IMPROVING BREASTFEEDING OUTCOMES: A PILOT RANDOMIZED CONTROLLED TRIAL OF A SELF-EFFICACY INTERVENTION WITH PRIMIPAROUS MOTHERS

by

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ABSTRACT

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Breastfeeding is recommended as the optimal source of nutrition for newborns for the first 6 months of life and beyond with the addition of complementary foods. While breastfeeding initiation rates have been increasing, duration rates remain a concern as many women prematurely discontinue due to difficulties encountered rather than maternal choice. In addition, there is a sizable gap between rates of exclusive breastfeeding and current recommendations. Targeting modifiable variables that may be amenable to intervention is one strategy to improve breastfeeding outcomes. One such modifiable variable is breastfeeding self-efficacy. Although research has clearly shown that breastfeeding self-efficacy is predictive of breastfeeding duration and exclusivity, it is unknown whether it can be enhanced to improve breastfeeding outcomes. The purpose of this pilot randomized controlled trial was to examine the feasibility and compliance of a newly developed trial protocol and the acceptability of an intervention to increase breastfeeding self-efficacy in the immediate postpartum period. Secondary outcomes included determining whether there were any trends between groups related to breastfeeding self-efficacy, duration, and exclusivity.
Participants included 150 primiparous mothers who were breastfeeding their healthy, full-term infants. Eligible and consenting mothers were randomized to either a control group (standard postpartum care) or an intervention group (standard postpartum care plus the self-efficacy intervention). Participants allocated to the intervention group received three individualized, self-efficacy enhancing sessions with the researcher; two sessions were conducted in hospital, and one was administered via telephone 1 week following hospital discharge. A research assistant blinded to group allocation collected outcome data at 4 and 8 weeks postpartum.

The results suggested that the administration of the intervention was feasible and that there was a high degree of protocol compliance; the majority of participants reported that the intervention was beneficial. Secondary outcomes identified that there was a trend among participants in the intervention group to have improved breastfeeding outcomes, including higher rates of breastfeeding self-efficacy, duration, and exclusivity at 4 and 8 weeks postpartum. Preliminary evidence also suggested that the self-efficacy intervention may have assisted to decrease perceptions of insufficient milk supply among the intervention group participants. Overall, the findings from this pilot trial indicated that a larger trial is warranted.
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CHAPTER 1: INTRODUCTION

The advantages of breastfeeding are well documented in the literature. They include health, nutritional, immunologic, developmental, psychological, social, economic, and environmental benefits for infants, mothers, and society (American Academy of Pediatrics [AAP], 1997; Stanley et al., 2007; World Cancer Research Fund/American Institute for Cancer Research, 2007) in both developed and developing countries. Studies also have identified that the benefits of breastfeeding are enhanced when breastfeeding is exclusive (infant receives breast milk only) and continues for at least 3 months (AAP, 2005; Wambach et al., 2005).

Due to the compelling advantages associated with human milk, breastfeeding has been identified as the optimal source of nutrition for infants. The AAP (2005); the Canadian Pediatric Society (2005); Health Canada (2004); and the World Health Organization (WHO, 2001) have recommended that mothers exclusively breastfeed their infants for the first 6 months of life and beyond, with the addition of complementary foods after 6 months. As such, exclusive breastfeeding is the reference or normative model against which all alternative forms of infant feeding are measured (AAP).

Despite current recommendations, the prevalence and duration of breastfeeding are variable across North America. Breastfeeding initiation has increased over the last 20 years, with approximately 84.5% of Canadian mothers currently initiating breastfeeding (Statistics Canada, 2003). However, breastfeeding duration remains a concern as many mothers discontinue well before the current recommendations of 6 months and beyond. In addition, low, exclusive breastfeeding rates are significant because there is a sizable
gap between the number of infants who are exclusively breastfed and current recommendations (Statistics Canada).

According to a Statistics Canada report from 2003, at 6 months, only 18.7% of Canadian women were exclusively breastfeeding, and just 38.7% were practicing any breastfeeding. Across Canada, this trend was evident in a west to east gradient, with higher breastfeeding duration reported in the west than in the east. For example, British Columbia reported that 55% of mothers continue to practice any breastfeeding at 6 months, with 28.8% breastfeeding exclusively (Statistics Canada), and New Brunswick reported that 16.6% of mothers are practicing any breastfeeding at 6 months, with 9.7% exclusively breastfeeding at 6 months. Similarly, the U.S. Department of Health and Human Services (DHHS, 2006) reported that 39.1% of mothers surveyed were breastfeeding to some extent at 6 months, and only 13.9% were breastfeeding exclusively at 6 months. The DHHS also found that many women who initiated breastfeeding were supplementing with formula, as only 60% of U.S. infants were exclusively breastfeeding in the early postpartum period (1 week) and 52% at 1 month.

Past research also had indicated that breastfeeding rates are considerably lower in socially disadvantaged women (Dubois & Girard, 2003; Guise et al., 2003; Li, Zhao, Mokdad, Barker, & Grummer-Strawn, 2003). In particular, women of low socioeconomic status, adolescents, and racial minorities were found to be less likely to exclusively breastfeed and breastfeed for shorter duration (Kruse, Denk, Feldman-Winter, & Rotondo, 2005; Ryan & Zhou, 2006). Overall, both exclusive and sustained breastfeeding are not being achieved (Sheehan, Watt, Krueger, & Sword, 2006) and require attention. As such, effective interventions are required to assist mothers to overcome the perceived
difficulties associated with breastfeeding so that they may breastfeed longer and exclusively.

Identifying effective interventions is no easy task. An extensive review of the literature found that the reasons for breastfeeding discontinuation are multifactorial and complex (Dennis, 2002). Furthermore, numerous variables have been identified as affecting breastfeeding duration and breastfeeding exclusivity. Although knowledge of these variables may be useful to health care providers to identify who might be at risk for early discontinuation, many of these variables are considered nonmodifiable and not amenable to intervention.

Dennis and Faux (1999) suggested that to address early breastfeeding discontinuation adequately, health care professionals need to identify high-risk women reliably so that supportive interventions targeting variables that may be modified can be implemented. Potentially modifiable variables that influence breastfeeding initiation and duration include smoking (Dennis, 2002; Peat et al., 2004; Wambach et al., 2005); breastfeeding difficulties (Lewallen et al., 2006); support from partner (Taveras et al., 2003), family, or friends (Bar-Yam & Darby, 1997; Dennis, 2002, 2003a; Peat et al.; Wambach et al.); employment (Dennis; Peat et al.; Taveras et al.); hospital policies (Dennis; Gagnon, Leduc, Waghorn, Yang, & Platt, 2005; Hill, 2000; Kruse et al., 2005; Wambach & Cole, 2000); positive intentions, attitudes, and beliefs (Dennis; Wambach et al.); psychosocial factors, including anxiety, or depression (Dennis & McQueen, 2007, 2009; J. J. Henderson, Evans, Straton, Priest, & Hagan, 2003; Peat et al.); breastfeeding confidence (Buxton et al., 1991; Loughlin, Clapp-Channing, Gehlbach, Pollard, &
McCutchen, 1985; O’Campo, Faden, Gielen, & Wang, 1992); and breastfeeding self-efficacy (Blyth et al., 2002; Dennis & Faux; Kronborg & Vaeth, 2004).

Although no one variable has been identified as the most influential on breastfeeding outcomes, breastfeeding confidence and breastfeeding self-efficacy have been acknowledged as important variables affecting breastfeeding outcomes that may be amenable to intervention. It is noteworthy that breastfeeding confidence and breastfeeding self-efficacy often are used synonymously among the breastfeeding literature, although breastfeeding confidence is not well defined and lacks a valid measurement tool. To address this limitation and promote the theoretical development of breastfeeding confidence, Dennis (1999) developed the breastfeeding self-efficacy theory and the Breastfeeding Self-Efficacy Scale (BSES).

As such, breastfeeding self-efficacy, defined as a mother’s perceived confidence in her ability to breastfeed her baby, may hold the most promise for further research as a potentially modifiable variable as it has a clear definition, a theoretical framework (Dennis, 1999), and a valid measurement tool (Dennis & Faux, 1999; Dennis, 2003a). However, the studies conducted to date on breastfeeding self-efficacy have been descriptive, identifying breastfeeding self-efficacy as a significant variable affecting breastfeeding duration and exclusivity. No studies have been done to determine whether mothers’ breastfeeding self-efficacy is modifiable or whether increasing mothers’ breastfeeding self-efficacy will improve breastfeeding outcomes. Thus, further research is required to address these important questions.
Problem Statement

Despite increased rates of breastfeeding initiation, duration continues to be a concern because many women prematurely discontinue breastfeeding prior to current breastfeeding recommendations and/or earlier than intended due to difficulties encountered rather than a planned choice. Furthermore, for the past several years, there has been little change in the number of new mothers exclusively breastfeeding.

Various studies have been conducted to address low breastfeeding duration. Many studies have identified mothers at risk of prematurely discontinuing breastfeeding so that target interventions may be initiated. Several of the variables identified as predictors of early cessation of breastfeeding are nonmodifiable demographic variables such as age, education, and income (Dennis, 2002). Targeting breastfeeding programs to different groups of individuals, such as a prenatal education and postnatal home visits to a group of low-income, Hispanic women (Gill, Reifsnider, & Lucke, 2007); a skin-to-skin intervention for culturally diverse women (Chapman, Damio, Young, & Perez-Escamilla, 2004); or breastfeeding peer counseling among low-income, predominantly Latina women (Chapman et al.), may be beneficial. However, the use of these diverse interventions in practice also contributes to a lack of standardized support for all breastfeeding mothers.

Researchers have suggested that if health professionals are to effectively improve low breastfeeding duration rates, they need to identify and address predisposing factors that may be amenable to intervention (Dennis & Faux, 1999). One possible modifiable variable is breastfeeding self-efficacy. However, no study has identified whether
mothers’ breastfeeding self-efficacy may be enhanced to improve breastfeeding outcomes. Thus, this pilot, randomized controlled trial (RCT) was conducted to (a) examine the feasibility and compliance of the trial protocol and the acceptability of the self-efficacy intervention; (b) conduct a preliminary data analysis to identify any trends among participants receiving the breastfeeding self-efficacy intervention versus usual care on breastfeeding self-efficacy, duration, and exclusivity; (c) inform the sample size calculation for a larger trial; (d) determine what combination of variables is predictive of breastfeeding duration at 4 weeks postpartum; and (e) determine what combination of variables is predictive of breastfeeding self-efficacy at 4 weeks postpartum.
CHAPTER 2: REVIEW OF THE LITERATURE AND CONCEPTUAL FRAMEWORK

This chapter reviews the concepts of maternal confidence and breastfeeding self-efficacy and their relationship to infant feeding outcomes, arguing that breastfeeding self-efficacy is an important, potentially modifiable variable that may be amenable to intervention. The literature is reviewed in chronological order to gain an understanding of the progression of evidence and changes in terminology. The similarities and differences between maternal confidence and breastfeeding self-efficacy are discussed, supporting the need for variables to be well defined and conceptualized. Current studies are reviewed in relation to infant feeding outcomes, specifically breastfeeding duration and exclusivity, with research gaps highlighted. Systematic reviews of interventions to improve breastfeeding outcomes also are reviewed, demonstrating areas of promise and those requiring additional research. Limitations of current interventions are discussed as the basis for a new, innovative intervention. Conclusions are summarized following the review of the literature. The chapter concludes with the conceptual framework developed by Dennis (1999) based on Bandura’s (1977) social learning theory.

The benefits of breastfeeding have been documented widely in the literature for infants, mothers, and society. Because of the advantages associated with breastfeeding, various initiatives have been implemented since the 1980s in an effort to increase breastfeeding rates. Many of these initiatives have received global attention in the promotion of breastfeeding through such international policies as the International Code of Marketing of Breast Milk Substitutes (WHO, 1981); the joint statement Protecting, Promoting, and Supporting Breastfeeding WHO/UNICEF (1989); the Innocenti Declaration on the Protection, Promotion, and Support of Breastfeeding (as cited in
WHO/UNICEF, 1990); and the Baby Friendly Hospital Initiative (BFHI; WHO/UNICEF, 1992). Although breastfeeding initiation rates have been increasing over the past 2 decades, the speed at which new mothers discontinue breastfeeding remains a concern, as many infants are not being breastfed for the recommended duration.

Breastfeeding has been recommended as the optimal source of nutrition for infants by the AAP (2005), the Canadian Pediatric Society (2005), Health Canada (2004), and various other organizations. Breastfeeding has been a longstanding recommendation, and many of these organizations have revised and updated their policy statements (Canadian Pediatric Society; Gartner et al., 2005; Health Canada) to reflect current scientific knowledge regarding the benefits of breastfeeding. In particular, the WHO changed its recommendation of exclusive breastfeeding for 4 to 6 months to exclusive breastfeeding for 6 months in 2001. Others followed with changes in recommendations of exclusive breastfeeding to 6 months (AAP; Canadian Pediatric Society) and beyond. More recently, the World Cancer Research Fund/American Institute for Cancer Research (2007) included breastfeeding as a nutritional preventative strategy for breast and ovarian cancer in mothers and obesity in children. This was the first breastfeeding recommendation in a cancer prevention report, and it was based on convincing evidence that breastfeeding protects both mother and child.

Benefits of Breastfeeding

A plethora of studies has highlighted the benefits of breastfeeding in developed and developing countries. Stanley et al. (2007) conducted a systematic review of more than 9,000 abstracts, 43 primary studies on infant health outcomes, 43 primary studies on
maternal health outcomes, and 29 systematic reviews or meta-analyses that included approximately 400 individual studies.

**Infant Outcomes**

Among the infant feeding outcomes examined, Stanley et al. (2007) found that a history of breastfeeding is associated with a reduction in the risk of acute otitis media, nonspecific gastroenteritis, severe lower respiratory tract infections, atopic dermatitis, asthma in young children, obesity, Type 1 and Type 2 diabetes, childhood leukemia, and sudden infant death syndrome. They found no relationship between breastfeeding and cognitive performance after controlling for maternal intelligence. However, a cluster-RCT that included 31 Belarusian hospitals and 17,046 healthy term infants found strong evidence that prolonged and exclusive breastfeeding improved the children’s cognitive development (Kramer et al., 2008).

Kramer et al.’s (2001) multicenter RCT also found that the infants from the intervention sites had a significant reduction in the risk of one or more gastrointestinal tract infections (9.1 vs. 13.2%; adj odds ratio [OR], 0.60; 95% CI: 0.40-0.91) and of atopic eczema (3.3% vs. 6.3%; adj OR, 0.54; CI: 0.31-0.95), but no significant reduction in respiratory tract infection. These findings provided additional support for interventions to enhance breastfeeding duration and exclusivity to improve infant outcomes.

**Maternal Outcomes**

Stanley et al. (2007) also found that a history of breastfeeding is associated with a reduced risk of Type 2 diabetes as well as breast and ovarian cancer. In relation to breast cancer, researchers have reported a significant reduction in the risk of breast cancer by 4.3% for each year of breastfeeding (RR 4.3 99% SE 0.8; Collaborative Group on
Hormonal Factors in Breast Cancer, 2002). Similarly, a dose-response also has been identified with total lifetime breastfeeding for > 12 months and a reduced risk of ovarian cancer.

Stanley et al. (2007) also identified a relationship between not breastfeeding and early cessation of breastfeeding and postpartum depression. However, the nature of the association was not specified in the systematic review. For example, whether postpartum depression may alter the decision to breastfeed or contribute to early cessation, as opposed to whether breastfeeding alters maternal mood, remains equivocal. Within the review, one study reported that depressive symptoms precede breastfeeding discontinuation (J. J. Henderson et al., 2003); another study reported that depressed mothers are less likely to breastfeed, have shorter duration of breastfeeding, and perceive the breastfeeding experience negatively (Dennis & McQueen, 2007, 2009; Seimyr, Edhborg, Lundh, & Sjogren, 2004). The effect of return to prepregnancy weight and postpartum weight loss and breastfeeding was not clear, and no relationship was identified between a history of lactation and osteoporosis.

Increased duration of lactation also was associated with a lower incidence of risk factors for cardiovascular disease in a study of 139,681 U.S. postmenopausal women (Schwarz et al., 2009). In particular, the women who reported a lifetime history of breastfeeding for longer than 12 months were less likely to have hypertension (OR 0.88, \(p < .001\)); diabetes (OR 0.80, \(p < .001\)); hyperlipidemia (OR 0.81, \(p < .001\)); and cardiovascular disease (OR 0.91, \(p = .008\)) than the women who never breastfed. Overall, these findings provided additional support for the benefits of breastfeeding when breastfeeding is exclusive and prolonged.


Societal Outcomes

There are also well-documented societal benefits associated with breastfeeding. In particular, socioeconomic and health care cost benefits are recognized as the result of cost savings for mothers breastfeeding versus formula feeding, less employee absenteeism attributable to childhood illnesses, fewer medical expenditures, and more time and attention for siblings and other family duties (Dennis, 2002; Khoury, Moazzem, Jarjoura, Carothers, & Hinton, 2005; Wambach et al., 2005). Enhanced benefits for the environment, including less need for the disposal of formula cans and bottles and decreased energy demands for the production and transportation of artificial feeding products, also have been identified (Gartner et al., 2005).

Overall, the benefits of breastfeeding for mothers, infants, and society are well known. In addition, because these diverse outcomes are associated with morbidity and mortality for infants and mothers, breastfeeding should be promoted as the optimal source of nutrition for all infants, unless contraindicated.

Contraindications to Breastfeeding

There are relatively few conditions in which breastfeeding would not be considered optimal for infants. These include infants with galactosemia; mothers who have active tuberculosis or are human T-cell lymphotropic virus Type I or Type II positive; mothers receiving diagnostic or therapeutic radioactive isotopes; mothers who are receiving antimetabolites or chemotherapeutic agents, or any of the other few contraindicated medications; mothers who are using drugs of abuse; and mothers who have active herpes lesions of the breast (Dennis, 2002; Gartner et al., 2005). In developed
countries, breastfeeding also is contraindicated in mothers who are infected with the HIV virus (AAP, 2005).

Breastfeeding Duration Rates

Despite the well-documented advantages of breastfeeding, the majority of mothers are not breastfeeding for the recommended duration, nor are they breastfeeding exclusively. In relation to breastfeeding duration, many women discontinue breastfeeding in the early weeks or months postpartum, well before the recommended 6-month duration. For example, two Ontario studies reported a rapid decline in breastfeeding in the first 4 weeks of 13% to 24% among five Ontario hospitals (Sheehan, Krueger, Watt, Sword, & Bridle, 2001) and 26% (Barber, Abernathy, Steinmetz, & Charlebois, 1997). A subsequent study by Sheehan et al. (2006) found similar rates, with 16.4% of mothers discontinuing breastfeeding before 4 weeks at the same five Ontario hospitals, with approximately 69% of the mothers discontinuing before 2 weeks. A national U.S. survey by Li et al. (2003) also found that 26% of mothers cease breastfeeding by 12 weeks, with 7% in the first 4 weeks, an additional 4% by 8 weeks, and 15% by 12 weeks. After the first 12 weeks, the rate of breastfeeding cessation is much smaller (between 2% and 5%) until 11 months. It, therefore, appears that the greatest gains in breastfeeding duration may be made by addressing the frequency of breastfeeding cessation in the early postpartum period.

Although some gains have been made with breastfeeding duration, there remains a considerable gap between current recommendations regarding breastfeeding exclusivity and rates of breastfeeding exclusivity. A cross-sectional design study of breastfeeding rates and patterns in Quebec found that the rate of exclusive breastfeeding among the
participants demonstrated a dramatic nonlinear drop in the first weeks and months postpartum (Haiek, Gauthier, Brosseau, & Rocheleau, 2007). Less than half (48%) of the 632 participants were exclusively breastfeeding at 1 week postpartum, and only 39% were exclusively breastfeeding at 4 weeks. Similarly, a longitudinal study of 11,490 infants in the United Kingdom (UK) found that the rates of exclusive breastfeeding steadily declined from 54.8% in the first 4 weeks to 31% at 12 weeks and only 9.6% at 16 weeks (Pontin, Emmett, Steer, Emond, & ALSPAC Study Team, 2007). A study in southwestern Ontario reported that only 67.8% of the mothers were fully breastfeeding at 1 week and 22.8% at 6 months (Clifford, Campbell, Speechley, & Gorodzinsky, 2006). In addition, rates of exclusive breastfeeding are even lower in low-income populations, minority/racial groups, and adolescents (Anderson, Damio, Chapman, & Perez-Escamilla, 2007; Mossman, Heaman, Dennis, & Morris, 2008; Ryan & Zhou, 2006).

Variables Affecting Breastfeeding Outcomes

Numerous variables have been identified as affecting breastfeeding outcomes, including sociodemographic, attitudinal, and intrapersonal characteristics; hospital policies; intrapartum experiences; and sources of social support (Dennis, 2002). Sociodemographic variables, including maternal age, education, income, ethnicity, and parity, have been acknowledged consistently by researchers (e.g., Blyth et al., 2004; Khoury et al., 2005; Kronborg & Vaeth, 2004; Peat et al., 2004; Taveras et al., 2003; Wambach et al., 2005) and have been identified as predictors of breastfeeding behaviour (Dennis). This research has provided health professionals with a sound knowledge base that may assist in identifying who might be at risk for early discontinuation of
breastfeeding. Although identifying these variables is important in targeting interventions toward at-risk women, these variables are primarily nonmodifiable.

Studies have developed predictive models in an attempt to identify the salient risk factors for early discontinuation of breastfeeding. For example, The Ontario Mother and Infant Survey (Sheehan et al., 2006) conducted a logistic regression analysis to identify the variables associated with breastfeeding discontinuation at 4 weeks postpartum. The model identified nine risk factors (four in hospital and five postdischarge). The four in-hospital identified risk factors included (a) intending to breastfeed for less than 4 months, (b) being born in Canada, (c) infant receiving formula while in hospital, and (d) not expecting to rely on a moms’ support group or drop-in centre while at home. The five factors identified postdischarge included (a) wanting to learn more about bottle-feeding while in hospital, (b) infants having one or more visits to a walk-in clinic, (c) perceiving that the information they received about breastfeeding was anything but supportive, (d) viewing the advice they received about breastfeeding as influencing their choice of infant feeding method, and (e) readmitting the infant to hospital for reasons other than circumcision.

Interestingly, another predictive model identified different variables affecting breastfeeding outcomes, perhaps because different variables were entered into the model. For example, Dunn, Davies, McCleary, Edwards, and Gaboury (2006) performed multivariate logistic regression to examine the relationship between vulnerability factors (e.g., confidence with breastfeeding, postpartum depression, supplementation, and perceived adequacy of support) and breastfeeding outcomes at 6 weeks postpartum, while controlling for age and education. They found that confidence with breastfeeding and
postpartum depression were independently related to breastfeeding outcome. Specifically, each 1-unit increase on the confidence scale increased the likelihood of continuation of breastfeeding (OR: 1.85, 95% CI: 1.50 - 2.27, \( p < .001 \)) compared to women with low confidence (score of 1). Women who scored 12 or greater on the Edinburgh Postnatal Depression Scale (EPDS) were more likely to wean (OR: 0.28, 95% CI: 0.11 - 0.71, \( p < .007 \)) than women who scored less than 12. These studies provided evidence of the complexity of variables associated with breastfeeding outcomes.

