Most of the mothers (107 [82.3%]) felt they had enough contact with their peer volunteer to help them with breast-feeding. Only 50 (38.5%) of the mothers indicated that they contacted their peer volunteer when they had difficulties; however, 27 (20.8%) stated that they did not have to contact their peer volunteer because they knew she was going to contact them. All of the participants who completed this questionnaire felt that every new breast-feeding mother should be offered peer support.

The 78 returned activity logs were reviewed to assess contacts with the peer volunteers in relation to infant feeding category and maternal perceptions of peer support. Correlations showed that specific peer volunteer activities with the 78 mothers were not significantly related to infant feeding category at 4, 8 or 12 weeks. However, maternal perceptions of peer support were moderately correlated to peer volunteer activities. In particular, the overall number of peer volunteer contacts ($p = 0.002$) and connections ($p < 0.001$) were positively correlated to the mothers' evaluations of their peer support experiences.

Although there was no evidence of criticism or reinforcement of poor health behaviours, information from the questionnaires evaluating mothers' perceptions and anecdotal information indicated that there were indeed other adverse outcomes of peer support. Of the 130 mothers in the experimental group who completed the questionnaire, 9 indicated that they were not satisfied with their peer support experience; most of these mothers would have liked their peer volunteer to have telephoned more frequently. However, a few mothers responded that they did not like a specific aspect of their peer volunteer. For example, only 1 mother requested to discontinue her participation in the intervention, stating that the peer volunteer frightened her about the potential hazards of not breast-feeding. The peer volunteer's comments made her anxious and diminished her feelings of confidence, despite the fact that breast-feeding was going well. Another mother felt her right to confidentiality was violated when her peer volunteer contacted the public health department without her consent. Although this mother did require professional assistance, the peer volunteer should have discussed the referral with the new mother. These negative experiences necessitate attention in the development of future peer support interventions and can be easily addressed in the orientation session.

Interpretation

We found that 81.1% of the mothers who received peer volunteer support were breast-feeding at 3 months post partum, as compared with 66.9% of the mothers in the control group. The significant effect of peer support on breast-feeding duration at 4, 8 and 12 weeks post partum remained even after controlling for all baseline demographic variables. Relative risk results suggest that 21% more mothers will continue to breast-feed at 12 weeks post partum if they are provided with peer support in addition to conventional support. Equally important is the finding that significantly more mothers in the peer support group than in the control group were exclusively breast-feeding at 12 weeks. Thus, peer volunteer support not only significantly improved breast-feeding duration but also exclusivity.

The occurrence and frequency of peer volunteer interactions were not associated with the extent of breast-feeding at 4, 8 and 12 weeks post partum. Thus, a standardized peer support intervention does not appear necessary. This finding is congruent with that reported by Israel,[23] who found that it is the quality, not the quantity, of social interactions and relationships that is most strongly associated with physical and psychological outcomes. Another explanation for this finding may be that it was not the actual receipt of peer support that increased breast-feeding duration but rather the perception that a peer volunteer would be available to help, if necessary. Research has indicated that the perception of support may have a stronger influence on specific health outcomes than the actual enactment of support.[24]

The lack of association in our study between the frequency of peer volunteer contacts and infant feeding categories (i.e., exclusive breast-feeding) at specific follow-up times contradicts the findings of Morrow and associates,[16] who reported that the number of home visits by peer volunteers was associated with breast-feeding levels at 3 months post partum. However, the home visit intervention in their study incorporated intensive (and expensive) training sessions and greater expectations of the volunteers' time. Given the differences between the 2 interventions (home visits v. telephone support) yet the similarity in relation to breast-feeding outcomes, one needs to questions the rationale behind extensive training and intervention standardization, which significantly increases the difficulty of implementing and sustaining a peer-based program on a large scale.

Although the frequency and occurrence of peer volunteer contacts was not associated with infant feeding categories, it was significantly related to the mothers' percep-

tions of peer support. Furthermore, the longer the relationship continued, the more positive the mother perceived the peer volunteer experience to be. The few mothers who were dissatisfied with peer support reported most frequently that their discontent was due to a limited relationship (the peer volunteer did not telephone enough). Thus, the quantity of peer volunteer contacts may have been an indirect measure of the quality (or lack thereof) of the peer–mother relationship. This issue should be addressed during the orientation sessions with peer volunteers in order to promote satisfaction with the intervention.

Since most of the mothers continued to breast-feed, it was not surprising that the majority of the mothers were satisfied with their infant feeding experience. However, although most of the participants reported that they would breast-feed their next infant, significantly more mothers in the control group than in the peer support group indicated that they would breast-feed their next infant differently. This suggests that mothers in the peer support group were more likely than the other mothers to evaluate themselves and their breast-feeding experience positively. One explanation for this result may be that, through the provision of informational and appraisal support, the peer volunteers confirmed with mothers the normalcy of their breast-feeding experience[25] or, through emotional support and anticipatory guidance, mothers were better able to cope with their breast-feeding difficulties.[26]

A meta-analysis of 13 trials[11] revealed that interventions based primarily on professional support showed a clear beneficial effect only until 2 months post partum; however, this finding would suggest that peer support may have a more enduring effect on breast-feeding duration than professional support alone. How much longer is still unknown, since our trial ended at 3 months post partum. These preceding findings indicate that the major result in our trial, that peer support significantly increased breast-feeding duration at 3 months post partum, is an important clinical finding that warrants further research, including studies that assess breast-feeding rates to at least 6 months post partum. Such studies should incorporate an assessment of social monitoring as a possible explanation for any positive outcome.

Generalizability of our findings is limited because of the homogeneous sample and the small geographic area used for recruitment. A large proportion of the women in our study were 25 years and older, well educated, from high-income households and born in North America; therefore, the effect of telephone-based peer support on breast-feeding duration among younger, less educated, low-income or immigrant women still requires rigorous evaluation. Finally, self-report was used to obtain outcome data; although researchers have documented a high level of accuracy of self-reports for infant feeding practices,[27,28] there may have been some underreporting of the use of non-human milk by the study participants, since preventive health behaviours tend to be overestimated by self-report measures.[29]

Conclusion

Although most mothers in North America prematurely discontinue breast-feeding, the results of our trial indicate that telephone-based peer support, in conjunction with professional support and the beneficial influences of the Baby-Friendly Hospital Initiative,[30] may help new mothers reach their breast-feeding goals and continue to breast-feed. Peer support also resulted in mothers evaluating themselves and their breast-feeding experience more positively, which led to higher maternal satisfaction with the infant feeding method. Furthermore, evidence is starting to be collected that shows peer volunteers as effective mediating links between mothers in the community and health care professionals; this may be particularly beneficial for socially disadvantaged breast-feeding mothers.

Competing interests: None declared.

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Correspondence to: *Dr. Cindy-Lee Dennis, Assistant Professor, Faculty of Nursing, University of Toronto, 50 St George St., Toronto ON M5S 3H4; fax 416 978-8222; cindylee.dennis@utoronto.ca*