**Breastfeeding Goals and Intentions**

Also of importance is that many mothers have reported not meeting their personal goals for intended duration of breastfeeding. For example, a study evaluating the effect of an antenatal educational intervention found that only 43% of the women breastfed for their intended duration (Lavender et al., 2005). Similarly, two other studies found that only 53% (Chezem, Friesen, & Boettcher, 2003) and 41% (Kronborg & Vaeth, 2004) of the mothers reported meeting their goal for breastfeeding duration. In addition, many studies have not evaluated mothers’ intended duration of breastfeeding as duration is typically evaluated against the recommended 6- month duration. Thus, it is important that studies include mothers’ intentions regarding breastfeeding duration because using < 6 months as a standard creates a normative definition of what constitutes early cessation of breastfeeding and may allow for misclassification (Buxton et al., 1991).

**Breastfeeding and Mental Health**

Studies also have found that many women who discontinue breastfeeding prematurely often have negative perceptions of the breastfeeding experience. In particular, a phenomenological study of women who discontinued breastfeeding within
the first 2 weeks postpartum reported that the mothers described a clash between their idealized standards and the reality of their early breastfeeding experiences (Mozingo, Davis, Droppleman, & Merideth, 2000). They further found that many of the women continued to experience feelings of failure, disappointment, or shame and self-doubt about not continuing to breastfeed. Similarly, Graffy and Taylor (2005) found that several women expressed regret that they were not able to breastfeed for as long as they intended and felt that they had not received the support that they needed.

Researchers have suggested that there may be an association between breastfeeding and postpartum depression; however, the relationship between maternal mood and breastfeeding remains equivocal. Although some studies have suggested that early weaning may lead to increased anxiety and/or depression (Papinczak & Turner, 2000), other studies have suggested that mothers suffering from depression are more likely to discontinue breastfeeding (J. J. Henderson et al., 2003), and yet others have found no relationship (McKee, Zayas, & Jankowski, 2004).

Dennis and McQueen (2007) conducted a time sequence analysis that examined the relationship between diverse feeding outcomes (infant feeding method, maternal satisfaction, infant feeding plans, breastfeeding progress and breastfeeding self-efficacy) and maternal mood in a sample of 594 Canadian women. They found that the women with depressive symptoms at 1 week postpartum (EPDS > 12) were significantly more likely to discontinue breastfeeding, be unsatisfied with their infant feeding method, experience significant breastfeeding problems, and report lower levels of breastfeeding self-efficacy by 4 and/or 8 weeks. Likewise, a qualitative systematic review that examined the relationship between infant-feeding outcomes and postpartum depression
reviewed 49 articles and identified similar findings (Dennis & McQueen, 2009). The researchers found that women with depressive symptoms in the early postpartum period may be at risk for negative feeding outcomes, including decreased breastfeeding duration, decreased levels of exclusive breastfeeding, decreased breastfeeding self-efficacy, and increased breastfeeding difficulties.

As such, it is imperative that effective interventions be identified in order for health professionals to assist mothers who want to breastfeed to meet their breastfeeding goals and to decrease any negative feelings associated with premature discontinuation. The identification of mothers with depressive symptoms is necessary to not only decrease the morbidity associated with postpartum depression but also to potentially avoid negative breastfeeding outcomes, such as early discontinuation of breastfeeding, dissatisfaction with infant feeding, breastfeeding difficulties, and low breastfeeding self-efficacy. In particular, efforts should be focused on decreasing the number of women who prematurely discontinue breastfeeding in the early postpartum period (8 weeks) and increasing the number of mothers who are exclusively breastfeeding in the same period. Assisting mothers to meet their goals may enhance mothers’ perception of themselves and the breastfeeding experience. Mothers’ confidence, also referred to as breastfeeding self-efficacy, is a potentially modifiable variable that has been consistently associated with breastfeeding outcomes (duration and exclusivity); intention to breastfeed; and psychosocial variables, including anxiety and depression. Further research into the modification of mothers’ breastfeeding self-efficacy is warranted.
Confidence and Breastfeeding Outcomes

Several studies have been conducted on mothers’ confidence and breastfeeding outcomes. Although the studies have collectively demonstrated similar findings, different terminology used to describe confidence and the lack of a consistent definition of confidence has limited the generalizability of the findings. As such, the reader will note the use of diverse terminology to describe the studies that have evaluated confidence and breastfeeding outcomes.

Early research has associated a lack of confidence in breastfeeding with negative breastfeeding outcomes (Buxton et al., 1991; Loughlin et al., 1985). In an American study of 94 breastfeeding mothers and infants recruited in the early postpartum period, Loughlin et al. found that maternal lack of confidence in breastfeeding was significantly \( (p < .001) \) associated with discontinuation of breastfeeding by 8 weeks (see Appendix A). They reported that anticipated duration of breastfeeding was significantly correlated with low confidence in breastfeeding \( (r = .34) \); mothers with low maternal confidence frequently reported their intended duration of breastfeeding to be < 6 months.

Buxton et al. (1991) evaluated the variables affecting early discontinuation of breastfeeding at 1 week among 187 American women. Women who intended to initiate breastfeeding upon the birth of their infants were recruited during the third trimester of pregnancy for a prenatal and a postnatal interview. The researchers found that 12 women (6.4%) who intended to breastfeed did not initiate breastfeeding upon the birth of their newborns. Although the mothers cited various reasons for not initiating breastfeeding, the researchers identified that these women had the lowest confidence in their ability to breastfeed among the mothers \( (F = 3.97, df = 2, p = .02) \). As such, the mothers who were
the least confident ($M = 3.7$) were more likely to not initiate breastfeeding, and the mothers with low confidence ($M = 4.1$) were more likely to discontinue breastfeeding within 1 week, when compared to the mothers who breastfed for longer than 1 week ($M = 4.7$). A “failed” breastfeeding attempt was 4 to 5 times more likely among the women who were less confident than those who were identified as confident.

O’Campo et al. (1992) evaluated psychosocial, demographic, and medical factors among 198 urban American pregnant women to assess what antenatal factors might be associated with longer breastfeeding duration. Of the factors evaluated, maternal confidence was found to be one of five variables that significantly influenced breastfeeding duration. The women who lacked confidence in their ability to breastfeed in the antenatal period were 3 times (RR: 3.1, 95%; CI: 1.39-6.76) more likely to discontinue breastfeeding, in comparison to breastfeeding women who were identified as very confident. In addition, the researchers suggested that maternal confidence affects not only breastfeeding duration but also the anticipated length of breastfeeding duration. In particular, there was a positive increase in the anticipated length of planned breastfeeding with increases in maternal confidence.

More recent studies also have identified similar findings. In particular, a prospective cohort study of 1,163 American low-risk mother-and-infant pairs found that the women who expressed confidence in their ability to breastfeed at the 1- to 2-day postpartum interviews were positively related to continuation of breastfeeding at 2 and 12 weeks (Taveras et al., 2003). The researchers also found the opposite: Mothers who reported a lack of confidence in their ability to breastfeed 1 to 2 days postpartum
(OR = 2.8; 95% CI: 1.02-7.6) were almost 3 times as likely to have discontinued breastfeeding by 2 weeks.

A secondary analysis of a cross-sectional study of 526 postpartum women in Ontario also found that the women who scored the lowest (1 out of 5) on breastfeeding confidence were 34 times more likely to discontinue breastfeeding (OR = 34.57, 95% CI: 9.44-126.5, \( p < .001 \)) than the women with higher confidence (Dunn et al., 2006). They further identified that the women who scored 2 or less on the confidence item were 3 times more likely to discontinue breastfeeding (OR: 3.10, 95% CI: 1.36-7.07, \( p = .01 \)). The researchers also evaluated the effect of vulnerability factors (e.g., confidence, postpartum depression, perceived adequacy of support, and supplementation) on breastfeeding outcomes at 6 weeks. They concluded that low confidence and depression have a much greater influence on early cessation of breastfeeding than nonmodifiable variables such as age and education.

An Australian study of 159 mothers that evaluated breastfeeding self-confidence on both initiation and duration of breastfeeding found that the establishment of breastfeeding was significantly associated with enhanced self-confidence to breastfeed for a short term (Papinczak & Turner, 2000). In this study, the mothers were interviewed in the early postpartum period, that is, prior to discharge, and then followed up at 12 weeks and 6 months postpartum. Increased breastfeeding self-confidence was one of the variables identified as significantly associated with longer breastfeeding duration. The mothers who continued to breastfeed for longer than 6 months reported high self-confidence in their ability to breastfeed for a long time (64%). Overall, the researchers
observed a significant positive correlation between breastfeeding confidence and breastfeeding duration.

Comparable finding also were identified in a study examining breastfeeding confidence among mothers who were eligible for the Women, Infants, and Children (WIC) Program. In this longitudinal, observational study of 64 American mothers intending to breastfeed, Ertem, Votto, and Leventhal (2001) found that the women who lacked confidence in the early postpartum period that they would be breastfeeding at 2 months postpartum (RR: 2.38, 95% CI: 1.82-6.18) were more likely to discontinue breastfeeding within the first 2 weeks postpartum. In addition, the mothers who were identified as not confident in their ability to breastfeed for 2 months were almost 12 times more likely to stop breastfeeding before 2 months than those who were confident.

American researchers also have related low maternal confidence/commitment to breastfeeding to the mothers’ perceptions of insufficient milk supply (IMS; Hill & Humenick, 1996). The purpose of this study was to assess the psychometric properties of the H & H Lactation Scale, based on the IMS conceptual framework. Hill and Humenick found that maternal confidence/commitment to breastfeeding played a significant role in sustaining breastfeeding. In particular, the mothers who decreased their level of breastfeeding tended to report low confidence/commitment to breastfeeding, low maternal-perceived infant breastfeeding satiety, and low breastfeeding satisfaction than the mothers who were breastfeeding exclusively. This was a significant finding because mothers’ perception of IMS consistently has been reported as one of the more common reasons for early discontinuation of breastfeeding (Wambach et al., 2005).
Likewise, a lack of confidence in breastfeeding was significantly associated with perceived IMS in a low-income urban population in Mexico (Segura-Millan, Dewey, & Perez-Escamilla, 1994). In this study of 165 Mexican mothers, 80% of the participants reported a perception of IMS at some point during the study. The multivariate analysis indicated that a lack of breastfeeding confidence was a significant variable \((p < .05)\) associated with perceived IMS.

Two qualitative studies in the UK also identified a relationship between low confidence and perceptions of IMS (Dykes & Williams, 1999; Dykes, Moran, Burt, & Edwards, 2003). In particular, a phenomenological study of the lived experience of breastfeeding with primiparous mothers in the UK revealed that several of the mothers expressed a lack of confidence in their ability to exclusively breastfeed their babies; consequently, many of the participants discontinued due to what they perceived as IMS (Dykes & Williams). Furthermore, very few of the mothers met their intended duration of breastfeeding. Similarly, two focus groups conducted with adolescent mothers in the UK who had breastfed or were breastfeeding their babies found “lacking confidence” to be one of five themes that emerged (Dykes et al.). A lack of confidence was expressed in both the adolescent mothers’ ability to carry out breastfeeding effectively and whether they would be able to produce enough milk.

Studies evaluating various measures of confidence and breastfeeding outcomes collectively have identified a positive association with increased confidence and increased breastfeeding duration and exclusivity (O’Campo et al., 1992; Papinczak & Turner, 2000; Taveras et al., 2003). Likewise, a lack of confidence has been correlated with early discontinuation of breastfeeding; low exclusive breastfeeding (Dunn et al.,
2006; Loughlin et al., 1985; O’Campo et al.); and noninitiation of breastfeeding among mothers who intended to breastfeed (Buxton et al., 1991). These findings were evident in the prenatal (Buxton et al.; O’Campo et al.) and postnatal assessments (Dunn et al., 2006; Loughlin et al.; O’Campo et al.; Taveras et al.) of the mothers’ confidence. In addition, these findings were identified in such diverse countries as Australia (Papinczak & Turner); Canada (Dunn et al.); Mexico (Segura-Millan et al., 1994); the UK (Dykes & Williams, 1999; Dykes et al., 2003); and the United States (Buxton et al.; Loughlin et al.; O’Campo et al.; Taveras et al.), as well as populations including WIC participants (Ertem et al., 2001) and adolescents (Dykes et al.). Finally, a lack of confidence in breastfeeding has been associated with perceptions of IMS (Dykes et al.; Hill & Humenick, 1996), which is one of the most commonly cited reasons for early discontinuation of breastfeeding. Lack of maternal confidence also has been found to be related to intended duration of breastfeeding (Loughlin et al.; O’Campo et al.). Overall, confidence has been identified as a salient variable affecting breastfeeding outcomes in diverse populations.

Confidence also has been identified as a variable that may be modified or is amenable to intervention. As such, it would seem reasonable that increasing mothers’ confidence in breastfeeding may lead to improved breastfeeding outcomes. However, a prevalent limitation among the aforementioned confidence studies affecting the generalizability of the findings and the development of an intervention was that confidence in breastfeeding has suffered from an atheoretical perspective in the extant literature (Dennis, 1999). The majority of the studies on breastfeeding confidence have failed to define confidence. For example, the researchers used various terms to describe confidence: maternal confidence (Dunn et al., 2006; O’Campo et al., 1992); confidence in
breastfeeding (Loughlin et al., 1985; Segura-Millan et al., 1994); confidence in ability to
breastfeed (Buxton et al., 1991; Papinczak & Turner, 2000); and so on. As a result, the
outcomes also have been presented in various ways, such as a lack of confidence in
breastfeeding (Loughlin et al.); a lack of confidence in ability to breastfeed (Taveras et
al., 2003); confidence in ability to be breastfeeding at 8 weeks postpartum (Ertem et al.,
2001); and confidence to exclusively breastfeed infant (Dykes & Williams, 1999).

Confidence also has been measured in diverse ways in previous studies. For
dexample, some studies have measured confidence with a simple question, “How
certain do you feel about feeding your baby?” with responses such as very worried to
very confident (Loughlin et al., 1985; Taveras et al., 2003); other studies have used a
simple yes/no response to, “Do you feel confident feeding your baby?” (Segura-Millan et
al., 1994); and yet others have used a confidence questionnaire (Buxton et al., 1991;
O’Campo et al., 1992). This lack of a standardized measure to evaluate confidence
hinders one’s ability to (a) make any conclusions regarding the comparability of the
“confidence” findings, and (b) understand how mothers develop breastfeeding confidence
or how confidence may be altered among breastfeeding mothers. This is congruent with
Bandura’s argument (1997) that confidence is a nondescript term that refers to the
strength of one’s belief, but does not necessarily specify what the certainty is about.
Furthermore, he believed “confidence to be a catchword rather than a construct embedded
in a theoretical system” (p. 382). To address this limitation, Dennis (1999) utilized
Bandura’s (1977) social learning theory to study breastfeeding confidence.
Social Learning Theory

Social learning theory posits that people learn from others through observation, imitation, and modeling (Bandura, 1977). In particular, people learn from observing others’ behaviours and attitudes, as well as the outcomes of those behaviours. Bandura suggested that through observational learning, an individual is able to code or symbolize how a new behaviour may be performed and then uses this new information later to guide behaviour. In addition, he believed that there is a self-regulatory process in learning. As such, individuals are able to select, organize, and transform the stimuli that they encounter, rather than simply react to external influences. Fundamental to social learning theory is the concept of self-efficacy (Bandura).

Self-Efficacy Theory

Bandura (1977) defined self-efficacy as an individual’s judgement of his or her capabilities to organize and execute courses of action required to attain designated types of performances. Self-efficacy is a cognitive process that is concerned with our beliefs that our actions can produce the outcomes that we desire. Self-efficacy values provide the foundation for many individual behaviours, including motivation, well-being, and personal accomplishment (Bandura). For example, when individuals believe that they are capable of producing the desired outcomes, they are more likely to pursue the behaviours. Alternatively, if individuals believe that they are not capable, they are less likely to act or persevere, especially if confronted with any barriers (Bandura). Therefore, individuals tend to select tasks and activities in which they feel confident and avoid those in which they do not feel confident.
Bandura (1977) described efficacy beliefs and outcome expectancy as distinct concepts. Efficacy beliefs are concerned with an individual’s judgement regarding the ability to carry out certain behaviours; outcome expectancy is the belief in the likelihood that the behaviour will lead to a specific outcome. For example, individuals may believe that quitting smoking would be healthier and decrease the risk of heart disease and cancer (outcome expectancy). However, if those individuals have low efficacy beliefs in their ability to quit smoking, they are unlikely to quit smoking. Thus, despite believing that a certain course of action will achieve specific outcomes, individuals may not engage in the behaviour if they perceive that they do not possess the ability to achieve the outcome.

Bandura also believed that the outcomes people expect often are dependent upon their judgement of what they can accomplish. For example, people who have strong efficacy beliefs anticipate positive outcomes, just as confident students foresee high marks and academic success. Likewise, people with low efficacy beliefs tend to anticipate failure and give up quickly in the face of any barriers or setbacks.

Thus, efficacy beliefs are a critical component of the way people function on a daily basis as individuals. Efficacy beliefs influence how people think, feel, and motivate themselves (Bandura, 1997). However, efficacy beliefs reflect perceptions of abilities rather than true abilities (Bandura). For example, individuals may feel low self-efficacy to lose weight while being very capable of losing weight. As such, self-efficacy theory posits that people’s beliefs in their abilities to perform specific behaviours influence (a) their choice of behavior and situations that they will attempt or avoid; (b) the effort that they will spend on a task, particularly when it is perceived that they will be successful; (c) how long they will persist with a task that they consider difficult; and (d) emotional
reactions that may occur when confronted with the threat of failure (Bandura). Thus, individuals tend to pursue tasks that they feel capable of achieving and avoid those in which they lack confidence.

Bandura (1997) identified self-efficacy as a multifaceted phenomenon, indicating that a high sense of self-efficacy in one aspect does not translate into a high sense of self-efficacy in other areas. For example, one’s perceived efficacy to control eating is likely not related to one’s perceived efficacy for public speaking. As such, self-efficacy beliefs are highly variable across realms of activity, under different levels of task demand, and under different situational circumstances (Bandura). Thus, it is imperative that measures of self-efficacy be tailored to domains of functioning that represent various gradients of task demands. In turn, this requires a good conceptual analysis of the phenomenon of interest.

**Sources of Self-Efficacy**

Bandura (1977) identified four main sources of information that may influence an individual’s perceived ability to master a particular behaviour: (a) performance accomplishment (past experience); (b) vicarious experience (observation of others); (c) verbal persuasion (encouragement from others); and (d) emotional arousal (pain, anxiety, and fatigue).

*Performance accomplishment.* Performance accomplishment, also referred to as enactive mastery experience, has been recognized as the most influential of the sources of self-efficacy as the basis of one’s personal experiences (Bandura, 1986). Successes build a strong sense of personal self-efficacy, whereas failures tend to undermine self-efficacy, especially if experienced before a sense of self-efficacy has been established (Bandura).
Therefore, early experiences can be critical in the development of self-efficacy beliefs. For example, easy success may encourage one who is confronted with a new task to expect quick results, and one may become easily discouraged when difficulties are encountered. Conversely, an individual who has to overcome barriers to achieve goals may learn to become resilient and experience success based on sustained effort to achieve those goals. Thus, when individuals believe that they are capable of achieving the desired outcomes, they may be more likely to persevere when confronted with barriers and rebound quickly from setbacks (Bandura).

*Vicarious experience.* Vicarious experience (e.g., the observation of others) can create and strengthen sources of self-efficacy beliefs, particularly when people see themselves as similar to the individuals being modeled (Bandura, 1986). Thus, the greater the similarities between the models and the individuals, the more influence the models are likely to have. If individuals can relate to the models or see themselves as similar, they are more likely to view their capabilities as similar. Observing others succeed by sustained effort raises the observers’ beliefs that they also may be capable of succeeding (Bandura). The opposite is also true in that observation of others’ failure at a task, despite effort and persistence, can lower or undermine self-efficacy.

*Verbal persuasion.* A third source of strengthening self-efficacy beliefs is through verbal persuasion. People who are persuaded that they are capable of achieving the designated performance are more likely to suspend greater energy and persevere. In turn, persuasive increases in self-efficacy can lead people to try harder to succeed, and self-affirming beliefs may promote the development of skills and a personal sense of self-efficacy (Bandura, 1986). However, it also is easy to lower or undermine self-efficacy
beliefs through social persuasion (Bandura). If unrealistic goals are envisioned through social persuasion, individuals may feel a lack of capability and avoid challenging activities. Additionally, if unrealistic beliefs of personal capabilities are raised and result in failure, the persuader may be discredited and the recipients’ beliefs in their capabilities further undermined (Bandura, 1997).

Bandura (1977) asserted that verbal persuasion is widely used because of its ease and availability. However, he also noted that it may be a weaker form of influence on efficacy because verbal persuasion creates expectations without providing an experiential base for them. As such, successful efficacy builders should do more than convey positive appraisals (Bandura). Effort should be given to structure situations where success may be displayed and may avoid placing people in situations prematurely where they may be more likely to fail. Bandura also encouraged individuals to measure success in terms of self-improvement rather than as a comparison or a triumph over others.

The effect of persuasion on perceived self-efficacy also is related to an extent on the perceived reliability, skill, expertise, and ability of the persuasive source (Holloway & Watson, 2002). When the source is perceived to have in-depth knowledge and experience, the source is trusted more; however, these sources may be considered weaker if the individual perceives that the demands of the task/circumstances are not well understood. Thus, the credibility of the persuasive source is determined by the individual receiving the verbal persuasion and may include individuals who have gone through similar experiences, are recognized experts on the topic or who are skilled in the activity.

Physiologic and emotional states. Bandura (1986) also found that emotional arousal can influence individuals’ self-efficacy. In situations where individuals are
stressed or experiencing physiologic arousal, they often interpret the physiologic signs as vulnerable to dysfunction (Bandura, 1997). In addition, when the stress or physiologic arousal is high, individuals are less likely to be successful in accomplishing the desired outcomes, which may further lead to inefficacious beliefs. Furthermore, this process can lead to the anticipation of elevated levels of stress, which can lead to aversive thoughts and distress that may produce the difficulty that they fear. As such, reducing stress levels, negative perceptions, and misinterpretations of bodily states is a key way of altering self-efficacy beliefs.

Mood states also have the ability to alter perceived self-efficacy. In particular, positive mood tends to increase self-efficacy, whereas low mood may lower self-efficacy (Bandura, 1997). Situational circumstances also can affect self-efficacy in that an individual’s level of self-efficacy may change in situations where there is a higher risk of feared consequences (Bandura, 1977).

Since Bandura’s seminal publication of social learning theory in 1977 introduced the subject of self-efficacy, numerous publications by a multitude of researchers, including Bandura himself, have resulted in the proliferation of information regarding self-efficacy. In 1997, Bandura described several ways self-efficacy has been evaluated over many years, including health functioning (health promotion); self-management of chronic disease; clinical functioning (anxiety and phobic dysfunctions, depression, eating disorders, alcohol and drug abuse); athletic functioning (athletic skills, self-regulation of performance, collective team efficacy); organizational functioning (career development, collective organizational efficacy), and so on. In addition, hundreds of articles have been
published regarding self-efficacy and diverse outcomes in various settings, including breastfeeding self-efficacy.

Breastfeeding Self-Efficacy

To build on Bandura’s (1977) self-efficacy theory, Dennis (1999) developed the self-efficacy framework to conceptualize maternal confidence. Dennis defined breastfeeding self-efficacy as a mother’s perceived ability to breastfeed her infant. Breastfeeding self-efficacy also can be defined as a mother’s confidence in her ability to successfully breastfeed her baby. As such, breastfeeding self-efficacy and breastfeeding confidence appear similar and have been used synonymously in some studies (Dunn et al., 2006; Khoury et al., 2005; Mitra, Khoury, Hinton, & Carothers, 2004). However, there are some distinct differences between confidence and self-efficacy. In particular, confidence often is measured in a generalized manner to reflect a more global self-perception, whereas breastfeeding self-efficacy is based on a theoretical model with a clear definition of what constitutes self-efficacy. Perceived self-efficacy refers to one’s agentive capabilities that one can produce given levels of attainment (Bandura, 1997). As such, self-efficacy assessments include an affirmation of capability level and the strength of the belief. Self-efficacy beliefs also have been clearly described as task and situation specific (Bandura, 1977). Thus, self-efficacy has been identified as multidimensional, requiring multiple measures of personal efficacy addressing the various gradients of tasks and domains associated with breastfeeding (Bandura, 1997).

Although it has been noted that the concepts of confidence and breastfeeding self-efficacy have both similarities and differences, they often are used interchangeably within
the breastfeeding literature and this thesis. As such, confidence throughout this study implies a mother’s perceived confidence in her ability to breastfeed successfully.

Self-efficacy theory also identifies the manner in which self-efficacy beliefs are developed. This improves one’s ability to understand how self-efficacy beliefs vary and how efficacy beliefs may be influenced among individuals. Having a concise definition of self-efficacy and a theoretical model further enhances our ability to build on theoretical and empirical findings regarding breastfeeding self-efficacy. For example, utilizing self-efficacy theory, Dennis (1999) posited that mothers’ breastfeeding self-efficacy will predict (a) if a mother chooses to breastfeed, (b) how much effort she will expend, (c) if she will have self-enhancing or self-defeating thought patterns, and (d) how she will emotionally respond to breastfeeding difficulties. In particular, Dennis proposed that efficacious (e.g., confident) mothers would be more likely to initiate breastfeeding; persist with breastfeeding, even if confronted with difficulties; use positive, self-encouraging strategies; and cope well when confronted with perceived barriers. Dennis also suggested that Bandura’s (1977) four sources of information may affect new mothers’ breastfeeding self-efficacy and that attention needs to be given to mothers’ breastfeeding self-efficacy and how it may be influenced and predict breastfeeding outcomes. These hypotheses have been substantiated in several studies evaluating breastfeeding self-efficacy and infant feeding outcomes. Finally, recognizing this multidimensional component of self-efficacy, Dennis and Faux (1999) developed and psychometrically tested the BSES as a measure of mothers’ breastfeeding self-efficacy.
**Breastfeeding Self-Efficacy Scale**

The BSES was originally developed as a 33-item, self-report instrument to measure breastfeeding confidence (Dennis & Faux, 1999). The BSES was pilot tested and psychometrically assessed with 130 Canadian breastfeeding women at 1 week postpartum (see Table 1). Psychometric testing demonstrated internal consistency, construct, and predictive validity (Dennis & Faux). The predictive validity of the BSES was evaluated by determining the relationship between mothers’ breastfeeding self-efficacy and method of infant feeding at 6 weeks postpartum. A significant difference was found ($p < .05$) between the self-efficacy scores and the feeding groups (breast, combination, or bottle), demonstrating the clinical utility of the tool to predict breastfeeding outcomes (Dennis & Faux). Initial testing revealed that the BSES is a valid and reliable instrument in a Canadian cohort; further testing was recommended in diverse populations at various intervals throughout the perinatal period.

Subsequently, psychometric testing was carried out on an Australian sample of 300 mothers; the BSES was administered antenatally and at 1 week and 16 weeks postpartum (Creedy et al., 2003). Psychometric assessment replicated the original validation study of the BSES. Results revealed added support for the reliability and validity of the BSES in the Australian sample. In addition, the BSES was translated and validated in a Chinese cohort (Dai & Dennis, 2003) and a Puerto Rican sample of postpartum mothers (Torres, Torres, Rodriguez, & Dennis, 2003). Finally, the BSES was shortened to a 14-item questionnaire, the Breastfeeding Self-Efficacy Scale-Short Form (BSES-SF; see Appendix B) and has since been psychometrically tested in two Canadian cohorts (Dennis, 2003a; Kingston, Dennis, & Sword, 2007) and an ethnically diverse
sample of mothers in the UK (Gregory, Dennis, Morrison, Penrose, & MacArthur, 2008). The BSES-SF has also been translated and psychometrically tested with Polish mothers (Wutke & Dennis, 2007).
Table 1

*Psychometric Testing of BSES and BSES-SF*

<table>
<thead>
<tr>
<th>Version</th>
<th>Sample</th>
<th>Cronbach’s alpha (α)</th>
<th>Predictive validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSES (Dennis &amp; Faux, 1999)</td>
<td>130 in-hospital Canadian breastfeeding mothers (primiparous and multiparous)</td>
<td>.96</td>
<td>A significant difference was found between BSES scale scores and infant feeding method at 6 weeks. F (118) 9.89, p = &lt; .001. BSES scores: exclusive breastfeeding $M = 173.5$, combination feeding $M = 161.9$ and exclusive bottle-feeding $M = 145.3$.</td>
</tr>
<tr>
<td>BSES (Creedy et al., 2003)</td>
<td>300 Australian antenatal women intending to breastfeed</td>
<td>.97 antenatal .96 1 week and 4 months postpartum</td>
<td>Significant differences in antenatal BSES were found among mothers who at 1 week were exclusively breastfeeding, combination feeding or exclusively bottle-feeding $t (274) = 3.68, p &lt; .001$. Similar BSES difference were found among mothers breastfeeding and bottle-feeding at 4 months $t (252) = 7.17, p &lt; .001$.</td>
</tr>
<tr>
<td>BSES (Dai &amp; Dennis, 2003)</td>
<td>186 Chinese primiparous breastfeeding mothers in hospital</td>
<td>.93</td>
<td>Self-efficacy scores postpartum and infant feeding method at 4 weeks ($t [179] = 4.32, p &lt; .001$) and 8 weeks ($t [179] = 4.286, p &lt; .001$)</td>
</tr>
<tr>
<td>BSES (Torres et al., 2003)</td>
<td>100 Puerto Rican breastfeeding mothers (primiparous and multiparous)</td>
<td>.96</td>
<td>Not evaluated</td>
</tr>
<tr>
<td>BSES-SF (Dennis, 2003a)</td>
<td>491 Canadian breastfeeding mothers at 1 week postpartum (primiparous and multiparous)</td>
<td>.94</td>
<td>Breastfeeding self-efficacy scores at 1 week were significantly related to infant feeding method at 4 weeks $[F (2) = 55.60, p &lt; .001$ and 8 weeks $[F (2) = 47.45, p &lt; .001$</td>
</tr>
<tr>
<td>BSES-SF Kingston et al. (2007)</td>
<td>63 Canadian breastfeeding mothers in hospital</td>
<td>.94</td>
<td>Breastfeeding self-efficacy scores at 48 hours postpartum were significantly related to infant feeding method at 4-weeks $t (60) = 3.12, p = .003$.</td>
</tr>
<tr>
<td>BSES-SF Wutke &amp; Dennis (2007)</td>
<td>105 in-hospital, Polish breastfeeding mothers</td>
<td>.89</td>
<td>Breastfeeding self-efficacy scores in hospital were associated with infant feeding at 8 weeks $t (103) = 3.07, p = .003$ and 16 weeks $t (103) = 4.53, p = .001$.</td>
</tr>
<tr>
<td>BSES-SF Gregory et al. (2008)</td>
<td>165 ethnically diverse breastfeeding mothers in hospital in the UK</td>
<td>.90</td>
<td>In-hospital BSES-SF were significantly associated with infant feeding method at 4 weeks ($F [2] 1.62, p &lt; .001$)</td>
</tr>
</tbody>
</table>
Breastfeeding Self-Efficacy and Breastfeeding Outcomes

Studies have identified breastfeeding self-efficacy as a significant variable affecting breastfeeding outcomes. These studies are discussed in detail in Appendix A. For example, a study of 130 Canadian breastfeeding mothers evaluated breastfeeding self-efficacy scores in hospital using the BSES and infant feeding method at 6 weeks postpartum by telephone (Dennis & Faux, 1999). The researchers found a significant difference in breastfeeding self-efficacy scores among the mothers who were exclusively breastfeeding ($M = 173.5$); combination feeding ($M = 161.9$); and exclusively bottle-feeding ($M = 145.3$) at 6 weeks, $F(116) = 9.89, p = < .001$. Their results demonstrated that the higher the breastfeeding self-efficacy score in hospital, the more likely it was that the mothers would be exclusively breastfeeding at 6 weeks. Importantly, this study demonstrated the predictive validity of the BSES, suggesting that it may have significant clinical utility in identifying mothers who may be at risk for early discontinuation of breastfeeding.

Similarly, in a prospective longitudinal study of 300 pregnant women in Brisbane, Australia, Blyth et al. (2002) evaluated the effect of breastfeeding self-efficacy on breastfeeding duration. Breastfeeding self-efficacy was measured with the BSES in the last trimester of pregnancy and at 1 week and 16 weeks postpartum. Antenatal and 1-week breastfeeding self-efficacy scores were significantly related to breastfeeding outcomes at 1 and 16 weeks. Mothers who were breastfeeding at 1 week were significantly more likely to have higher breastfeeding self-efficacy scores ($M = 128.10$ $SD = 22.74$) antenatally than mothers who were bottle-feeding ($M = 109.57$ $SD = 27.18$;
Likewise, the 1-week BSES scores were significantly different among the mothers who were breastfeeding or bottle-feeding at 16 weeks postpartum ($t[252] = 7.17, p < 0.001$), with breastfeeding mothers ($M = 146.97$ $SD = 15.56$) having higher mean breastfeeding self-efficacy scores than the bottle-feeding mothers ($M = 126.48$ $SD = 25.82$). There also was a considerable difference in mean BSES scores among the women who were exclusively breastfeeding, partially breastfeeding, and formula feeding at 1 week and 16 weeks. These findings suggested that breastfeeding self-efficacy is significantly related to breastfeeding duration and level. These findings also supported the predictive validity of the BSES scores antenatally and in the early postpartum period as the mothers with high breastfeeding self-efficacy were more likely to be breastfeeding and doing so exclusively at 1 week and 16 weeks than the mothers with low breastfeeding self-efficacy.

Comparable findings were identified in three non-English-speaking populations using translated versions of the BSES (Dai & Dennis, 2003; Torres et al., 2003) and the BSES-SF (Wutke & Dennis, 2007). In a study of 186 Chinese women, Dai and Dennis found that self-efficacy scores in the early postpartum period were predictive of infant feeding method at 4 and 8 weeks. In particular, data analysis revealed that the mothers with high breastfeeding self-efficacy scores in the early postpartum period were more likely to be breastfeeding at 4 and 8 weeks postpartum, and doing so exclusively. Conversely, the mothers who were bottle-feeding by 4 weeks had significantly lower breastfeeding self-efficacy scores ($t[179] = 4.32, p < .001$), as did the mothers who were bottle-feeding at 8 weeks ($t[179] = 4.286, p < .001$). Torres et al. also found significant mean differences in breastfeeding self-efficacy scores among Puerto Rican women who
were exclusively breastfeeding ($X = 139.64 \pm 17.38$) and mothers who were breastfeeding with some form of supplementation ($X = 126.17 \pm 23.46$; $t = 2.96$, $p < .001$). Wutke and Dennis also found significant mean differences in BSES scores in hospital among 105 Polish mothers using a translated version of the BSES-SF. Consistent with other researchers, the BSES-SF in-hospital scores were predictive of breastfeeding duration and breastfeeding exclusivity at 8 and 16 weeks.

Gregory and colleagues (2008) examined the relationship between breastfeeding self-efficacy and maternal demographic variables among a multicultural sample of 165 breastfeeding women in the UK. They found that mothers that were exclusively breastfeeding at 4 weeks postpartum had significantly higher in-hospital BSES-SF scores ($M = 49.4$, SD 12.9) than mothers who were partially breastfeeding ($M = 44.7$, SD = 9.5) or bottle-feeding ($M = 42.2$, SD 11.7): $F [2] = 1.62$, $p < .001$). Interestingly, of the demographic variables evaluated, they found that Caucasian mothers had significantly lower mean scores ($M = 44.4$, SD = 12.1) than those of other ethnicity ($M = 48.4$, SD 12.9; $t [163] = -2.06$, $p = .04$) including Southeast Asian mothers. No association was found between BSES-SF scores and other demographic variables such as maternal age ($F [3] = .55$, $p = .65$) or level of education ($F [3] = 0.46$, $p = .70$).

Additional studies also have identified similar findings using the BSES-SF to measure breastfeeding self-efficacy. In a prospective correlational study of 100 Canadian adolescent mothers, the participants, who were recruited prenatally from an adolescent antenatal clinic were administered the BSES-SF as a measure of breastfeeding confidence (Mossman et al., 2008). The mothers were then contacted at 1 week postpartum to readminister the BSES-SF and then at 4 weeks postpartum to determine the method of
infant feeding and the reasons for terminating breastfeeding, if they were no longer breastfeeding. Of the 24 mothers with low breastfeeding self-efficacy, only 5 (21%) continued to breastfeed for at least 28 days, in comparison to 41 (70%) of the 59 mothers with high breastfeeding self-efficacy who continued to breastfeed for at least 28 days. As such, the mothers with high breastfeeding self-efficacy, as measured by the BSES-SF, were more likely to maintain breastfeeding for the 28-day contact period (hazard ratio = 4.19, \(p = .001\)). The Cox multivariate regression identified postnatal breastfeeding self-efficacy as the most significant predictor of breastfeeding duration at 28 days when examined with prenatal attitudes and prenatal self-efficacy.

Researchers also have found self-efficacy to be a salient variable affecting breastfeeding outcomes when compared to other variables (Blyth et al., 2004; Kronborg & Vaeth, 2004). In particular, Blyth et al. sought to examine the effect of modifiable variables on breastfeeding duration at 1 and 16 weeks. Variables of interest included breastfeeding intentions, provision of breastfeeding information, breastfeeding support, and breastfeeding self-efficacy. Demographic variables also were measured. Of the variables that were examined, breastfeeding information, support, intended duration of breastfeeding, and breastfeeding self-efficacy were associated with breastfeeding duration at 1 week postpartum. No maternal demographic variables were statistically associated with breastfeeding outcomes at 1 week. However, at 16 weeks postpartum, the maternal demographic variables of age (\(X^2 = 8.80, p < .05\)); education (\(X^2 = 7.75, p < .05\)); and previous breastfeeding experience (\(X^2 = 7.35, p < .05\)) were significantly associated with breastfeeding duration. Antenatal breastfeeding intentions (\(X^2 = 33.67, \))
and antenatal breastfeeding self-efficacy ($X^2 = 14.89, p < .001$) continued to be significantly associated with breastfeeding duration at 16 weeks. Logistic regression identified that intended duration of breastfeeding and breastfeeding self-efficacy were the most significant modifiable variables predictive of breastfeeding duration.

One study sought to examine the relationship between perceptions of IMS and breastfeeding confidence using the BSES-SF among 262 breastfeeding mothers in Japan (Otsuka, Dennis, Tatasuoka, & Jimba, 2008). While the majority of mothers intended to breastfeed exclusively, less than 40% were exclusively breastfeeding at 4 weeks postpartum. The most common reason for supplementation was perceived IMS cited by 73% of the mothers. The researchers found that the mothers’ perception of IMS was significantly correlated with breastfeeding self-efficacy in hospital ($r = .45, p < .001$). They concluded that increasing breastfeeding self-efficacy in the immediate postpartum period may reduce the perception of IMS and early discontinuation of breastfeeding among new mothers.

Similarly, Kronberg and Vaeth (2004) identified self-efficacy as one of a number of psychosocial variables identified as independent predictors of breastfeeding duration. In this study of 471 Danish mothers, the researchers found that duration of schooling ($p = .002$); mother’s intention to breastfeed her child ($p = .001$); previous experience with breastfeeding ($p < .001$); self-efficacy with respect to breastfeeding ($p < .001$); how confident the mother felt not knowing the exact amount of milk her baby had received ($p = .012$); and knowledge about breastfeeding ($p = .001$) were factors that had a statistically significant, positive association with breastfeeding duration. In addition, when these factors were considered, other factors such as social influence, social support,
resources, and outcome evaluation (value attributed to successful breastfeeding) did not have any independent prognostic effect. Specific to breastfeeding self-efficacy, the researchers found that the mothers who had low to moderate self-efficacy were twice as likely to discontinue breastfeeding as those with high self-efficacy (hazard ratio: 1.90 95% CI: 1.33 - 2.73). Kronberg and Vaeth identified self-efficacy and breastfeeding intention as interrelated because the mothers with high self-efficacy had intentions of breastfeeding for a longer period (OR: 4.41; CI: 2.72 - 7.13) and these mothers felt more confident regarding not knowing the exact amount of milk their infants received (OR: 5.38; CI: 3.47 - 8.34).

Overall, studies evaluating breastfeeding self-efficacy and breastfeeding outcomes have identified breastfeeding self-efficacy as significantly correlated to breastfeeding duration and exclusivity (Blyth et al., 2002; Dennis & Faux, 1999). These findings have been identified in diverse populations of mothers, including Canadian (Dennis & Faux; Kingston et al., 2007); Australian (Blyth et al., 2002); Puerto Rican (Torres et al., 2003); Chinese (Dai & Dennis, 2003); Polish (Wutke & Dennis, 2007); ethnically diverse (Gregory et al., 2008); and adolescents (Mossman et al., 2008). In addition, significant findings have included the predictive validity of BSES scores antenatally and at 4, 6, 8, and 16 weeks postpartum. Thus, these findings have provided evidence of the relationship between breastfeeding self-efficacy and breastfeeding duration and exclusivity. They also have supported the potential clinical utility of identifying women at risk for early breastfeeding discontinuation based on the potentially modifiable variable breastfeeding self-efficacy and have further justified the need to develop a breastfeeding self-efficacy enhancing intervention. Finally, when compared to the other
variables studied, breastfeeding self-efficacy has been identified as a salient variable affecting breastfeeding outcomes (Blyth et al., 2004; Kronborg & Vaeth, 2004; Mossman et al., 2008).

Variables Affecting Breastfeeding Self-Efficacy

Only one published study to date has looked at the variables that may be predictive of breastfeeding self-efficacy in the early postpartum period. This population-based study of 522 Canadian breastfeeding mothers examined diverse maternal characteristics and variables (e.g., sociodemographic, psychological, pregnancy related, stressors, social support, obstetric, infant feeding and maternal adjustment) at 1 week postpartum (Dennis, 2006). Dennis found that the maternal characteristics that significantly correlated ($p < .001$) with BSES scores at 1 week included age, education, parity, vulnerable personality, self-esteem, perceived stress, satisfaction with job, global support, relationship-specific husband, relationship-specific other women with children, relationship-specific conflict with mother, mode of delivery, satisfaction with pain management in labour, satisfaction with labour and delivery care, satisfaction with postpartum care, control during labour, active say in decisions during labour, length of hospital stay, breastfeeding progress, feeding infant as planned, satisfaction with infant feeding method, confidence in ability to care for infant, feelings about being a mother, attachment to infant, anxiety and maternal mood. However, the best-fit regression model identified eight variables that explained 54% of the variance in BSES scores at 1 week postpartum: education ($t = 4.52, p < .001$); support from other women with children
(t = 2.22, p < .05); type of delivery (t = -2.33, p < .05); satisfaction with pain relief during labour (t = 4.51, p < .001); satisfaction with postpartum care (t = 4.13, p < .001); breastfeeding progress (t = 13.38, p < .001); feeding infant as planned (t = 3.44, p < .001); and anxiety (t = -3.71, p < .001). These findings provided additional support that interventions to assist breastfeeding mothers should be tailored to meet the unique needs of the individual mothers due to the diverse childbirth, postpartum, and newborn experiences that new mothers encounter. The identification of anxiety as a significant variable provides additional support for the self-efficacy theory and the inverse relationship between anxiety and self-efficacy demonstrated in other studies.

However, more research is warranted regarding variables predictive of breastfeeding self-efficacy scores in the early postpartum period to identify whether other salient variables influence breastfeeding self-efficacy in the postpartum period when health care professionals are in contact with new mothers. In particular, this study sought to determine what baseline in-hospital variables are predictive of breastfeeding self-efficacy at 4 weeks postpartum. This may provide additional information regarding the potential influences on breastfeeding self-efficacy in the immediate postpartum period.

Systematic Reviews of Breastfeeding Interventions

Four systematic reviews published since 2000 have focused on interventions to promote or support breastfeeding duration (Britton, McCormick, Renfrew, Wade, & King, 2007; de Oliveira, Camacho, & Tedstone, 2001; Guise et al., 2003; Hannula, Kaunonen, & Tarkka, 2008).

Guise et al. (2003) systematically reviewed whether primary care-based interventions improved breastfeeding initiation and duration among 22 RCTs, 8 non-
RCTs, and 5 systematic reviews. Diverse interventions were included in the analysis, including one-on-one education, telephone or in-person support, provision of educational materials, rooming in, early contact, and commercial discharge packages. The interventions were provided by different people (e.g., nurses, lactation consultants, peers) for various frequencies and in different settings. Meta-analyses revealed that educational interventions had the greatest effect of any single intervention in increasing breastfeeding initiation (difference 0.23; 95% CI, 0.12-0.34) and short-term duration (difference 0.39; 95% CI, 0.27-0.50). Education was found to be particularly effective in areas where breastfeeding initiation rates were low (< 50%). Key components of effective breastfeeding education included that (a) the intervention be conducted by a lactation consultant or nurse, and (b) the content contain information regarding breast milk as ideal nutrition for infants, the benefits of breastfeeding, the physiology of breastfeeding, positioning and latching techniques, equipment, and ways to address fears. In addition, effective sessions lasted between 30 and 90 minutes. Guise et al. found that written materials alone did not influence breastfeeding rates.

Support programs conducted in person, by telephone, or both, also were effective in increasing short-term duration (difference 0.11; 95% CI: 0.03-0.19) and long-term duration (difference 0.08; 95% CI: 0.02-0.16; Guise et al., 2003). Interestingly, the review suggested that the effect of education and support was not greater than that of education alone. Studies that included a support intervention alone, in comparison to studies that combined breastfeeding education and support, demonstrated a larger increase in duration at 12 weeks postpartum (difference 0.1195% CI: 0.30-0.19 to difference 0.37; 95% CI: 0.17-0.58).
de Oliveira et al. (2001) evaluated the effectiveness of strategies and procedures used in primary care settings aimed to improve breastfeeding duration in 33 experimental and 31 quasi-experimental studies. The studies were categorized according to the period when they were delivered: (a) prenatal phase only, (b) postnatal phase only, and (c) both prenatal and postnatal phases. Diverse interventions were included, such as education materials, home visiting, group sessions, and so on. The researchers found that the most effective interventions in increasing breastfeeding duration combined information, guidance, and support, and were long term and intensive. In effective studies, the most common information given to mothers was related to the benefits of breastfeeding for mothers and infants, how breast milk is produced, hazards of bottle-feeding, breastfeeding on demand, exclusive breastfeeding, and prolonged breastfeeding. Additional information given to the mothers included positioning and attachment; expression and storage of breast milk; strategies to combine breastfeeding and working; strategies to overcome common breastfeeding problems; the provision of emotional support, encouragement; and reassurance to increase mothers’ confidence in breastfeeding.

Home visits that provided support based on breastfeeding concerns identified by mothers, assisted with problem solving, and involved family members also were effective (de Oliveira et al., 2001). The review found that the combination of two or three strategies that begin prenatally and continued postnatally was generally more effective than interventions delivered only in the postpartum period. Interventions or components that tended to have no effect included those that had no face-to-face interactions, gave information that was contradictory, or were limited to a short time period.
Britton et al. (2007) evaluated the effectiveness of extra breastfeeding support from professionals, trained lay people, or both, on breastfeeding duration. The review included 34 trials (29,345 mother-infant pairs) from 14 different countries. Diverse interventions were identified in the study, such as including in-home or telephone support that may have been provided by professionals such as lactation consultants; nutritionists; midwives; registered nurses; or lay support (e.g., peers) in the antenatal and postpartum period or the postpartum period only. The review found that professional and lay support was effective, and together, they also were effective. In particular, all forms of extra support analyzed together had a beneficial effect on duration of breastfeeding (RR: 0.91, 95% CI 0.88 [0.86-0.96]) up to 6 months. In addition, all forms of extra support together had a greater effect on duration of exclusive breastfeeding than on any breastfeeding (RR: 0.81, 95% CI: 0.74-0.89). However, subgroup analysis revealed that lay support was associated with a marked reduction in the cessation of exclusive breastfeeding (RR: 0.72, 95% CI: 0.57-0.90). Professional support was found effective in preventing the cessation of breastfeeding up to 4 months (RR: 0.78, 95% CI: 0.67-0.91), but not at other time points.

The overall findings from the systematic review suggested that consideration should be given to the provision of extra support as part of routine care for new breastfeeding mothers (Britton et al., 2007). However, the evidence did not recommend any specific type of support as being the most effective. Thus, additional research is required to assess the effectiveness of interventions lead by professionals, lay persons, or both, on breastfeeding duration and exclusivity. Incorporating feedback from mothers regarding interventions that they perceive to be effective also would be beneficial.
The objective of Hannula et al.’s (2008) systematic review was twofold: (a) to describe how breastfeeding is professionally supported during pregnancy, and (b) to evaluate the effectiveness of supportive interventions on breastfeeding outcomes. The systematic review included 31 studies and 5 review studies conducted between 2000 and 2006. Diverse interventions were identified regarding professional support and differed according to the perinatal period. In particular, during pregnancy, individual and group education, as well as the provision of written materials, was used. In hospitals, mothers received individual counselling, hands-on and hands-off teaching, and written materials. In the postpartum period, the most common interventions included home visits and telephone calls.

Various interventions were identified as effective in increasing breastfeeding duration in hospital and the postpartum period, including practical hands-off teaching when combined with professional support and encouragement. There also was strong evidence that women who gave birth in a Baby Friendly Hospital with stricter compliance to the BFHI had higher breastfeeding rates. Women with risk factors such as cesarean section, early discharge, or lack of support benefited from extra breastfeeding support. Finally, in the postpartum period, home visits, telephone calls, breastfeeding centres, and combined professional and peer support also were associated with improved breastfeeding duration.

Collectively, the systematic reviews identified that diverse interventions such as education; a combination of information, guidance, and support; home visits; and support (one-on-one or telephone based) by professionals, peers, or both, have been effective in increasing breastfeeding duration and exclusivity. However, no one intervention has been
identified as the most effective. As many of the interventions included a combination of methods used, it is difficult to determine which component was the effective one (Hannula et al., 2008). However, this should not be considered a limitation as multifaceted interventions such as support, education, and hospital practices may be the most effective when combined. Interventions that were initiated in the prenatal period and continued postnatally were generally more effective than interventions initiated in the postpartum period (de Oliveira et al., 2001; Hannula et al.). Additional support was found to have the greatest effect among mothers who had moderate initiation and duration rates (Britton et al., 2007) or vulnerable groups such as those with a lack of support (Hannula et al.). Interventions that were delivered face-to-face also appeared to be more effective than those delivered primarily by telephone (Britton et al; de Oliveira et al.).

Several methodological issues affected the validity of the findings. Breastfeeding interventions have been argued to lack scientific rigor (Britton et al., 2007; de Oliveira et al., 2001; Guise et al., 2003). Prevalent methodological limitations have included (a) a lack of description regarding interventions; (b) outcomes evaluated at different time periods (e.g., a few weeks to a few years); (c) different measurements of breastfeeding duration (i.e., actual duration of breastfeeding vs. mean duration); and (d) nonstandardized definitions of breastfeeding. For example, among studies evaluating educational interventions, there were wide variations related to the content covered, method of communicating content, amount of time for delivery of the intervention, training to deliver the intervention, and so on. In addition, control groups often were identified as “usual care,” whereby usual care was widely variable among settings (Britton et al.). In some countries, usual care may comprise several home visits by
midwives (UK), but other countries may include one follow-up home visit or telephone call (Canada) or no home follow-up (Brazil). This lack of standardization among the studies made a comparison of the findings difficult. Finally, several studies evaluated multiple interventions, which may prevent an evaluation of the effect of an individual intervention or any interaction between interventions (de Oliveira et al.).

More research needs to be conducted regarding effective interventions to improve breastfeeding duration and exclusivity. Future studies should endeavour to address identified research gaps from previous studies, including (a) developing a study that is methodologically rigorous, (b) providing a detailed account of the intervention so that the intervention may be reproduced, (c) providing precise definitions of breastfeeding to aid in a comparison of the findings, and (d) evaluating what interventions mothers perceive as beneficial.

RCTs Evaluating Self-Efficacy Enhancing Interventions

A literature search of studies evaluating self-efficacy revealed more than 1,000 peer-reviewed articles. Self-efficacy has been examined (a) in diverse conditions (e.g., diabetes, asthma, arthritis and pain); (b) in health promotion (e.g., sexual health, smoking cessation); (c) in various settings (e.g., community and hospitals); and (d) with different populations (e.g., children, adolescents, adults). Several studies have demonstrated that self-efficacy scores are predictive of behaviour changes, including decreased smoking (Fossum, Arborelius, & Bremberg, 2004; Ratner, Johnson, Bottorff, Dahinten, & Hall, 2000); increased exercise (Hinton & Olson, 2001); improved nutrition (Campbell et al., 2004); and safe sexual health practices (Stallworth et al., 2004). In addition, researchers have demonstrated that self-efficacy can be increased and sustained to improve diverse
outcomes, including parenting skills (Hudson, Campbell-Grossman, Fleck, Elek, & Shipman, 2003); health promotion activities such as sun-safe behaviours (Miller, Geller, Wood, Lew, & Koh, 1999; Rodrigue, 1996); and chronic disease self-management of arthritis (Lorig, Sobel, Ritter, Laurent & Hobbs., 2001) and pain (LeFort, Gray-Donald, Rowat & Jeans, 1998).

Nine RCTs specifically evaluated an intervention designed to increase self-efficacy as a primary outcome (see Appendix C). The studies are presented according to the theory upon which the intervention was based.

Social-Cognitive Theory

Damush et al. (2003) explored the effectiveness of a self-management program compared to usual care among 211 American patients with acute low back pain. The intervention included components of an arthritis self-management program, a chronic back pain program, and social-cognitive theory. The participants received three in-person classes at the health centre that focused on treatment recommendations, behavioural changes, increasing self-efficacy, and reducing negative affect. The participants also were provided with written educational materials, a physician letter of support, and telephone follow-up. The telephone follow-up occurred at 4, 6, and 8 weeks to reinforce the class sessions, discuss the ascertainment of goals, and assist with problem solving.

Maintenance calls were then made on a monthly basis to continue to reinforce the class sessions and sustain behavioural change. The control group received usual care based on the physician’s judgement, which could include physiotherapy, occupational therapy, pain clinic, and/or back exercises. Damush et al. (2003) found that patients in the intervention group reported significantly increased scores on self-efficacy to manage
acute low back pain (0.62, 95% CI: 0.06-1.18, \( p = .03 \)). Additional outcomes revealed significantly better scores on the Roland Disability Questionnaire (\( p = .009 \)), mental functioning (\( p = .009 \)), time spent in physical activity (\( p = .047 \)), and reduced fears of movement/reinjury (\( p = .005 \)) after 12 months. The findings suggested that the self-management program improved self-efficacy and additional outcomes and that these changes were sustained at the 12-month follow-up.

Ludman et al. (2003) also found significant increases in self-efficacy for managing depression in their study evaluating 386 American patients at high risk for depression recurrence or relapse. The intervention, based on social-cognitive theory, was a multifaceted intervention provided by three depression prevention specialists: a psychologist, a psychiatric nurse, and a social worker. The intervention included an educational booklet and a videotape about the effective management of chronic depression, two in-person visits with a depression prevention specialist, three scheduled telephone monitoring contacts, and four personalized monitoring mailings. Specific components of the intervention included stress reduction strategies, tracking of depressive symptoms, and identification of prodromal depressive symptoms to identify potential recurrence early. The goals of the intervention were to increase the participants’ self-efficacy and behavioural skills for the self-management of depression and improve their adherence to medication regimens. The participants in the control group received usual care, which included any services that would normally be available, such as referral to specialized mental health care.
**Self-Efficacy Theory**

Two RCTs are included that used self-efficacy theory, a component of social-cognitive theory, to develop their intervention. Kara and Asti (2004) evaluated the effect of a structured education program on self-efficacy expectations with 60 Turkish patients with chronic obstructive pulmonary disease (COPD) versus educational advice. The experimental group received a 4-week structured education program utilizing the four sources of self-efficacy expectancies: (a) structured education classes incorporating goal setting and achievable tasks (mastery); (b) group participation in rehabilitation program (modelling); (c) praise and encouragement for participants efforts (verbal persuasion); and (d) adverse emotional and physiological arousal, which was minimized through teaching stress management techniques and monitoring the physiologic state, such as heart rate. The control group received standard educational advice at the initial interview. Interestingly, both groups significantly improved their self-efficacy scores from pre-to postintervention. However, for the intervention group, there was a significant improvement in total score on the COPD Self-Efficacy Scale (CSES; $F = 127.22, p < .001$). In addition, within-group analysis identified that the intervention group had significant improvements in self-efficacy scores at all measurement times for all five subscales and were maintained. Within-group differences for the control group were not significant for all five subscales and were not maintained at 1 month, indicating that the structured educational program (intervention) was more effective at increasing self-efficacy than the single session of educational advice (control).

Wong, Wong, and Chan (2005) used sources of self-efficacy in the development of their intervention to determine whether nurse-initiated telephone follow-up would
increase patients’ self-efficacy to manage dyspnea with 60 COPD patients in Hong Kong.

The experimental group of 30 participants received structured, individualized education and supportive telephone follow-up contact during Days 3 to 7 and again at Days 14 to 20. The intervention consisted of three components: assessment of self-efficacy, management options, and evaluation. Similar to Kara and Asti’s (2004) study, the management component consisted of goal setting (performance accomplishment), praise and encouragement (verbal persuasion), and minimization of stress through stress management techniques (emotional arousal). However, because this intervention was telephone based, vicarious experience was not a component of the intervention. The average length of the telephone contacts was 12.8 minutes. The results revealed that self-efficacy scores in the telephone support group increased significantly for some measures (physical exertion, weather/environment), but not all (negative affect, emotional arousal and behavioural risk factors).

A large body of literature has also evolved over the past 2 decades concerning self-efficacy perceptions and the mediating role of these perceptions in self-management activities with chronic diseases (Barlow, Williams & Wright, 1999; Lorig, Lubeck, Kraines, Seleznick & Holman, 1985). In particular, the application of self-efficacy theory to arthritis management (Lorig, Feigenbaum, Regan, Ung, & Holman, 1986), and the Arthritis Self-Management Program (Lorig & Holman, 1993), have consistently demonstrated significant early and sustained clinical improvements that are linked to baseline and improved arthritis self-efficacy coping scores. The Chronic Disease Self-Management Program, based on self-efficacy theory incorporated (a) skills mastery, (b) reinterpretation of symptoms, (c) modeling, and (d) social persuasion to enhance the
individual’s sense of personal efficacy (Lorig et al., 2001). Additionally, components of programs, such as the Arthritis Self-Management program have been adapted and applied successfully to other conditions including those with idiopathic chronic pain (LeFort, Gray-Donald, Rowat & Jeans, 1998).

**Vicarious Experience**

A Canadian RCT of 56 first-time male patients undergoing coronary artery bypass graft (CABG) was conducted to determine whether vicarious experience would reduce anxiety and increase self-efficacy expectation and self-reported activity versus patients receiving standard care (Parent & Fortin, 2000). The vicarious experience intervention was provided by volunteer peer patients who had formerly undergone CABG surgery to provide visual proof of successful surgery and rehabilitation. The intervention was provided over three private support visits by the peer volunteer, with the visits occurring 24 hours before surgery, the 5th postoperative day, and 4 weeks after surgery. Emotional and informational support given by the peers was intended to reassure the participants undergoing CABG, coach them toward activity, and reinforce risk factor reduction. Components of the intervention included interventions tailored to meet individual needs, emotional and informational support, listening, responding to concerns, affirmation, feedback, and social comparisons. The experimental group and the control group received routine information on surgery and recovery, which is considered standard care.

The results indicated that the participants in the experimental group reported significantly greater self-efficacy expectations than the control group for general activities ($p < .002$), walking ($p < .001$), and climbing stairs ($p < .015$) at 5 days. By Week 4, both groups demonstrated significant increases in self-efficacy, but the
differences were no longer significant. Group differences also were found, with the experimental group having significantly lower anxiety during hospitalization ($p < .01$) and increased self-reported activity after surgery than the control group. Thus, Parent and Fortin (2000) concluded that this type of support was effective in helping cardiac patients undergoing bypass cope with surgical anxiety, improve self-efficacy expectations, and self-reported activity after surgery.

Weber et al. (2004) conducted a pilot RCT to test the effects of a one-on-one peer support program with 30 American males who had undergone radical prostatectomy that resulted in urinary and sexual dysfunction. The participants were paired with support partners who were long-term survivors of prostate cancer who had also undergone radical prostatectomy with urinary and sexual dysfunction. This intervention, based on vicarious experience underpinnings, emphasized a supportive environment for the participants to discuss problems encountered postoperatively, such as emotional and physical concerns. The focus of the intervention was determined by the dyads based on the individual needs of the participants. At 8 weeks, the participants in the experimental group had significantly higher self-efficacy ($t = 2.5, p < .05$) from pre- to postintervention that was not present in the control group. Additional findings revealed a significant negative-correlation between self-efficacy and depression ($r = -0.65, p < .01$), indicating that the individuals with high self-efficacy scores were less likely to be depressed.

**Standardized and Individualized Teaching**

An RCT of 120 Taiwanese adults over the age of 65 was conducted to examine the effect of a multifactorial intervention designed to prevent falls by increasing individuals’ self-efficacy to prevent falls, improving their knowledge of medication
safety, and decreasing environmental risk factors (Huang & Acton, 2004). The control group received standard fall-prevention information, including a standardized brochure containing fall prevention information developed by the researchers. The participants in the experimental group received all of the standardized information, plus individualized fall-prevention teaching based on individual fall-related risk factors assessed at the first home visit. An individualized fall-prevention intervention was established for each participant based upon the assessment of risk factors specific to environmental hazards and medications. The results demonstrated that the experimental group improved fall prevention self-efficacy over the control group, although the difference was not significant. In addition, the number of falls was reduced in both groups when compared to the baseline.

Motivational Interviewing

Brown et al. (2003) explored the impact of motivational interviewing versus brief advice on smoking cessation self-efficacy and smoking cessation outcomes among adolescent smokers hospitalized for psychiatric and substance use disorders. Motivational interviewing consisted of two 45-minute individual sessions with participants who were hospitalized or outpatients. Telephone follow-up was provided up to six times during the 6 months following discharge from hospital. The brief advice group received 5 to 10 minutes of advice and information on how to quit smoking. Motivational interviewing was found to be more effective than brief advice on increasing the individuals’ smoking cessation confidence. However, there were no differences between the groups on smoking cessation outcomes. Higher self-efficacy scores at discharge were associated with significantly less smoking during follow-up and greater likelihood of abstinence.
Cognitive-Behavioural Group Training

van der Venn et al. (2005) evaluated cognitive-behavioural group training (CBGT) versus blood glucose awareness training in 107 patients with Type 1 diabetes in poor glycemic control (HbA1C ≥ 8%). The aim of the study was to assess the effects of the CBGT on glycemic control, diabetes self-efficacy, and well-being among the study participants. The main components of the CBGT included cognitive restructuring and individual goal setting. Sessions were provided in a standardized manner, including review of homework, introduction of a theme, exercise, and group discussion. Themes included (a) individual goal setting, (b) role of cognitions and emotions in diabetes self-care, (c) stress, (d) worry about complications, (e) diabetes and interpersonal relationships, and (f) diabetes management as teamwork. The control group was provided with blood glucose awareness training, aimed at preventing and correcting extreme fluctuations in blood glucose levels. Both interventions provided a patient manual and consisted of six weekly 2-hour sessions. The results indicated that the CBGT group had greater increases in diabetes self-efficacy and lower diabetes-related distress and depressive symptoms than the control group from the run-in period (T2 to 3-month follow-up T3). However, no differences were found in HbA1C scores between the groups, indicating that increases in self-efficacy did not lead to improved glycemic control.

Summary of RCTs Evaluating Interventions That Enhance Self-Efficacy

Overall, the review of these RCTs suggested that there are diverse interventions that may increase individuals’ self-efficacy and that these increases are found with various populations and conditions. However, the results also suggested that some
interventions may be more effective than others. For example, four studies were highly successful as their findings demonstrated that the intervention group had significantly improved gains on self-efficacy and other additional outcomes such as the ability to manage back pain (Damush et al., 2003); depression (Ludman et al., 2003; Weber et al., 2004); and overall health status (Lorig et al., 2001). Other studies have found increases in self-efficacy at some measurement points, but not all measurement points (Kara & Asti, 2004; Wong et al., 2005). Likewise, other studies found increases in self-efficacy over the control group; however, the differences either were not maintained after 4 weeks (Parent & Fortin, 2000) or did not lead to changes in other outcomes such as increased smoking cessation (Brown et al., 2003) or decreased falls (Huang & Acton, 2004).

Common components of the interventions identified as effective at increasing self-efficacy included (a) one-on-one or group sessions, (b) the provision of written materials (brochures/manuals), (c) telephone follow-up, (d) sessions based on individual needs, (e) educational advice, and (f) the provision of a supportive environment where the participants could share their thoughts and feelings. Evaluations from participants regarding what interventions they perceived to be influential in increasing self-efficacy were lacking and are recommended for future study.

There were some limitations among the self-efficacy studies that affected the generalizability of the findings. Several studies included sample sizes that may have been insufficiently powered to detect changes (Kara & Asti, 2004; Parent & Fortin, 2000; Weber et al., 2004; Wong et al., 2005). Two studies had high rates of nonparticipation/refusal, which could have resulted in an overrepresentation of motivated participants (Brown et al., 2003; Damush et al., 2003). In addition, many of the
interventions were conducted among homogeneous populations with diverse conditions whose results were not generalizable to the entire population. For example, Brown et al. evaluated motivational interviewing versus brief advice in a population of adolescents with a psychiatric or substance abuse history who likely had many differences than a random sample of adolescents.

Collectively, these studies provided empirical support that self-efficacy can be increased through various methods of behavioural change strategies. Some of the studies also identified that self-efficacy may be enhanced and sustained, and may lead to improved outcomes. Finally, many of the studies that had significant outcomes utilized Bandura’s (1977) self-efficacy theory or social-cognitive theory as a framework for the development of their interventions, congruent with this study’s conceptual framework.

Summary of Literature Review

Studies evaluating confidence and breastfeeding have demonstrated a consistent association between mothers’ confidence and breastfeeding outcomes. Specifically, mothers who are confident regarding breastfeeding often have intentions to breastfeed for a longer period and demonstrate greater breastfeeding duration. Likewise, mothers who report low breastfeeding confidence are more likely to discontinue breastfeeding prematurely and experience perceptions of IMS. Similarly, studies evaluating breastfeeding self-efficacy have been positively associated with and predictive of breastfeeding duration. In particular, higher breastfeeding self-efficacy is associated with increased breastfeeding duration and exclusivity.

These findings (e.g., confidence and breastfeeding self-efficacy) have been evident in diverse settings (Canada, Australia, the UK, the United States, Poland, China,
and Puerto Rico); with diverse populations (WIC participants, adolescents, and primigravidas); and at various times throughout the perinatal period (antenatal, early postpartum, and late postpartum). As such, breastfeeding self-efficacy has been identified as an important, potentially modifiable variable predictive of breastfeeding duration that may be amenable to intervention in order to improve breastfeeding outcomes. However, no studies have specifically studied a breastfeeding self-efficacy enhancing intervention. Fortunately, there is current literature upon which an intervention may be developed to enhance new mothers’ breastfeeding self-efficacy, including factors predictive of breastfeeding self-efficacy at 1 week postpartum, systematic reviews of interventions to improve breastfeeding duration, and RCTs of interventions to increase self-efficacy.

The identification of variables predictive of breastfeeding self-efficacy in the early postpartum period may assist health professionals to identify mothers at risk for premature discontinuation of breastfeeding due to low self-efficacy. In addition, health care professionals may be able to modify many of these variables and ultimately improve mothers’ breastfeeding self-efficacy when breastfeeding is being established in order to optimize breastfeeding outcomes for mothers and infants. These variables are also noteworthy as they could be considered confounding variables that could affect mothers’ breastfeeding self-efficacy and would need to be controlled for in a study to adequately assess the effect of an intervention.

The systematic reviews suggested that diverse strategies may be effective at improving breastfeeding duration. However, breastfeeding duration rates continue to be low in North America, and breastfeeding exclusivity rates appear to have reached a plateau, suggesting that current practices are not effective. In addition, no one
intervention has been identified as superior to others, leading to the diversity of interventions currently found in practice. The systematic reviews did, however, reveal some positive findings. First, interventions by health providers and/or peers may be effective in increasing the duration of breastfeeding and breastfeeding exclusivity, such as additional support or educational interventions. However, there is little evidence to support which intervention (professional/peer/both) may be the best in any given situation (in person, by telephone, or both). Second, there were limitations among many of the studies, and more rigorous research is needed to identify effective interventions to address breastfeeding outcomes. Finally, although numerous studies have evaluated the effectiveness of interventions, evidence is lacking regarding interventions that breastfeeding mothers have identified as beneficial.

Similarly, a review of the RCTs evaluating diverse interventions to improve self-efficacy found that several interventions are effective in increasing self-efficacy among various conditions and settings. However, again, no intervention has been identified as the most effective. It is noteworthy that two of the RCT interventions found that increases in self-efficacy were associated with decreased depression among diabetics with poor glycemic control (van der Ven et al., 2005) and men who had undergone radical prostatectomy (Weber et al., 2004). Because the postpartum period is a time for increased vulnerability to perinatal mood disorders such as postpartum depression, an intervention designed to increase new mothers’ breastfeeding self-efficacy may have a protective effect on depressive symptoms. However, more research is needed because current research has suggested that the evidence is inconclusive regarding the direction of the relationship between depressive symptoms and breastfeeding. Although Dennis and
McQueen (2007) found that depressive symptoms in the postpartum period precede breastfeeding cessation and the perception of breastfeeding difficulties, other researchers have suggested that early breastfeeding cessation may lead to depressive symptoms (Papinczak & Turner, 2000).

Overall, this review of the literature formed a strong empirical base that (a) breastfeeding self-efficacy is a salient variable affecting breastfeeding outcomes; (b) breastfeeding self-efficacy may be amenable to intervention; (c) various interventions have been identified as effective in increasing breastfeeding duration, although more research is needed; (d) self-efficacy has been modified, sustained, and improved in diverse conditions and settings; and (e) there is sufficient evidence to support the development of an intervention that can potentially increase mothers’ breastfeeding self-efficacy. However, the development of an intervention to improve breastfeeding self-efficacy would be enhanced with the use of a theoretically justified framework and outcomes measures that have well-established reliability and validity (Sidani & Braden, 1998).

**Conceptual Framework**

The primary objective of this trial was to examine the feasibility and compliance of the trial protocol and the acceptability of the self-efficacy intervention. Secondary outcomes included evaluating any trends among the participants receiving the self-efficacy intervention versus usual care on breastfeeding self-efficacy, duration, and exclusivity. The conceptual framework used to guide the development of the self-efficacy intervention and evaluation of breastfeeding outcomes is Dennis’s (1999) self-efficacy framework.
Dennis’s Self-Efficacy Framework

Dennis’s (1999) self-efficacy framework was developed using self-efficacy theory to study breastfeeding confidence. The self-efficacy framework conceptualizes the role of self-efficacy in explaining and predicting behaviour. The framework depicts sources that may affect an individual’s self-efficacy. Thus, this framework may be utilized to (a) conceptualize the relationship among the individual’s self-efficacy (confidence to breastfeed successfully), consequences (response), and behaviour, and (b) understand how an individual’s self-efficacy may be influenced (antecedents; see Figure 1).

<table>
<thead>
<tr>
<th>Antecedents</th>
<th>Self-Efficacy</th>
<th>Consequences</th>
<th>Behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sources of information</td>
<td>Confidence</td>
<td>Individual response</td>
<td>Activity</td>
</tr>
<tr>
<td>Performance</td>
<td>Choice of behavior</td>
<td>Effort and persistence</td>
<td>Initiation</td>
</tr>
<tr>
<td>Accomplishment</td>
<td>Thought patterns</td>
<td>Emotional reactions</td>
<td>Performance</td>
</tr>
<tr>
<td>Vicarious experience</td>
<td></td>
<td></td>
<td>Maintenance</td>
</tr>
<tr>
<td>Verbal persuasion</td>
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<td></td>
<td></td>
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<tr>
<td>Physiological and affective states</td>
<td></td>
<td></td>
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</tbody>
</table>

Figure 1. Self-efficacy framework.

Central to Dennis’s (1999) framework is self-efficacy, defined as confidence in one’s ability to perform a task or specific behaviour, or to change a specific cognitive state successfully (Bandura, 1977, 1986). The framework posits that an individual’s level of self-efficacy will have consequences in terms of the individual’s choice of behaviour, amount of effort expenditure and persistence, thought patterns, and emotional reactions. In particular, efficacious individuals will be more likely to pursue tasks that they feel confident in accomplishing, invest a high level of effort, persist in the face of failures or setbacks, remain task focused and think strategically, and attribute failure to insufficient effort (Bandura, 1997). Efficacious individuals will quickly recover their sense of
efficacy after failures or setbacks. In turn, these responses are directly related to the behaviour in terms of initiation, performance, and maintenance of the behaviour.

In relation to breastfeeding, Dennis’s (1999) framework identifies that a mother’s breastfeeding self-efficacy will influence (a) whether she chooses to breastfeed or bottle-feed, (b) the level of effort or persistence with breastfeeding, (c) the thought patterns she may experience, and (d) her emotional reactions to breastfeeding. Thus, based on Bandura’s (1977) self-efficacy theory, the model proposes that mothers who are efficacious in their breastfeeding abilities will be more likely to initiate breastfeeding, put forth a great effort and persist if breastfeeding difficulties are experienced, and have positive thought patterns and emotional reactions to breastfeeding. The framework also depicts that these consequences will directly affect behaviour in the initiation, performance, and maintenance of breastfeeding.

This relationship was evaluated and described earlier in the review of the literature of studies examining the relationship between breastfeeding self-efficacy and infant feeding outcomes. Thus, this framework may be used as an assessment tool to identify mothers at risk for early cessation of breastfeeding due to low breastfeeding self-efficacy. In addition, this framework identifies sources of influence that may affect an individual’s self-efficacy. These influences on self-efficacy also may be utilized purposively to enhance an individual’s self-efficacy.

Development of Self-Efficacy Expectations

The arrows depicted in the model in Figure 1 identify that the antecedents (e.g., sources of information) can affect an individual’s self-efficacy. As such, an individual’s self-efficacy may partially be determined by performance accomplishments, vicarious
experiences, verbal persuasion, and inferences made from one’s physiologic and/or affective state. Thus, women develop their breastfeeding self-efficacy expectations based on past experiences and performances, observation of others, verbal persuasion, and their present physiological and emotional states. These concepts were described earlier in the literature review.

Utilization of Dennis’s Self-Efficacy Framework

Dennis’s (1999) framework depicts several fundamental principles that were incorporated into this trial. First, as the antecedents (e.g., sources of information) were identified as affecting an individual’s self-efficacy, they were utilized to develop the self-efficacy intervention. However, as previously noted, these sources of information may influence one’s self-efficacy purposively with the self-efficacy intervention or indirectly through the sources of information. For example, variables affecting breastfeeding, such as support, hospital policies, others’ behaviour (e.g., intentions, beliefs) and personal factors (e.g., age) may be observed through vicarious experience (Cernadas, Noceda, Barrera, Martinez, & Garsd, 2003; Dennis, 2002; Kruse et al., 2005; Wambach et al., 2005). Thus, acknowledging that there are several sources of influence on self-efficacy provided evidence regarding the complexity of the variables that can affect one’s behaviour and the need to control for potentially confounding variables within this study.

Second, as the model proposes, an individual’s level of breastfeeding self-efficacy will predict breastfeeding performance in terms of initiation, duration, and exclusivity. Thus, the model was used to support the notion that mothers with low breastfeeding self-efficacy are at increased risk for early cessation of breastfeeding and less exclusive
breastfeeding. As such, an intervention to increase a mother’s breastfeeding self-efficacy may lead to increased breastfeeding duration and exclusivity.

Finally, psychometric testing of the BSES and BSES-SF (Dennis & Faux, 1999; Dennis, 2003a) provided empirical support for the self-efficacy framework. In particular, breastfeeding self-efficacy scores in the early postpartum period were predictive of infant feeding status at 6 weeks, as mothers with increased breastfeeding self-efficacy continued to breastfeed and were breastfeeding exclusively (Dennis & Faux). These findings have been validated in diverse populations, including mothers in Australia (Creedy et al., 2003); Puerto Rico (Torres et al., 2003); China (Dai & Dennis, 2003); Poland (Wutke & Dennis, 2007); the UK (Gregory et al., 2008), and among adolescent Canadians (Mossman et al., 2008).

In order to employ a behaviour successfully (breastfeeding), mothers must be confident in performing the task (efficacy expectancy), have the knowledge and skills, and value the perceived outcome (Bandura, 1997). The individuals are more likely to engage in activities that have favourable outcomes, or something that is valued. As such, the intervention should endeavor to not only enhance new mothers’ self-efficacy but also address the value of breastfeeding for mothers and infants as well as mothers’ knowledge and skills regarding breastfeeding.

**Purpose of Pilot Study**

The main purpose of this pilot study was to examine the procedures for a larger, multisite trial. In particular, the feasibility of and the compliance with the trial protocol and the acceptability of the intervention were examined, including (a) the rate of participant recruitment and reasons for nonparticipation; (b) the randomization
procedure; (c) the acceptability of the intervention in terms of the timing, dosage, and satisfaction; (d) the appropriateness of recruitment forms and data collection questionnaires; and (e) the suitability of using the chosen outcome measures with the patient population at 4 and 8 weeks postpartum. An estimate of the mean and variability for those in the control group was determined to inform a sample size calculation for the main trial. Additional data analysis was conducted to identify any trends among the participants receiving the self-efficacy intervention versus usual care on breastfeeding self-efficacy, duration, and exclusivity. Finally, an analysis of maternal baseline variables was conducted to determine (a) the variables predictive of breastfeeding self-efficacy at 4 weeks postpartum, and (b) the variables predictive of breastfeeding continuation at 4 weeks postpartum.

Research Questions

Primary Question

1. What is the feasibility of, acceptability of, and compliance with the trial protocol?

Feasibility

1. What is the recruitment rate of participants and reasons for nonparticipation?

2. What is the average length of time from delivery to the first in-hospital self-efficacy intervention session and from hospital discharge to the telephone-based self-efficacy intervention session?

3. What is the average length of time for the delivery of the self-efficacy intervention in hospital and by telephone?
Acceptability

1. What are mothers’ evaluations or views of the self-efficacy intervention?

Compliance

1. How many mothers had an observed breastfeeding session?
2. How many mothers had two in-hospital and one telephone-based self-efficacy intervention sessions?
3. What is the data collection follow-up rate at 4 and 8 weeks postpartum?

Secondary Questions

1. What is the effect of the self-efficacy intervention on breastfeeding self-efficacy at 4 and 8 weeks postpartum?
2. What is the effect of the self-efficacy intervention on breastfeeding duration at 4 and 8 weeks postpartum?
3. What is the effect of the self-efficacy intervention on breastfeeding exclusivity at 4 and 8 weeks postpartum?
4. What is the effect of the self-efficacy intervention on depressive symptomatology at 4 and 8 weeks postpartum?
5. What is the effect of the self-efficacy intervention on anxiety at 4 and 8 weeks postpartum?

Additional Questions

1. What, if any, strategies do mothers perceive as increasing their breastfeeding self-efficacy?
2. What, if any, strategies do mothers perceive as detrimental in increasing their breastfeeding self-efficacy?
3. What baseline variables predict breastfeeding duration at 4 weeks postpartum?

4. What baseline variables predict breastfeeding self-efficacy scores at 4 weeks postpartum?
CHAPTER 3: METHODS

Study Design

Overview

A pilot RCT was conducted to determine the feasibility of and compliance with the trial protocol and the acceptability of the newly developed self-efficacy intervention. In-hospital, primiparous, breastfeeding mothers were assessed for eligibility within the first 24 hours postpartum (see Figure 2). Eligible, consenting mothers were then randomly allocated to the self-efficacy intervention group (intervention group) or the standard postpartum care group (control group). Women allocated to the intervention group received standard postpartum care and three individualized sessions with the researcher. Two sessions were conducted in hospital, and one session was conducted by telephone within 1 week of discharge from hospital. Mothers in the control group received only standard in-hospital and community postpartum care. A research assistant (RA) blinded to group allocation telephoned all mothers at 4 and 8 weeks postpartum to collect outcome data. At the end of 8 weeks, the participants in the intervention group also evaluated their satisfaction with the intervention.

This chapter defines the outcome measures; describes the sample and setting; and includes a discussion of the trial manoeuvres, pretrial procedures, randomization procedure, intervention, measurement of outcome variables, and methods to control contamination between the groups that were used in the pilot trial.
Definition of Outcome Variables

Feasibility

Burns and Grove (2001) defined feasibility as the degree to which the study can be executed, given the requisite time and other resource constraints, and may include examining the availability of participants, time commitment, cost, data collection procedures and instruments, and so on. Feasibility for this pilot trial was monitored using the Self-Efficacy Intervention Activity Log (see Appendix D).
Compliance

For this pilot trial, compliance was defined as the degree to which the trial protocol was adhered to as intended. This included the process involved with the delivery of the self-efficacy intervention and any deviations from the protocol. Compliance also was monitored with the Self-Efficacy Intervention Activity Log and the recruitment and randomization logs. The goal for acceptable levels of compliance in terms of the participants receiving all three sessions of the self-efficacy intervention and observed breastfeeding session was 75%.

Acceptability of the Self-Efficacy Intervention

Acceptability of the self-efficacy intervention was defined as whether new mothers found the self-efficacy intervention to be beneficial. Acceptability was assessed at the completion of the study using the Maternal Satisfaction with the Self-Efficacy Intervention Questionnaire (see Appendix E) by all mothers in the intervention group.

Breastfeeding Self-Efficacy

Breastfeeding self-efficacy was defined as a mother’s perceived ability to breastfeed her infant (Dennis, 1999). Breastfeeding self-efficacy was measured using the BSES-SF (Dennis, 2003a) for all participants at baseline and 4 and 8 weeks. Mothers in the intervention group also were assessed with the BSES-SF, as stipulated in the intervention protocol.

Breastfeeding Duration

Breastfeeding was defined as the receipt of any breast milk via bottle or breast within the past 24 hours. If a mother discontinued breastfeeding at 4 or 8 weeks
postpartum, breastfeeding duration was recorded from the date of the infant’s birth until the date of breastfeeding cessation (i.e., absence of breast milk for 24 hours).

**Breastfeeding Exclusivity**

A mother’s infant feeding method was further classified according to one of six categories defined by Labbok and Krasovec (1990; see Table 2) at 4 and 8 weeks using the Infant Feeding Questionnaire (see Appendix F). For this study, breastfeeding exclusivity was defined as the receipt of breast milk only, with no nonhuman milk in the past week.

**Table 2**

**Definitions of Infant Feeding Categories**

<table>
<thead>
<tr>
<th>Category of infant feeding</th>
<th>Requires that infant receive</th>
<th>Allows infant to receive</th>
<th>Does not allow infant to receive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusive breastfeeding</td>
<td>Breast milk (including milk expressed)</td>
<td>Vitamins, minerals, medicines</td>
<td>Anything else</td>
</tr>
<tr>
<td>Almost exclusive breastfeeding</td>
<td>Breast milk as the predominant source of infant nourishment</td>
<td>&lt; 1 bottle/week of nonhuman milk, water, water-based drinks, fruit juice, ORS, ritual fluids.</td>
<td>Anything else</td>
</tr>
<tr>
<td>High breastfeeding</td>
<td>Breast milk as the predominant source of infant nourishment</td>
<td>&gt; 1 bottle/week of nonhuman milk or any food or liquid</td>
<td>1 bottle/day of nonhuman milk</td>
</tr>
<tr>
<td>Partial breastfeeding</td>
<td>Breast milk and any food or liquid</td>
<td>1 bottle/day of nonhuman milk or any food or liquid</td>
<td></td>
</tr>
<tr>
<td>Token breastfeeding</td>
<td>Nonhuman milk or any food or liquid as the predominant source of infant nourishment</td>
<td>Breast is used for comfort or to console the infant with minimal nutritional contribution</td>
<td></td>
</tr>
<tr>
<td>Bottle-feeding</td>
<td>Any nonhuman food or liquid</td>
<td>Breast milk</td>
<td></td>
</tr>
</tbody>
</table>

Source: Labbok and Krasovec (1990)

**Depressive Symptomatology**

Depressive symptomatology may include a depressed mood, a loss of interest or pleasure in most activities, changes in weight and appetite, sleep disturbance, fatigue and loss of energy, feelings of worthlessness or excessive feelings of guilt, and poor concentration (American Psychiatric Association, 2000). The EPDS has been identified as the most extensively evaluated tool for the assessment of depressive symptomatology.
in postpartum women (Boyd, Le, & Somberg, 2005) and was used to assess for depressive symptoms at baseline and at 4 and 8 weeks postpartum (see Appendix G).

**Anxiety**

State anxiety refers to a palpable reaction or process taking place at a given time and level of intensity (Spielberger, 1970). This outcome was measured at baseline and at 4 and 8 weeks postpartum using the State portion of the State-Trait Anxiety Inventory (STAI-State; Spielberger; see Appendix H). The State Anxiety Scale assesses feelings of apprehension, tension, nervousness, and worry that a person may be feeling at present or a particular time. In this study, state anxiety was measured in relationship to how the mother was feeling at the current time.

**Sample**

**Inclusion Criteria**

The target population for the study comprised all in-hospital mothers who met the following criteria:

1. Primiparous.
2. Singleton birth.
3. Infant $\geq$ 37 weeks gestational age at delivery.
4. Initiated breastfeeding.
5. Could speak and understand English.
Exclusion Criteria

The exclusion criteria for the trial were as follows:

1. Condition of mother or infant that would interfere with breastfeeding (e.g., severe illness, psychosis, major congenital anomaly, antibiotic therapy that required pumping and discarding).

2. Infant in NICU for > 24 hours, where discharge was not expected to be with the mother.

Setting and Sample Size

The study was conducted at an acute care hospital located in an urban setting in northwestern Ontario that is the sole provider of maternal-infant care in the area and the referral hospital for the catchment area. The selected site had a birth rate of approximately 1,470 during the fiscal year 2006-2007, with 592 being primigravidas, of which 517 (87.3%) initiated breastfeeding. Assuming a similar delivery rate, it was anticipated that approximately 500 breastfeeding primigravidas would be available to participate in this pilot trial. Based on previous research conducted by Dennis, Hodnett, Gallop, and Chalmers (2002) with primiparous breastfeeding women, it was expected that approximately 10% of the mothers would not meet the inclusion criteria; these data were recorded in the eligibility assessment form (see Appendix I) and included in the feasibility evaluation. Given a conservative 20% loss to follow-up, and a recruitment schedule that spanned Monday to Thursday, it was expected that approximately 150 participants would be recruited in the allotted 6-month recruitment period. Because this was the first time that a self-efficacy intervention had been evaluated, no formal power
analysis was conducted. Data from this pilot trial were used to perform a power analysis for the larger RCT.

Sampling

The trial used a nonprobability sampling method as neither the hospital nor the participants were randomly selected. However, the participants were randomly assigned to either the intervention group or the control group using consecutively numbered, sealed, opaque envelopes constructed by a researcher not involved in this study. Upon confirmation of eligibility, consent to participate (see Appendix J) and completion of baseline information (see Appendix K), the researcher or the RA and the mother opened the sealed envelope to reveal the group allocation. To ensure the availability of an audit trail, the envelope number was recorded on a master information sheet that included the participant’s name, telephone number, group assignment, and trial enrollment date.

Recruitment was to be conducted on a daily basis from Monday to Thursday each week so that the intervention could be delivered Monday to Friday. Because the researcher was solely recruiting participants and administering the self-efficacy intervention, the Monday-to-Friday schedule was anticipated to be reasonable for the 6-month period. However, within the first month of the trial, it became apparent that a fairly significant number of potential participants were having their babies on the weekend and were being excluded from the study. In addition, the process of study explanation, obtaining consent and baseline information, randomization, and delivery of the intervention (for intervention participants) was identified as too lengthy to complete at one time. Thus, the protocol was changed to include an RA who was primarily responsible for assessing eligibility, recruiting, obtaining consent from, and randomizing
the participants; the intervention was then delivered by the researcher separately. Recruitment was subsequently conducted 7 days a week, providing that the researcher was available to deliver the intervention.

Manoeuvre

**RCT Manoeuvre Prior to Randomization**

Prior to participant recruitment, ethics approval was obtained from the hospital’s research ethics board and the University of Toronto’s Health Sciences 1 Research Ethics Board. A letter of information also was provided to the nurses on the postpartum unit about the pilot trial (see Appendix L).

All mothers meeting the eligibility criteria were briefly introduced to the study by an RN on the postpartum unit and asked for permission for the researcher to provide a detailed explanation. The RA was able to approach potential participants directly to discuss the study. Once permission to contact potential eligible participants was obtained, the researcher/RA was able to provide a detailed verbal and written explanation of the study (see Appendix M), assess for eligibility, and obtain consent. All participating mothers completed a baseline demographic questionnaire, the BSES-SF (Dennis, 2003a); the EPDS (Cox, Holden, & Sagovsky, 1987); and the STAI-State (Spielberger, 1970). Following completion of the baseline information, the mothers were randomized and informed of their group allocation.

**RCT Manoeuvre Following Randomization for Both Groups**

Participants in the intervention group were provided with the self-efficacy intervention, which was initiated following group allocation or at the earliest convenient time for the mother while in hospital. Participants in the control group received standard
in-hospital and community postpartum care. All mothers were telephoned by another RA not involved in the recruitment who was blinded to group allocation at 4 and 8 weeks postpartum to complete the follow-up questionnaires. After all outcome data were collected, the RA was unblinded by opening an opaque envelope that was attached to the final questionnaire and revealed the mother’s group allocation. If the mother was in the intervention group, the RA administered all questions on the Maternal Satisfaction with the Self-Efficacy Intervention Questionnaire. If the mother was in the control group, the RA asked two open-ended questions from the Maternal Satisfaction with the Self-Efficacy Intervention Questionnaire that were applicable to all participants in the study.

Four and 8 weeks postpartum were selected for data collection time periods because many mothers discontinue breastfeeding due to difficulties in the first 8 weeks postpartum and also because it should have helped to decrease recall bias.

Study Groups

Control Group

Mothers randomized to the control group received the standard in-hospital and community postpartum care that all new mothers receive. They also were able to access any services that are usually provided to new mothers. This may have included breastfeeding support and education provided by nurses on the postpartum unit and a single home visit or telephone call by a public health nurse for those who consent. In addition, all new mothers were screened in hospital to identify infants and/or families who may need extra services and support provided by the Healthy Babies, Healthy Children (HBHC) Program. This service continued for all mothers meeting the criteria, regardless of group allocation. Although the major objectives of the HBHC Program are
to (a) help families find and access services; (b) help families who may be living in stressful or difficult situations; (c) build positive parenting skills; (d) support the healthy growth and development of children, and not specifically breastfeeding support, the nurses of the HBHC Program also are qualified to give breastfeeding information. All mothers also were provided with the usual breastfeeding resources from the hospital on discharge. These resources included information regarding local breastfeeding supports available to new mothers in the community (e.g., a lactation consultant 2.5 days/week, LaLeche League, public health nurse) and written breastfeeding information provided by Health Canada.

Intervention Group

Self-efficacy intervention. In addition to receiving standard in-hospital and community postpartum care, participants randomly assigned to the intervention group also received the self-efficacy intervention. This was an individualized intervention provided in three sessions in the early postpartum period (see Appendix N for the self-efficacy intervention manual’s table of contents). The first session was to occur after randomization with mothers in the hospital, preferably within 24 hours of delivery. The second session also took place in hospital, with the goal of occurring within 24 hours of the first session. In addition, the observation of breastfeeding at one of the two in-hospital sessions was planned in order to try to maximize performance accomplishment. The third session occurred via telephone within 1 week of hospital discharge. Telephone contact was thought to be the most systematic and feasible method of accessing the participants upon discharge because the hospital serves a large catchment area, and it was anticipated that approximately 10% to 15% of the participants would be from outlying rural
communities. All of the sessions followed a standardized format that included assessment of breastfeeding self-efficacy, efficacy-enhancing strategies to increase self-efficacy, and evaluation of strategies. The strategies to increase breastfeeding self-efficacy utilized the four sources of information identified in the breastfeeding self-efficacy framework (Dennis, 1999): performance accomplishment, vicarious experience, verbal persuasion, and physiologic cues.

*Part I: Assessment.* The assessment component of the self-efficacy intervention included an examination of the mother’s (a) breastfeeding goals, (b) breastfeeding self-efficacy using the BSES-SF, (c) low-scoring (≤ 3) and high-scoring (≥ 4) items on the BSES-SF, (d) perceptions related to each low-scoring BSES-SF item, and (e) general physiologic and affective states. This thorough assessment assisted to identify the goals and needs of each new mother, and guide the implementation of efficacy-enhancing strategies in an attempt to increase the mother’s breastfeeding self-efficacy. The assessment of each mother’s breastfeeding goals and any perceived barriers or impediments to achieving the goals were identified to ensure that the intervention was individualized and congruent with the new mother’s needs.

The administration of the BSES-SF provided information specific to each mother’s breastfeeding self-efficacy. This self-report 14-item questionnaire consisted of a 5-point Likert-type scale, with 1 representing *not at all confident* and 5 being *very confident*. Individual responses on each item were examined to determine specific areas where the mother required additional assistance due to low self-efficacy (score ≤ 3 on an item) and specific areas where the mother felt efficacious and warranted positive reinforcement (score ≥ 4 on an item).
Each mother’s perceptions related to low breastfeeding self-efficacy also were explored to learn more about the reasons for low self-efficacy. For example, Item 1 stated, “I can always determine that my baby is getting enough milk.” When a mother scored low (≤ 3), it was important to gain additional information behind the perception of low self-efficacy to guide the efficacy enhancing strategies, such as a lack of knowledge regarding methods to evaluate that the infant is getting enough or a perceived lack of ability to produce sufficient milk. Alternatively, assessing general perceptions related to high-scoring items (≥ 4) was useful to understand how the individual had developed positive efficacy beliefs concerning breastfeeding. Finally, an assessment into the mother’s physiologic and affective state also identified additional factors that could interfere with breastfeeding and, if so, were addressed in the efficacy-enhancing strategies.

*Part II: Efficacy Enhancing Strategies.* Efficacy enhancing strategies were implemented in an effort to increase the mother’s breastfeeding self-efficacy based on the initial assessment. These strategies were congruent with the individual’s breastfeeding goals and the four sources of self-efficacy: performance accomplishment, vicarious experience, social persuasion, and physiologic and affective state. Since the intervention was based on the initial assessment and individualized, the specific content of the efficacy-enhancing strategies could not be completely standardized as the mothers had various breastfeeding goals, different low-scoring and high-scoring items, and diverse perceptions related to breastfeeding self-efficacy. However, the process of determining individual needs was standardized.
To partially standardize the efficacy-enhancing strategies, a list of general responses were developed based on the four sources of self-efficacy (see Table 3). For example, general strategies included goal setting (performance accomplishment); use of visual aids (e.g., written materials) to make observable breastfeeding skills apparent to mother (vicarious experience; see Appendix O); provision of feedback and positive reinforcement (verbal persuasion); and provision of anticipatory guidance regarding affective state (emotional arousal). These examples were used as a template of efficacy-enhancing strategies used to administer the self-efficacy intervention.
Table 3

*Example of General Management Strategies*

<table>
<thead>
<tr>
<th>Source of information</th>
<th>Examples of general efficacy-enhancing strategies</th>
</tr>
</thead>
</table>
| Performance accomplishment | - Give attention to successful or improved aspects of breastfeeding performance.  
- Provide positive reinforcement and suggestions about how to improve future breastfeeding performance.  
- Set short-term goals that the mother will be able to achieve (structure tasks to bring success).  
- Provide anticipatory guidance that difficulties may be encountered, especially in the early period. Success usually requires tenacious effort and it is how the difficulties are handled that will determine future success.  
- Identify and reinforce past and present successes or accomplishments. |
| Vicarious experience | - Use visual aids to make unobservable breastfeeding skills apparent to mother.  
- Use visual aids to demonstrate breastfeeding techniques such as positioning or proper latch.  
- Provide written materials to supplement learning. |
| Verbal persuasion | - Provide positive feedback whenever appropriate, highlighting personal capabilities.  
- Correct any inaccurate and low perceptions of performance capability.  
- Dispel any myths about breastfeeding.  
- Create optimistic beliefs: You have what it takes to succeed.  
- Provide support when handling pressure and failure.  
- Provide accurate information to increase sense of ability.  
- Encourage mother to envision successful performances and manage self-defeating thoughts on how she might persevere through any breastfeeding difficulties that are apparent to the mother.  
- Encourage participation from family/friends to encourage new mothers’ efforts. |
| Emotional Arousal | - Provide anticipatory guidance that the tendency to experience anxiety, pain, and fatigue should be explicitly acknowledged and normalized.  
- Correct any misinterpretations of bodily states.  
- Provide information/discussion on practices that may help to overcome emotional arousal. |

The researcher also endeavoured to make the general efficacy-enhancing strategies specific to each mother’s needs. For example, when a mother indicated low self-efficacy on the BSES-SF item, “I can always determine that my baby is getting enough,” specific strategies were then utilized according to the need identified (see Table 4). This identified the complex and variable nature of the intervention provided and the fact that the research protocol could not anticipate every unique scenario. Therefore, general efficacy-enhancing strategies were used as a template for the delivery of the self-
efficacy intervention, and specific strategies for each item were implemented based on maternal needs. All data from the self-efficacy intervention sessions were recorded in the activity record to assess the standardization and dose of the intervention delivery among the participants.

Table 4

*Example of Specific Management Strategies for Item 1 of BSES-SF*

<table>
<thead>
<tr>
<th>Item</th>
<th>Example of specific efficacy-enhancing strategies</th>
</tr>
</thead>
</table>
| I can always determine that my baby is getting enough. | Performance accomplishment  
1. Give attention to mother and/or infant cues that indicate the infant is getting enough  
   - Number of feeds per day (8-12)  
   - Urine output (starting scant to small amounts increasing in frequency and amount). By day 7, infant should have 6-8 heavy/wet diapers/day  
   - Stool output (describe changes in stool)  
   - Good latch: phlanged lips, no noises, jaw movement to ear  
   - If milk is in, breasts feel softer after a feeding  
   - Infant appears sleepy and satisfied after a feeding  
   - Usually content for 1-2 hours after feeding  
   - Active and alert when awake  
2. Set goals for mother to evaluate over the next 24 hours. For example, mother can record feeds and output to assess whether infant output is appropriate for infant’s age.  
3. Outline what mother has done correctly and provide suggestions on how to improve (structure tasks for success).  
Verbal persuasion  
1. Give positive reinforcement to improved breastfeeding performance. “Look how content and relaxed the infant is after feeding” or “that is the third urine he/she has had today which is what is expected.”  
Affective state  
1. Provide anticipatory guidance. “It is not always easy learning a new task, especially when you are tired and having pain. Many women feel this way and we understand that it can be overwhelming at times. To ease some of that load, we have some written materials you can refer to in hospital and at home so you do not have to feel that you have to remember everything. This is a pamphlet given to all new mothers in the hospital describing how you can tell if your infant is getting enough.” |

*Part III: Evaluation.* At the end of each session, the researcher was supposed to readminister the BSES-SF, with a focus on the previous low-scoring items to identify any short-term changes in breastfeeding self-efficacy. This evaluation also was anticipated to
aid in the identification of any plans for the new mothers and areas of focus for the next
session. In an effort to minimize social desirability bias, mothers were encouraged to
respond as honestly as possible to the questions without concern for the researcher.

However, the readministration of the BSES-SF was stopped early in the study as
the participants’ often were questioning whether their breastfeeding self-efficacy should
have changed from the beginning to the end of each session. In addition, although the
questionnaire only included 14 items, it did seem burdensome after the initial data
collection.

Summary of Instruments

Table 5 summarizes the study instruments according to the timing of their
administration.

Table 5

<table>
<thead>
<tr>
<th>Study Instruments and Timing of Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
</tr>
<tr>
<td>----------------------------</td>
</tr>
<tr>
<td>Baseline</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>4 and 8 weeks postpartum</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>8 weeks postpartum</td>
</tr>
<tr>
<td>Ongoing</td>
</tr>
</tbody>
</table>

Baseline Demographic Information (Maternal Characteristics)

A questionnaire that included sociodemographic, labour and delivery, newborn,
and postpartum variables affecting breastfeeding outcomes (Dennis, 2002) was
administered at baseline, prior to randomization. Maternal characteristics included variables used to describe the sample: each participant’s age, highest level of education, ethnicity, marital status, and employment status. To further describe the sample, the questionnaire included information regarding type of delivery, medication use in labour, newborn separation from mother or other complications, mother’s perceptions of breastfeeding progress and support, and so on. This questionnaire had been used in previous perinatal studies (Dennis, Janssen, & Singer, 2004) with no difficulties and was modified for use in this study. In this pilot trial, the responses to these questions were obtained for the majority of participants within 24 hours of delivery. Thus, these baseline characteristics represented the first 24 hours postpartum, not the entire in-hospital postpartum period.

Primary Outcome: Feasibility, Compliance, and Acceptability

Feasibility was used to describe how well the trial protocol, including the self-efficacy intervention, was carried out. The Eligibility Assessment and the Self-Efficacy Intervention Activity Log were designed to record feasibility data related to (a) recruitment (e.g., reasons for nonparticipation and noneligibility, number of babies in NICU, and so on), and (b) timing regarding the intervention (e.g., time from delivery to intervention, discharge to telephone follow-up, length of session in-hospital and by telephone, etc.). The Self-Efficacy Intervention Activity Log also was designed to document the delivery of the self-efficacy intervention. In particular, areas of interest included the recording of efficacy-enhancing strategies implemented; number of low-scoring and high-scoring items on the BSES-SF; most frequent low-scoring and high-scoring items; affective state (e.g., physiologic cues); and so on.
Compliance, referred to as the degree to which the trial protocol was followed, also was recorded on the Self-Efficacy Intervention Activity Log. In particular, compliance-related measures included the number of mothers who actually received (a) two in-hospital and one telephone self-efficacy intervention session, (b) the number of mothers with observed breastfeeding during the self-efficacy intervention sessions, and (c) data collection follow-up at 4 and 8 weeks postpartum.

The Maternal Satisfaction with the Self-Efficacy Intervention Questionnaire was used to assess the general acceptability of the intervention from the mothers’ perspective at 8 weeks postpartum. Only the mothers in the intervention group completed all of the questions on the questionnaire. The questionnaire was comprised of 11 brief statements regarding the mothers’ perception of the intervention with a 5-point Likert-type range of responses from 1 (strongly disagree) to 5 (strongly agree). The statements sought to ascertain whether the mothers perceived that the intervention was beneficial, was too long or too short both in hospital and by telephone, was instrumental in assisting in meeting their breastfeeding goals, and was satisfactory. The questionnaire also included 4 open-ended questions to determine what, if anything, the researcher or others did that may have increased or decreased breastfeeding self-efficacy. It also provided space for any additional comments. The intervention group participants completed the 4 open-ended questions, while the control group participants completed the 2 open-ended questions that pertained to both groups.

Secondary Outcomes

Breastfeeding duration, exclusivity and satisfaction. The Infant Feeding Questionnaire was used to assess breastfeeding duration, exclusivity, and satisfaction
with infant feeding. The questionnaire was developed from a previous breastfeeding trial (Dennis et al., 2000) and modified for this trial to assess infant feeding behaviours at 4 and 8 weeks by telephone. The questionnaire is comprised of nine questions that primarily ask about the method of infant feeding (breastfeeding or bottle-feeding), level of breastfeeding, mothers’ perceptions of how infant feeding is progressing, and whether she is feeding her infant as she intended. If a mother indicated that she was breastfeeding, breastfeeding was further defined using the classification by Labbok and Krasovec (1990): (a) exclusive breastfeeding (breast milk only); (b) almost exclusive breastfeeding, breast milk and other fluids, but not formula; (c) high breastfeeding (< one bottle/day); (d) partial breastfeeding (at least one bottle of formula/day); or (e) token breastfeeding (breast given to comfort baby, but not nutrition). If a mother was no longer practicing any breastfeeding (e.g., she was formula feeding), the date of discontinuation of breastfeeding was recorded.

Breastfeeding self-efficacy. The BSES-SF is a 14-item, self-report instrument (Dennis, 2003a) that was used to assess breastfeeding self-efficacy at baseline and 4 and 8 weeks postpartum. All items were preceded by the phrase “I can always” and anchored with a 5-point Likert scale ranging from 1 (not at all confident) to 5 (always confident). As recommended by Bandura (1977), all items were presented positively, and scores were summed to produce a range from 14 to 70, with higher scores indicating higher levels of breastfeeding self-efficacy.

The BSES (Dennis & Faux, 1999) was originally developed as a 33-item, self-report instrument to measure breastfeeding confidence. The measure contained two subscales: the Technique subscale, where items depicted maternal skills and recognition
of specific principles required for successful breastfeeding, and the Intrapersonal Thoughts subscale, where items are related to maternal attitudes and beliefs toward breastfeeding. Following a pilot test, an initial psychometric assessment was conducted with a convenience sample of 130 Canadian breastfeeding women who completed the questionnaires during the postpartum hospitalization and again at 6 weeks postpartum (Dennis & Faux). Cronbach’s alpha coefficient for the scale was 0.96, with 73% of all corrected item-total correlations ranging from 0.30 to 0.70. Responses were subjected to principal components analysis with a varimax rotation, yielding the theorized subscales. Support for the predictive validity of the tool was demonstrated through positive correlations between BSES scores and infant feeding method at 6 weeks postpartum.

However, internal consistency statistics with the original BSES suggested item redundancy. As such, another methodological study was undertaken, and 18 items were deleted using explicit reduction criteria (Dennis, 2003a). Based on the encouraging reliability analysis of the new 14-item BSES-SF, construct validity was assessed using principal components factor analysis, comparison of contrasted groups, and correlations with measures of similar constructs. Support for predictive validity was demonstrated through significant mean differences between breastfeeding and bottle-feeding mothers at 4 and 8 weeks postpartum. Finally, the BSES-SF was recently validated in a Canadian sample of adult (Kingston et al., 2007) and adolescent mothers (Mossman et al., 2008) and an ethnically diverse UK cohort (Gregory et al., 2008), and was translated and validated with Polish mothers (Wutke & Dennis, 2007). Demographic response patterns suggested that the BSES-SF is a unique tool to identify mothers at risk of prematurely discontinuing breastfeeding.
Depressive symptomatology. This outcome was measured using the EPDS (Cox et al., 1987), a 10-item self-report instrument. Items were rated on a 4-point scale to produce a summative score ranging from 0 to 30, with higher scores indicating lower maternal mood. When used as a screening tool to identify depressive symptoms, the EPDS provides a relatively rapid measure of emotional distress that can be interpreted easily by clinicians (Mosack & Shore, 2006; Sharp & Lipsky, 2002); in addition, it is easy to administer, requiring little time and training (Cox & Holden, 2003).

This instrument does not diagnose postpartum depression; rather, it is the most frequently used instrument to assess postpartum depressive symptomatology (Beck, 2001). Created to counter the limitations of other well-established depression scales, it has been validated by standardized psychiatric interviews with large samples and has well-documented reliability and validity in more than 11 languages (Affonso, De, Horowitz, & Mayberry, 2000). The EDPS has demonstrated good sensitivity (86%) and specificity (78%) as an indicator of depressive symptoms when the published recommended EPDS cut-off score of > 12 (Cox et al.) is used. Subsequent studies have found similar sensitivity and specificity estimates (Boyd et al., 2005). Thus, a score of > 12 was used to indicate depressive symptomatology at baseline and at 4 and 8 weeks.

Anxiety. This outcome was measured using the STAI-State (Spielberger, 1970), a 20-item self-report instrument developed to assess levels of relatively transient situation-related (state) anxiety. Items were rated on a 4-point scale to produce a summative score ranging from 20 to 80, with higher scores indicating higher levels of anxiety. The STAI-State has been used widely in pregnancy and postpartum studies, and anxiety has been consistently related to depressive symptomatology in new mothers (Beck, 2001).
Cronbach’s alphas at 12 and 16 weeks postpartum from pilot data (Dennis, 2003b) were 0.94 and 0.95, respectively. This questionnaire was administered at baseline and at 4 and 8 weeks.

Data Management

The RA at the hospital was largely responsible for all participant recruitment activities and the collection of all baseline data prior to randomization after the protocol change at 1 month. Baseline data were obtained from electronic medical records as well as the participants. Outcome data were collected from the participants by telephone by the RA who was blinded to group allocation. Data were entered into a Microsoft Access® database at the research office by the researcher and/or the RA. In particular, the researcher entered all baseline data collected from the hospital on the main computer and entered all outcome data on the second data base. The RA entered all outcome data into the main database. Logic and range checks verified the accuracy of the data.

All computer files were backed up weekly on a universal smart drive and stored in a separate, locked location away from the original data. All hard-copy, trial-related materials were stored in a locked filing cabinet. Any identifying participant information such as consent forms and contact sheets were stored in an alternate locked filing cabinet to protect participant confidentiality.

Data Analysis

Because this was a pilot trial, the primary focus was on examining the feasibility of and compliance with the trial protocol and the acceptability of the self-efficacy intervention. Data were collected at baseline, 4 and 8 weeks postpartum, and at each
session of the self-efficacy intervention sessions. Data were analyzed using SAS V. 9.1 software and were based on intention-to-treat principles.

**Primary Outcomes**

Descriptive statistics were used to analyze the feasibility, compliance, and acceptability questions. Means and standard deviations were calculated for continuous variables and frequencies and percentages for categorical variables. Content analysis was used for the open-ended questions (Burns & Grove, 2001; Simons, Lathlean, & Squire, 2008). Specifically, word frequency analysis was used to analyze comments of what the participants perceived to influence their breastfeeding confidence. To increase the reliability of the data, the word frequency analysis was conducted individually by the researcher and then by the RA under the headings identified by the researcher. The findings were collated with an additional count for any discrepancy identified. Consensus was obtained by the researcher and the RA on all five questions.

**Secondary Outcomes**

Because this was a pilot study and a power analysis was not conducted, data analysis was performed to identify whether any trends were apparent regarding differences between the participants who received the self-efficacy intervention versus usual care on breastfeeding self-efficacy, duration, and exclusivity. A two-tailed level of significance of 0.05 was used for the analysis. For continuous data, such as BSES-SF scores, an independent two-sample *t* test was used to assess differences between the intervention group and the control group at 4 and 8 weeks postpartum. For dichotomous data such as breastfeeding at 4 and 8 weeks postpartum, a chi-square test was used to
assess differences between the two groups. Overall, these data provided preliminary findings regarding the potential effectiveness of the self-efficacy intervention.

Breastfeeding self-efficacy change scores also were calculated from baseline to 4 weeks and from 4 weeks to 8 weeks to determine the magnitude of changes in breastfeeding self-efficacy by infant feeding method. Mean change scores were computed \((T_2 - T_1)\) and \((T_3 - T_1)\), and differences between infant feeding groups (breastfeeding versus bottle-feeding) were compared using the \(t\) test.

Additional Outcomes

Two regression analyses were conducted to determine (a) which variables predicted breastfeeding self-efficacy, as measured by the BSES-SF at 4 weeks postpartum, and (b) which baseline variables predicted breastfeeding continuation at 4 weeks. Bivariate analysis was performed to identify potentially significant predictive variables to be entered into each of the models. The regression analyses were performed by entering the potentially significant predictive variables into the appropriate regression model using an alpha level of .10 (Norman & Streiner, 2008).

The formula presented by Tabachnick and Fidell (2001) was used to calculate the proposed sample size for the regression analyses. With a Type I error of .05 and a Type II error of .20, the sample size \((N)\) needed to evaluate \((m)\) predictors is: \(N = 104 + m\). Alternatively, Norman and Streiner (2000) proposed a simple sample size calculation where 5 to 10 participants would be required for each variable in the model. In this study, the largest number of independent predictors was 14. Thus, based on these calculations, the sample from the pilot trial was adequate.
Compliance

The Self-Efficacy Intervention Activity Log was developed to monitor compliance with the trial protocol. In particular, monitoring the delivery of the self-efficacy intervention was necessary as the efficacy-enhancing strategies were based on maternal needs identified during the assessment. Thus, various doses of the intervention and efficacy-enhancing strategies were provided based on maternal needs.

As the researcher was the sole person who delivered the intervention, compliance in terms of a standardized approach was high. In addition, the researcher, who developed the self-efficacy intervention, was familiar with the intervention protocol. The Self-Efficacy Intervention Manual was developed to enhance compliance with the trial protocol and the standardization of the intervention.

Contamination

As the intervention was delivered in hospital, attempts were made to minimize any potential contamination. This included randomizing only one mother per room when eligible participants were in semiprivate rooms. Any visual materials distributed as part of the intervention were kept with the researcher and given to the participants prior to discharge to minimize the risk of the study materials being distributed to control group participants.

Cointervention

Breastfeeding mothers were able to use community supports to assist with breastfeeding once discharged from the hospital. It was expected that any breastfeeding services accessed postdischarge would occur for participants in either group. Thus, randomization was expected to neutralize the effect of any cointervention. To further
minimize the potential for cointervention, hospital staff were blinded to the specific components of the intervention. While the postpartum nurses may have observed the researcher talking with potential or actual participants, they were not provided with the specifics of the intervention.

Loss to Follow-Up

The questionnaires were designed to require a low level of literacy and relatively little time to complete. Attrition is a significant threat to internal and external validity in intervention and longitudinal studies; Capaldi and Patterson (1987) estimated the average retention rate of 6-month to 2-year follow-up studies at 62%. With a follow-up of 8 weeks, minimal loss to follow-up was expected. However, the following telephone strategies (Morrison et al., 1997) were employed to encourage high retention rates. The baseline questionnaire contained an alternate contact for each participant and e-mail address. The participants were telephoned during their stated “best time to contact” period, and messages were left. Directory assistance was telephoned for all disconnected and wrong numbers. The desired goal was a minimum response rate of 90%.

Risks and Benefits

Risks

There were no known risks of participating in this trial. Participants in both groups received access to all standard postpartum and newborn care in hospital and the community following delivery of their infants. No treatment or supportive interventions were withheld from either group of participants. Early discontinuation of breastfeeding can be a sensitive subject for some mothers, and every effort was made to support the mothers’ chosen method of infant feeding.
With a prevalence rate of postpartum depression of 13%, it was anticipated that the administration of the EPDS would identify a certain percentage of mothers suffering from depressive symptoms who would require referral for treatment. In addition, because Question 10 on the EPDS asked about self-harm, there would be individuals who identified themselves as having self-harm ideation. For example, a sample of 522 Canadian mothers found the total number of mothers expressing suicidal ideation using the EPDS was 4.5% at 1 week and 4.3% at the 4-week assessment, increasing slightly to 6.3% at 8 weeks (Dennis, 2004). When a participant in this pilot trial was identified as having an EPDS score > 12 or any positive score (1, 2, or 3) on the self-harm item, further assessment was conducted, and the appropriate protocol was implemented to ensure that mothers with depressive symptoms were referred and had access to treatment.

Any mother identified with a score of > 12 on the EPDS at 8 weeks suggesting probable depression was referred to her family physician, with a referral letter noting the EPDS score faxed to the family physician with the mother’s consent (see Appendix P). If the participant did not have a family physician, she was referred to the mental health assessment team or the local emergency if immediate assistance was required. If any mother scored positive (1, 2 or 3) on the self-harm item (Question 10) on the EPDS, at any of the assessment periods, the maternal self-harm protocol was followed (see Appendix Q) with a referral to the mental health assessment team in the hospital’s emergency department, if indicated (see Appendix R). Although no specific question on the EPDS was related to infant harm, should a mother have indicated at any time that she may harm her infant, the infant harm protocol would have been implemented by the RA collecting the data (see Appendix S). The maternal self-harm and harm to infant
documentation forms have been used in another postpartum depression trial (Dennis et al., 2009).

**Benefits**

There were no known benefits to participation in the trial for the individuals who were breastfeeding. However, participants in other perinatal trials of supportive interventions found that they enjoyed having the opportunity to provide information that may help others in the future. In addition, this trial provided an opportunity for new mothers to discuss their experiences about issues they had encountered related to infant feeding. Because the components of this trial included sources of additional support for breastfeeding mothers, there was the potential for the outcomes to be enhanced.
CHAPTER 4: RESULTS

Sample

In total, 251 primiparous women were assessed for eligibility during the study period of March 3, 2008, to July 23, 2008 (see Figure 3). Eighty-nine women did not meet the eligibility criteria. The most common reasons for exclusion were that their infants were admitted to the NICU with an anticipated stay longer than 24 hours (n = 25, 28%), followed by the decision to bottle feed (n = 22, 24.7%). Of the 162 eligible participants, 12 (7.5%) refused to participate. Thus, the acceptance rate for enrollment in this pilot trial was 92.5%. Regarding their desire to breastfeed their infants, less than half of the women were breastfed themselves as infants (n = 70, 46.7%; see Table 6 for baseline demographic characteristics). In relation to breastfeeding, the vast majority of the women felt that they had support from their partners (n = 134, 89.3%); mothers (n = 133, 88.7%); mothers-in-law (n = 106, 70.7%); friends (n = 116, 77.3%); and sisters (n = 90, 60%). In addition, the majority of participants felt that they were able to speak with other mothers who also had children (n = 121, 80.7%).

The majority of participants had physicians as their primary care providers (n = 113, 75.3%), followed by midwives (n = 22, 14.7%) and midwives with obstetric consultation (n = 15, 10%). However, those who had a midwife either as the sole provider or who shared care with an obstetrician would receive midwifery follow-up after discharge from hospital (n = 32, 24.7%).

The mean BSES-SF score measured at baseline was 46.4 (SD = 9.3), ranging from 25 to 67. The scores were similar among the participants in the control group.
(M = 45.6, SD = 9.8) and the intervention group (M = 47.3, SD = 8.6). Likewise, mean EPDS scores were similar between the participants in the control group (M = 5.4, SD = 4.5) and those in the intervention group (M = 5.1, SD = 3.5), as were the STAI scores. Furthermore, using the designated cut-off scores to indicate depressive symptoms (> 12) and anxiety (≥ 40), 10 (6.6%) participants had a positive score for depressive symptoms at baseline; 7 (8.6%) participants were in the control group, and 3 (4.4%) were in the intervention group. Twenty-two (14.7%) mothers were identified as having anxiety symptoms, with 15 (18.5%) in the control group and 7 (10.4%) in the intervention group.
Figure 3. Schema for trial recruitment.
### Table 6

**Baseline Demographic Characteristics of Control and Intervention Groups**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Control group (81) N (%)</th>
<th>Intervention group (69) N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;19</td>
<td>8 (9.9)</td>
<td>12 (17.4)</td>
</tr>
<tr>
<td>20-24</td>
<td>18 (22.2)</td>
<td>18 (26.1)</td>
</tr>
<tr>
<td>25-29</td>
<td>27 (33.3)</td>
<td>18 (26.1)</td>
</tr>
<tr>
<td>30-34</td>
<td>21 (25.9)</td>
<td>16 (23.2)</td>
</tr>
<tr>
<td>&gt;35</td>
<td>7 (8.6)</td>
<td>5 (7.3)</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married/Common-law</td>
<td>66 (81.5)</td>
<td>55 (79.7)</td>
</tr>
<tr>
<td>Single</td>
<td>15 (18.5)</td>
<td>14 (20.3)</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td>*80</td>
<td></td>
</tr>
<tr>
<td>Elementary</td>
<td>2 (2.5)</td>
<td>0</td>
</tr>
<tr>
<td>High school</td>
<td>20 (13.4)</td>
<td>20 (29)</td>
</tr>
<tr>
<td>Some college</td>
<td>6 (7.5)</td>
<td>9 (13)</td>
</tr>
<tr>
<td>College graduate</td>
<td>25 (31.3)</td>
<td>23 (33.3)</td>
</tr>
<tr>
<td>Some university</td>
<td>5 (6.25)</td>
<td>0</td>
</tr>
<tr>
<td>Graduate of university</td>
<td>19 (23.75)</td>
<td>12 (17.4)</td>
</tr>
<tr>
<td>Graduate degree</td>
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<td>5 (7.3)</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
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<td></td>
</tr>
<tr>
<td>Caucasian</td>
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<td>57 (82.6)</td>
</tr>
<tr>
<td>Aboriginal</td>
<td>12 (14.8)</td>
<td>9 (13)</td>
</tr>
<tr>
<td>Other</td>
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<td>3 (4.4)</td>
</tr>
<tr>
<td><strong>Income</strong></td>
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<tr>
<td>&lt;19,999</td>
<td>21 (27.2)</td>
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<tr>
<td>20,000-39,999</td>
<td>11 (14.3)</td>
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</tr>
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<td>40,000-59,999</td>
<td>14 (18.2)</td>
<td>10 (14.5)</td>
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<tr>
<td>60,000-79,999</td>
<td>15 (19.5)</td>
<td>11 (15.9)</td>
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<tr>
<td>&gt;80,000</td>
<td>16 (20.8)</td>
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<tr>
<td><strong>Smokes</strong></td>
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</tr>
<tr>
<td>Yes</td>
<td>13 (16.5)</td>
<td>11 (15.9)</td>
</tr>
<tr>
<td>No</td>
<td>66 (83.5)</td>
<td>58 (84.1)</td>
</tr>
<tr>
<td><strong>Primary care provider</strong></td>
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</tr>
<tr>
<td>Midwife</td>
<td>14 (17.3)</td>
<td>8 (11.6)</td>
</tr>
<tr>
<td>Physician</td>
<td>61 (75.3)</td>
<td>52 (75.4)</td>
</tr>
<tr>
<td>Both</td>
<td>6 (7.4)</td>
<td>9 (13)</td>
</tr>
<tr>
<td><strong>Decision to breastfeed</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before pregnancy</td>
<td>41 (50.6)</td>
<td>37 (53.6)</td>
</tr>
<tr>
<td>Early pregnancy</td>
<td>21 (25.9)</td>
<td>17 (24.6)</td>
</tr>
<tr>
<td>Midpregnancy</td>
<td>13 (16.1)</td>
<td>8 (11.6)</td>
</tr>
<tr>
<td>Late pregnancy/Birth</td>
<td>6 (7.4)</td>
<td>7 (10.1)</td>
</tr>
<tr>
<td><strong>Planned breastfeeding duration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I don’t know</td>
<td>11 (13.6)</td>
<td>14 (20.3)</td>
</tr>
<tr>
<td>Less than 2 months</td>
<td>2 (2.5)</td>
<td>1 (1.5)</td>
</tr>
<tr>
<td>2-4 months</td>
<td>5 (6.2)</td>
<td>5 (7.3)</td>
</tr>
<tr>
<td>4-6 months</td>
<td>26 (32.1)</td>
<td>20 (29)</td>
</tr>
<tr>
<td>Longer than 6 months</td>
<td>37 (45.7)</td>
<td>29 (42)</td>
</tr>
</tbody>
</table>

Table 6 Cont’d
Seventy-seven percent (n = 115) of the participants gave birth vaginally, with the most common form of analgesia received being narcotic injection (n = 109, 72.7%; see Table 7 for baseline delivery and postpartum characteristics). The majority of the participants (n = 104, 70.3%) reported being satisfied with the pain relief they received. Breastfeeding progress, as measured in hospital, indicated that the majority of participants felt that breastfeeding progress was good to very good (n = 96, 64%). In addition, while in hospital, the majority of participants reported that they were breastfeeding exclusively (n = 116, 77.3%). Information abstracted from the charts indicated that many of the participants experienced one or more of various interventions, or complications, with the most common including an oxytocin drip or an artificial rupture of membranes (n = 71, 47.3%); laceration (n = 53, 46.1%); episiotomy (n = 13,
11.3%); and high blood pressure (n = 13, 9.7%). Less frequent complications included meconium-stained amniotic fluid (n = 13, 8.7%); postpartum bleed (n = 8, 5.3%); and retained placenta (n = 3, 2%). Fourteen (18.8%) infants were separated from their mothers at birth to go to the NICU, with the majority (n = 10, 71.4%) of separations lasting less than 24 hours.

From all the preceding sample characteristics, no clinically important differences were found among the majority of baseline characteristics of the participants in the control group or the intervention group. However, delivery and postpartum characteristics identified in the participants’ labour and birth records found that more participants in the intervention group had both maternal and neonatal interventions and/or complications. In particular, 28 (34.6%) women in the control group had no identified obstetric interventions or complications, as compared to 11 (15.9%) in the intervention group.

Similarly, the birth records for the participants in the intervention group indicated increased meconium-stained amniotic fluid (n = 10, 14.5%), as compared to those in the control group (n = 3; 3.7%) This finding suggested that the women in the intervention group may have experienced increased interventions or complications during labour or the postpartum period. However, having had meconium-stained amniotic fluid and an infant not requiring treatment or admission to NICU may not have been clinically relevant to breastfeeding outcomes. More participants in the control group had scores above the cut-off for depressive symptoms and anxiety symptoms than the participants in the intervention group, although the differences were not statistically significant ($p = .29$ and $p = .15$, respectively).
### Baseline Delivery and Postpartum Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Control group (81) n (%)</th>
<th>Intervention group (69) n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of delivery</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal</td>
<td>51 (63)</td>
<td>47 (68.2)</td>
</tr>
<tr>
<td>Vacuum</td>
<td>3 (3.7)</td>
<td>3 (4.4)</td>
</tr>
<tr>
<td>Forceps</td>
<td>7 (8.6)</td>
<td>4 (5.8)</td>
</tr>
<tr>
<td>Elective cesarean section</td>
<td>4 (4.9)</td>
<td>2 (2.9)</td>
</tr>
<tr>
<td>Emergency cesarean section</td>
<td>16 (19.8)</td>
<td>13 (18.8)</td>
</tr>
<tr>
<td><strong>Perineum</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intact</td>
<td>20 (39.2)</td>
<td>12 (25.5)</td>
</tr>
<tr>
<td>Laceration</td>
<td>24 (47)</td>
<td>29 (61.7)</td>
</tr>
<tr>
<td>Episiotomy</td>
<td>7 (13.7)</td>
<td>6 (12.8)</td>
</tr>
<tr>
<td><strong>Analgesia</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>6 (7.4)</td>
<td>8 (11.6)</td>
</tr>
<tr>
<td>Epidural</td>
<td>16 (19.8)</td>
<td>14 (20.3)</td>
</tr>
<tr>
<td>Entonox</td>
<td>19 (23.5)</td>
<td>14 (20.3)</td>
</tr>
<tr>
<td>Injection</td>
<td>56 (69.1)</td>
<td>53 (76.1)</td>
</tr>
<tr>
<td>General anesthetic</td>
<td>2 (2.5)</td>
<td>2 (2.9)</td>
</tr>
<tr>
<td>Other (spinal for c/s)</td>
<td>8 (11.6)</td>
<td>10 (12.4)</td>
</tr>
<tr>
<td><strong>Meconium</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3 (3.7)</td>
<td>10 (14.5)</td>
</tr>
<tr>
<td>No</td>
<td>78 (96.3)</td>
<td>59 (85.5)</td>
</tr>
<tr>
<td><strong>No obstetric interventions/ complications</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>28 (34.6)</td>
<td>11 (15.9)</td>
</tr>
<tr>
<td>Mother/infant separated at birth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7 (8.6)</td>
<td>7 (10.1)</td>
</tr>
<tr>
<td>No</td>
<td>74 (91.4)</td>
<td>62 (89.9)</td>
</tr>
<tr>
<td><strong>Length of separation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brief (assessment only)</td>
<td>3 (42.7)</td>
<td>2 (28.6)</td>
</tr>
<tr>
<td>&lt;12 hours</td>
<td>2 (28.6)</td>
<td>1 (14.3)</td>
</tr>
<tr>
<td>12-24 hours</td>
<td>1 (14.3)</td>
<td>1 (14.3)</td>
</tr>
<tr>
<td>&gt; 24 hours</td>
<td>1 (14.3)</td>
<td>3 (42.9)</td>
</tr>
<tr>
<td><strong>No neonatal complications</strong></td>
<td>71 (87.7)</td>
<td>61 (88.4)</td>
</tr>
<tr>
<td><strong>Breastfeeding progress</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terrible</td>
<td>3 (3.7)</td>
<td>1 (1.5)</td>
</tr>
<tr>
<td>Not well</td>
<td>7 (8.6)</td>
<td>6 (8.7)</td>
</tr>
<tr>
<td>Satisfactory</td>
<td>20 (24.7)</td>
<td>17 (24.6)</td>
</tr>
<tr>
<td>Good</td>
<td>35 (43.2)</td>
<td>24 (34.8)</td>
</tr>
<tr>
<td>Very good</td>
<td>16 (19.8)</td>
<td>21 (30.4)</td>
</tr>
<tr>
<td><strong>Infant Feeding (in hospital)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast only</td>
<td>61 (75.3)</td>
<td>55 (79.7)</td>
</tr>
<tr>
<td>Breast with occasional supplement</td>
<td>16 (19.8)</td>
<td>13 (18.8)</td>
</tr>
<tr>
<td>Breast with supplement at every feeding</td>
<td>4 (5)</td>
<td>1 (1.5)</td>
</tr>
</tbody>
</table>

*More than one response may apply*
Primary Research Question: Feasibility, Compliance, and Acceptability

The primary research question for this pilot trial was to evaluate the feasibility of and compliance with the trial protocol and the acceptability of the intervention.

Feasibility

Recruitment rate. The recruitment rate for the trial was 92.5%, with 150 of 162 eligible participants agreeing to participate. Those who refused to participate were not asked any additional questions, so the reasons for nonparticipation were not ascertained.

Timing of self-efficacy intervention sessions. To explore the delivery of the intervention, the data were recorded on the Self-Efficacy Intervention Activity Log. Session 1 was planned to occur within 24 hours of delivery. Sixty-eight women were eligible to receive the intervention, but 1 participant withdrew from the study postrandomization, indicating that she was “too tired and had changed her mind.” Overall, sixty-seven (98.5%) women received the first self-efficacy intervention session, with 54 (80.5%) receiving the intervention within 24 hours (see Table 8). The mean time for delivering the intervention after 24 hours was 34.5 hours. One participant (1.5%) did not receive the first session because she had too many visitors. A convenient time was not identified for the intervention after several attempts. Of the approximate 13 (20%) participants who did not receive Session 1 within 24 hours, the main reasons were cesarean section, early-morning birth, mother too tired, or postpartum complication such as postpartum hemorrhage. Nurses were consulted concerning the appropriateness of contacting participants regarding the study. When the nurses indicated that it was not a good time, the potential participants were contacted at a later time.
Sixty-four participants (94.1%) were eligible to receive the second in-hospital session because 4 (5.9%) participants had been discharged from hospital earlier than 24 hours postpartum. Of the eligible women, 63 (98.4%) received Session 2 within 24 hours of the first session, as planned. One participant (1.6%) had her second session 28 hours after the first session. Usually the in-hospital sessions were conducted in the morning (0900-1100) prior to visitors coming and before the participants were discharged. One small disadvantage of the early-morning sessions was that some physicians do their rounds during the lunch hour, and occasionally, some participants were discharged on their first postpartum day and were subsequently not available for their second session. When it was identified that a participant was going to be discharged on the first postpartum day (mother requesting to be discharged), the second session was provided that same day.

The third session was intended to occur prior to 1 week posthospital discharge via telephone. All 68 participants were eligible to receive Session 3. However, 7 (10.3%) eligible participants did not receive the third session because the researcher was unable to contact them (n = 3), their infants remained in NICU (n = 2), and breastfeeding was discontinued (n = 2). Fifty-four (88.5%) participants received Session 3 within 1 week of hospital discharge. Of the 7 (11.5%) participants who received the session > 1 week, the average time was 9 days postpartum ($M = 8.85$, $SD = 0.69$).
Table 8

**Summary of Intervention Timing**

<table>
<thead>
<tr>
<th>Timing of intervention</th>
<th>Received</th>
<th>Did not receive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session 1 (n = 67) Within 24 hours of birth</td>
<td>54 (80.6%)</td>
<td>13 (19.4%)</td>
</tr>
<tr>
<td>Session 2 (n = 64) Within 24 hours of session 1</td>
<td>63 (98.4%)</td>
<td>1 (1.6%)</td>
</tr>
<tr>
<td>Session 3 (n = 61) Within 1 week of hospital discharge</td>
<td>54 (88.5%)</td>
<td>7 (11.5%)</td>
</tr>
</tbody>
</table>

*Duration of self-efficacy intervention sessions.* The mean duration of the first session was 16.6 minutes ($SD = 6.1$), ranging from 5 to 40 minutes. The mean duration of the second session was 18.7 minutes ($SD = 8.2$), ranging from 5 to 45 minutes. The third session was similar to the first session, with a mean duration of 16.1 minutes ($SD = 5.3$) and ranging from 4 to 35 minutes.

*Compliance*

One major change occurred to the trial protocol within the first month of the study regarding the recruitment and randomization procedure. The trial protocol specified that the researcher would be responsible for obtaining consent, baseline data and randomization for all participants, and delivery of the intervention for those allocated to the intervention group. However, it became apparent that it was not feasible because of the time commitment. Early in the recruitment process, the researcher incurred frequent interruptions during the process of study explanation, consent, and/or baseline data collection.

In addition, there were situations where the researcher felt rushed to complete the intervention. To address this issue, an RA was hired to assess eligibility, obtain consent and baseline information, and perform randomization. The researcher was then able to deliver the intervention to the intervention group participants at their convenience and
experienced fewer interruptions and/or felt less rushed during the intervention. Overall, the perception of the researcher was that at times, the process of obtaining consent, baseline data, randomization, and delivery of the intervention was too long to be conducted at one time. The RA was an effective way of decreasing any potential burden on the participants and allowing adequate time for the delivery of the intervention.

Compliance with the self-efficacy intervention was documented with the Self-Efficacy Intervention Activity Log to track the specific components of the intervention and whether the intervention protocol was implemented as intended. The sessions followed a standardized method, with the researcher first enquiring how the mother was feeling and then rating her overall feelings of fatigue, anxiety, and pain on a scale of 1 (no pain) to 10 (severe pain). Mean pain scores decreased from a high in Session 1 of 4.5 (SD = 1.5) to a low in Session 3 of 2.8 (SD = 1.7). Anxiety scores remained relatively the same for Session 1 (M = 1.7; SD = 1.0); Session 2 (M = 2.1; SD = 1.6); and Session 3 (M = 1.7; SD = 1.1). Similarly, fatigue scores remained fairly constant, with a higher mean of 4.6 (SD = 1.7) in Session 1; 3.9 (SD = 1.6) in Session 2; and 4.1 (SD = 1.6) in Session 3. Strategies were then discussed in relation to the participants’ ratings.

Next, the BSES-SF was examined, noting areas of high breastfeeding self-efficacy (≥ 4) and areas of low breastfeeding self-efficacy (≤ 3). Among the intervention group participants, the average number of low-scoring items decreased from a mean of 7.2 (SD = 4.0) during Session 1 to 2.6 (SD = 3.5) in Session 3. Likewise, the mean number of high-scoring items increased from 6.7 (SD = 4.9) during Session 1 to a mean of 11.4 (SD = 3.5) in Session 3. The most frequent low-scoring items (≤ 3) in Session 1 were successfully coping with breastfeeding like other challenging tasks (n = 57, 83.8%),
followed by determining whether the baby was getting enough (n = 55, 80.8%) and ensuring that the baby was properly latched for the whole feeding (n = 49, 72.1%; see Table 9). Comparably, in Session 3, comfortably breastfeeding my baby with family members present (n = 21, 34.4%) and breastfeeding the baby without using formula as a supplement (n = 20, 32.8%) were the most common low-scoring items.

Table 9

Frequency of BSES-SF Items

<table>
<thead>
<tr>
<th>BSES-SF item</th>
<th>Session 1 n = 68</th>
<th>Session 3 n = 61</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can always...</td>
<td>≤2</td>
<td>≥4</td>
</tr>
<tr>
<td>1. determine that my baby is getting enough</td>
<td>24</td>
<td>31</td>
</tr>
<tr>
<td>2. successfully cope with breastfeeding like other challenging tasks</td>
<td>28</td>
<td>29</td>
</tr>
<tr>
<td>3. breastfeed my baby without using formula as a supplement</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>4. * ensure that my baby is latched on for the whole feeding</td>
<td>18</td>
<td>31</td>
</tr>
<tr>
<td>5. manage the breastfeeding situation to my satisfaction</td>
<td>16</td>
<td>24</td>
</tr>
<tr>
<td>6. * manage to breastfeed even if my baby is crying</td>
<td>22</td>
<td>19</td>
</tr>
<tr>
<td>7. keep wanting to breastfeed</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>8. * comfortably breastfeed with my family members present</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td>9. be satisfied with my breastfeeding experience</td>
<td>6</td>
<td>27</td>
</tr>
<tr>
<td>10. deal with the fact that breastfeeding can be time consuming</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>11. * finish feeding my baby on one breast before switching to the other breast</td>
<td>14</td>
<td>29</td>
</tr>
<tr>
<td>12. continue to breastfeed my baby for every feeding</td>
<td>5</td>
<td>21</td>
</tr>
<tr>
<td>13. manage to keep up with my baby’s breastfeeding demands</td>
<td>7</td>
<td>25</td>
</tr>
<tr>
<td>14. tell when my baby is finished breastfeeding</td>
<td>18</td>
<td>25</td>
</tr>
</tbody>
</table>

*no response from participants exclusively pumping

Efficacy-enhancing strategies were then implemented based on individual responses. The most and least frequently used strategies are listed in Table 10.
Overall, identifying and reinforcing past and present success and accomplishments, giving attention to successful or improved aspects of breastfeeding performance, and suggesting strategies about how to improve future breastfeeding performances were the most frequently used strategies in all three sessions. Other efficacy-enhancing strategies varied according to session. In particular, anticipatory guidance was provided in Session 1 about difficulties that may be encountered (77.6%); pain, anxiety, and fatigue (53.7%); and information about how to overcome pain, anxiety, and fatigue (56.7%). During Session 2, the participants were frequently provided with written material to supplement learning (73.4%), and during Session 3, the participants were frequently provided with positive reinforcement regarding breastfeeding skills (60.6%). Overall, the use of visual aids to make unobservable breastfeeding skills apparent (9%; 6.3%) and to demonstrate breastfeeding techniques (4.5%; 1.6%) were the least frequent strategies used during Sessions 1 and 2. This was likely because of the intentional use of performance accomplishment strategies (actively doing) versus observation. At the end of each session, the participants were asked whether they had any questions concerning infant feeding.
### Table 10

**Summary of Efficacy-Enhancing Strategies by Session**

<table>
<thead>
<tr>
<th>Efficacy-enhancing strategy</th>
<th>Session 1</th>
<th>Session 2</th>
<th>Session 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 67 (%)</td>
<td>n = 64 (%)</td>
<td>n = 61 (%)</td>
</tr>
<tr>
<td>1. Identified and reinforced past and present successes and accomplishments.</td>
<td>48 (71.6)</td>
<td>47 (73.4)</td>
<td>53 (86.9)</td>
</tr>
<tr>
<td>2. Gave attention to successful or improved aspects of breastfeeding performance.</td>
<td>46 (68.7)</td>
<td>54 (84.4)</td>
<td>48 (78.7)</td>
</tr>
<tr>
<td>3. Suggested strategies about how to improve future breastfeeding performances.</td>
<td>44 (65.7)</td>
<td>38 (59.4)</td>
<td>32 (52.5)</td>
</tr>
<tr>
<td>4. Set achievable short-term goals.</td>
<td>28 (41.8)</td>
<td>16 (25)</td>
<td>5 (8.2)</td>
</tr>
<tr>
<td>5. Provided anticipatory guidance about breastfeeding difficulties that may be encountered.</td>
<td>52 (77.6)</td>
<td>22 (34.4)</td>
<td>2 (3.3)</td>
</tr>
<tr>
<td>6. Used visual aids to make unobservable breastfeeding skills apparent.</td>
<td>6 (9.0)</td>
<td>4 (6.3)</td>
<td>n/a*</td>
</tr>
<tr>
<td>7. Used visual aids to demonstrate breastfeeding technique.</td>
<td>3 (4.5)</td>
<td>1 (1.6)</td>
<td>n/a*</td>
</tr>
<tr>
<td>8. Provided written materials to supplement learning.</td>
<td>6 (9.0)</td>
<td>47 (73.4)</td>
<td>n/a*</td>
</tr>
<tr>
<td>9. Provided positive feedback highlighting breastfeeding skills (high-scoring BSES-SF items).</td>
<td>39 (58.2)</td>
<td>33 (51.6)</td>
<td>37 (60.6)</td>
</tr>
<tr>
<td>10. Corrected inaccurate and low perceptions of performance capability.</td>
<td>15 (22.3)</td>
<td>8 (12.5)</td>
<td>2 (3.3)</td>
</tr>
<tr>
<td>11. Dispelled myths about breastfeeding.</td>
<td>8 (11.9)</td>
<td>3 (4.7)</td>
<td>4 (6.6)</td>
</tr>
<tr>
<td>12. Created optimistic beliefs.</td>
<td>23 (34.3)</td>
<td>16 (25)</td>
<td>9 (14.8)</td>
</tr>
<tr>
<td>13. Provided support when handling disappointment or failure.</td>
<td>13 (19.4)</td>
<td>12 (18.6)</td>
<td>12 (19.7)</td>
</tr>
<tr>
<td>14. Encourage mother to envision successful performances and manage self-defeating thoughts.</td>
<td>2 (3.0)</td>
<td>10 (15.6)</td>
<td>2 (3.3)</td>
</tr>
<tr>
<td>15. Encouraged participation from family/ friends to support new mother’s efforts.</td>
<td>19 (28.4)</td>
<td>10 (15.6)</td>
<td>1 (1.6)</td>
</tr>
<tr>
<td>16. Provided anticipatory guidance- pain, anxiety and fatigue – explicitly acknowledged and normalized.</td>
<td>36 (53.7)</td>
<td>14 (21.9)</td>
<td>5 (8.2)</td>
</tr>
<tr>
<td>17. Provided information on practices that may help overcome pain, anxiety and fatigue.</td>
<td>38 (56.7)</td>
<td>13 (20.3)</td>
<td>12 (19.7)</td>
</tr>
<tr>
<td>18. Other.</td>
<td>1 (1.5)</td>
<td>4 (6.3)</td>
<td>10 (16.4)</td>
</tr>
</tbody>
</table>

* not applicable by telephone

One question was removed from the activity log shortly after the initiation of the pilot trial because of the potential for response bias. The question asked whether the participant felt that her breastfeeding self-efficacy had increased from the start of the session to the end of the session. It was apparent that some participants felt somewhat...
uncomfortable being asked this directly by the researcher after one interaction. In addition, there was a similar question at the end of the study that could capture the participants’ overall perception whether the intervention increased their breastfeeding self-efficacy. This question was asked by the RA, who was not directly involved in providing the intervention.

*Observed breastfeeding session.* Having at least one observed breastfeeding session was a goal for this study because it was hypothesized that having an opportunity to implement efficacy-enhancing strategies during the process of breastfeeding would be optimal. Breastfeeding was observed at least once for 40 (58.8%) of the participants. Having an observed breastfeeding session often occurred by chance or upon the suggestion of the researcher if the infant was awake and interested. Ensuring that there was an observed breastfeeding session for all participants would have required notification of the researcher to return to the hospital at a later time, which was not feasible.

*Dose of intervention.* The majority of the participants had the prescribed dose of the intervention, including two in-hospital sessions and one telephone follow-up postpartum. Overall, 58 (85.3%) participants received all three intervention sessions. Eight (11.8%) participants received two of the three sessions, and 2 participants (2.9%) received only one of the three sessions, both in-hospital.

*Loss to follow-up.* In the control group, 1 participant withdrew at the 4-week follow-up, and 2 were completely lost to follow-up. At 8 weeks, an additional 5 participants were lost to follow-up. Thus, the overall loss to follow-up in the control group was 8 (9.9%) participants. Similarly, in the intervention group, 4 participants were
lost to follow-up at the 4-week telephone call, and an additional 3 participants were lost to follow-up at 8 weeks. Overall, 7 (10.1%) participants in total were lost to follow-up in the intervention group, with the addition of 1 participant who withdrew in hospital postrandomization (n = 8, 11.6%). Both participants who withdrew from the study cited changing their minds about participating in the study. Specifically, the intervention group participant stated that she had hoped that she would have been in the other (control) group and changed her mind about participating. The participant in the control group stated that she did not have time to answer the questions and did not want to be telephoned back. Thus, the overall loss to follow-up at 8 weeks was 16 (10.7%) participants. E-mail was an effective way to keep in contact with 4 participants whom the RA was unable to contact for follow-up. Of these 4 participants, 3 had unexpectedly moved, and 1 had documented an incorrect telephone number.

Intervention Acceptability

The majority (n = 61, 89.7%) of the participants who received the self-efficacy intervention and completed the Maternal Satisfaction with the Self-Efficacy Intervention Questionnaire were satisfied with their experience (see Table 11). In particular, the majority of participants felt that the discussions with the researcher were beneficial (n = 57, 93.4%); the researcher provided assistance that was specific to their needs (n = 52, 85.3%); they would recommend this type of additional support to their friends (n = 57, 93.5%); the information that the researcher provided helped them to feel more confident to breastfeed (n = 53, 86.9%); and the researcher assisted them to meet their breastfeeding goals (n = 50, 82%). In addition, many participants indicated that they would have liked to have been able to contact the researcher when they needed assistance
(n = 39, 64%). Overall, the majority of participants agreed or strongly agreed that they were satisfied with the support provided by the researcher.

Alternatively, the majority (n = 33, 54%) of participants disagreed that assistance from the staff was sufficient and that additional support was not required. In response to the statement, “The time I spent with the researcher was too short,” diverse findings were identified. Although the majority (n = 36, 58.9%) disagreed that the intervention was too short, more than one quarter of the participants (n = 16, 26.3%) agreed that the time spent with the researcher was too short, and 9 (n = 14.8%) were unsure. Similarly, in response to whether the participants would have preferred more visits from the researcher in hospital, the majority of participants (n = 36, 58.9) disagreed, yet a substantial number of participants would have preferred more visits from the researcher while in hospital (n = 22, 36.1%). Lastly, the majority of participants (n = 39, 63.9%) indicated that they were unsure whether they would have liked more telephone calls from the researcher after discharge.
Table 11

Summary of Maternal Satisfaction With Self-Efficacy Intervention Questionnaire

<table>
<thead>
<tr>
<th>Maternal satisfaction statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The discussions with the researcher were beneficial.</td>
<td>4 (6.6%)</td>
<td>21 (34.4%)</td>
<td>36 (59%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. The researcher provided assistance that was specific to my needs.</td>
<td>8 (13.1%)</td>
<td>22 (36.1%)</td>
<td>30 (49.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I would recommend this type of additional support to my friends.</td>
<td>3 (4.9%)</td>
<td>9 (14.8%)</td>
<td>48 (78.7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The time I spent with the researcher was too short.</td>
<td>33 (54.1%)</td>
<td>9 (14.8%)</td>
<td>16 (26.3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I would have preferred more visits from the researcher in hospital.</td>
<td>32 (52.3%)</td>
<td>19 (31.2%)</td>
<td>3 (4.9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I would have liked more telephone calls after discharge from the researcher.</td>
<td>39 (63.9%)</td>
<td>3 (4.9%)</td>
<td>15 (24.6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I would have liked to have been able to contact the researcher when I needed assistance.</td>
<td>37 (60.7%)</td>
<td>2 (3.3%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. The assistance from the nursing staff was good and additional support was not needed.</td>
<td>27 (44.3%)</td>
<td>6 (9.8%)</td>
<td>19 (31.2%)</td>
<td>3 (4.9%)</td>
<td></td>
</tr>
<tr>
<td>9. The information the researcher provided made me feel more confident to breastfeed.</td>
<td>27 (44.3%)</td>
<td>6 (9.8%)</td>
<td>26 (42.6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. The researcher assisted me to meet my breastfeeding goals.</td>
<td>27 (44.3%)</td>
<td>23 (37.7%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Overall, I am satisfied with the support from the researcher.</td>
<td>28 (45.9%)</td>
<td>30 (49.2%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

n = 61

Secondary Research Questions

The secondary research questions for this pilot trial were to identify any trends in data regarding the effect of the self-efficacy intervention on breastfeeding self-efficacy, breastfeeding duration, breastfeeding exclusivity, depressive symptomatology, and anxiety at 4 and 8 weeks postpartum.

Breastfeeding Self-Efficacy

No significant differences between groups were found in mean BSES-SF scores at 4 and 8 weeks postpartum (see Table 12). However, the participants in the intervention group had higher mean BSES-SF scores at both 4 and 8 weeks postpartum.
Table 12

*T Tests of Mean BSES-SF Scores by Group*

<table>
<thead>
<tr>
<th>Time</th>
<th>Group</th>
<th>M</th>
<th>SD</th>
<th>t(df)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
<td>55.03</td>
<td>13.66</td>
<td>-1.56 (140)</td>
<td>.12</td>
</tr>
<tr>
<td>4 weeks</td>
<td>Intervention</td>
<td>58.38</td>
<td>11.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>54.85</td>
<td>15.80</td>
<td>-1.59 (131)</td>
<td>.11</td>
</tr>
<tr>
<td>8 weeks</td>
<td>Intervention</td>
<td>58.97</td>
<td>13.67</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To further explore breastfeeding self-efficacy over time, additional data analyses were conducted with BSES-SF scores from baseline, 4 weeks, and 8 weeks by infant feeding method (breastfeeding versus bottle-feeding; see Table 13). The analysis was conducted using BSES-SF change scores (baseline to 4 weeks, and 4 weeks to 8 weeks) by group (control and intervention) and follow-up period (4 weeks and 8 weeks) to determine mean change scores and any differences between the groups.

No significant differences were found in BSES-SF change scores between participants in the intervention or control group at 4 weeks [$t (140) = -0.60, p = .54$] or 8 weeks [$t (131) = 0.78, p < .44$]. However, both the control group ($M = 14.19, SD = 10.80$) and the intervention group ($M = 12.45, SD = 10.42$) participants’ mean BSES-SF change scores increased from baseline to 4 weeks postpartum by approximately 12 to 14 points among those who were breastfeeding. Similarly, there was a slightly greater increase from baseline to Week 8 of approximately 16 to 18 points above baseline for the control group and the intervention group among those who continued to breastfeed.

Alternatively, among the participants who discontinued breastfeeding, there were relatively no changes in the BSES-SF scores among participants in the intervention group from baseline to Week 4 ($M = .78, SD = 13.90$) and a decrease in BSES scores among
the participants in the control group \((M = -4.20, SD = 14.61)\) who were bottle-feeding.

Similarly, among those who were bottle-feeding, mean BSES-SF scores decreased from baseline to 8 weeks postpartum among both groups, with a slight decrease in the intervention group \((M = -1.83, SD = 16.44)\) and a larger decrease in the control group \((M = -6.08, SD = 13.94)\).

Table 13

*Comparison of Mean BSES Change Scores by Infant Feeding Method and Group*

<table>
<thead>
<tr>
<th>Time</th>
<th>Group</th>
<th>Feed type</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 weeks</td>
<td>Control</td>
<td>Breast (59)</td>
<td>14.19</td>
<td>10.80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bottle (20)</td>
<td>-4.20</td>
<td>14.61</td>
</tr>
<tr>
<td></td>
<td>Intervention</td>
<td>Breast (55)</td>
<td>12.45</td>
<td>10.42</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bottle (9)</td>
<td>.78</td>
<td>13.90</td>
</tr>
<tr>
<td>8 weeks</td>
<td>Control</td>
<td>Breast (47)</td>
<td>17.12</td>
<td>10.39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bottle (25)</td>
<td>-6.08</td>
<td>13.94</td>
</tr>
<tr>
<td></td>
<td>Intervention</td>
<td>Breast (43)</td>
<td>16.56</td>
<td>8.62</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bottle (9)</td>
<td>-1.83</td>
<td>16.44</td>
</tr>
</tbody>
</table>

Similarly, significant differences were identified in the BSES-SF scores between those who continued to breastfeed and those who were formula feeding. In particular, average BSES-SF scores of the women who were bottle-feeding at 4 weeks \((M = 39.8; SD = 14.5)\) were significantly lower than those who were breastfeeding \((M = 60.8; SD = 7.9; t (140) = -10.54, p < .001)\). This difference in BSES-SF scores continued to be significant at 8 weeks between the women who were bottle-feeding and those who were breastfeeding \((t (131) = -13.83, p < .001)\). Overall, these findings suggested that the women who continued to breastfeed had greater breastfeeding self-efficacy regardless of group allocation. Furthermore, the women who discontinued breastfeeding often had lower breastfeeding self-efficacy scale scores than when they initiated breastfeeding.
**Breastfeeding Duration**

Although not statistically significant, more participants in the intervention group were breastfeeding at both follow-up periods (see Table 14). In particular, at 4 weeks postpartum, 55 (85.9%) participants in the intervention group continued to breastfeed, as compared to 58 (74.4%) in the control group ($\chi^2 = 2.90, p = .08$). Similarly, at 8 weeks, 43 (70.5%) participants in the intervention group continued to breastfeed, whereas 48 (65.6%) participants in the control group continued ($\chi^2 = 0.34, p = .56$).

Table 14

<table>
<thead>
<tr>
<th>Time</th>
<th>Intervention group</th>
<th>Control group</th>
<th>$\chi^2$</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Breast</td>
<td>Bottle</td>
<td>Breast</td>
<td>Bottle</td>
</tr>
<tr>
<td>4 Weeks</td>
<td>55 (85.9)</td>
<td>9 (14.1)</td>
<td>58 (74.4)</td>
<td>20 (25.6)</td>
</tr>
<tr>
<td>8 Weeks</td>
<td>43 (70.5)</td>
<td>18 (29.5)</td>
<td>48 (65.6)</td>
<td>25 (34.4)</td>
</tr>
</tbody>
</table>

*Note. df = 1*

However, when evaluating the rate of breastfeeding discontinuation from hospital to 4 weeks, and then from 4 to 8 weeks postpartum, significant group differences were identified (see Table 15). The intervention group had 9 (14.1%) women discontinue breastfeeding by 4 weeks, and an additional 9 (17.3%) discontinued between 4 and 8 weeks postpartum. Conversely, in the control group, 20 (25.6%) women discontinued breastfeeding by 4 weeks, and 5 (9.4%) more women discontinued breastfeeding from 4 to 8 weeks (9.4%). Thus, the rate of decline was significantly different between groups ($\chi^2 = 4.29, p < .05$) as the control group participants experienced a much steeper decline in breastfeeding discontinuation (see Figure 4).
Table 15

Rate of Breastfeeding Discontinuation Between Groups

<table>
<thead>
<tr>
<th>Time</th>
<th>Intervention group</th>
<th>Control group</th>
<th>( \chi^2 )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Weeks</td>
<td>n 64</td>
<td>n (%) 9 (14.1)</td>
<td>n 78</td>
<td>n (%) 20 (25.6)</td>
</tr>
<tr>
<td>8 Weeks</td>
<td>n 52</td>
<td>n (%) 9 (17.3)</td>
<td>n 53</td>
<td>n (%) 5 (9.4)</td>
</tr>
</tbody>
</table>

*Note. df = 1*

Diverse reasons for breastfeeding discontinuation were reported at 4 weeks postpartum. The intervention group participants stopped breastfeeding because of perceptions of insufficient milk supply (n = 2, 22.2%); baby in NICU for prolonged period so that mother was unable to put infant to breast (n = 2, 22.2%); poor weight gain (n = 1, 11.1%); too time-consuming (n = 1, 11.1%); too painful (n = 1; 11.1%); difficulty latching (n = 1, 1.11%); and the participant changed her mind about breastfeeding (n = 1, 11.1%). The control group participants discontinued breastfeeding primarily due to perceptions of insufficient milk supply (n = 12, 60%); difficulty latching (n = 4, 20%); mastitis (n = 1, 5%); too stressful (n = 1, 5%); postpartum depression (n = 1, 5%); and recommended by physician (n = 1, 5%).

Figure 4. Rate of breastfeeding discontinuation.
Breastfeeding Exclusivity

To explore the impact of the self-efficacy intervention on breastfeeding outcomes, an analysis was conducted comparing the level of infant feeding among groups (see Table 16). A greater percentage of participants in the intervention group were breastfeeding exclusively at both 4 (n = 39, 60.9%) and 8 (n = 31, 50.8%) weeks postpartum than the control group at 4 (n = 43, 55.1%) and 8 (n = 33, 45.2%) weeks postpartum. However, the differences were not statistically significant.

Table 16

<table>
<thead>
<tr>
<th>Time</th>
<th>Infant feeding category</th>
<th>Control n = 78</th>
<th>BSEI n = 64</th>
<th>χ² (df)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 weeks</td>
<td>Exclusive</td>
<td>43 (55.1)</td>
<td>39 (60.9)</td>
<td>5.87 (5)</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>Almost exclusive</td>
<td>1 (1.2)</td>
<td>3 (4.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>3 (3.8)</td>
<td>3 (4.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Partial</td>
<td>11 (14.1)</td>
<td>10 (15.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Token</td>
<td>4 (5.1)</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bottle-feeding</td>
<td>16 (20.5)</td>
<td>9 (14.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Weeks</td>
<td>Exclusive</td>
<td>33 (45.2)</td>
<td>31 (50.8)</td>
<td>3.48 (5)</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td>Almost exclusive</td>
<td>3 (4.1)</td>
<td>5 (8.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>2 (2.7)</td>
<td>3 (4.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Partial</td>
<td>10 (13.7)</td>
<td>4 (6.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Token</td>
<td>1 (1.4)</td>
<td>1 (1.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bottle-feeding</td>
<td>24 (32.8)</td>
<td>17 (27.8)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional analysis was conducted comparing the similar infant categories of exclusive, almost exclusive, and high breastfeeding combined to form a new variable, high breastfeeding, and partial and token breastfeeding were combined to form a new variable, low breastfeeding. The participants who had completely stopped putting their babies to breast were not entered. The intervention group participants were practicing high breastfeeding at a higher rate at both 4 and 8 weeks postpartum (see Table 17). At 4 weeks postpartum, 45 participants (81.8%) in the intervention group were high
breastfeeding, as compared to 47 participants in the control group (75.8%). However, the difference between the groups was not significant. Similarly, at 8 weeks, the difference between the groups was not significant, with 39 (88.6%) women in the intervention group practicing high breastfeeding, as compared to 38 (77.5%) participants in the control group.

Participants provided various reasons for adding additional fluids to their infants’ diet in the first 4 weeks of life. The participants in the control group reported that they stopped exclusively breastfeeding because of perceptions of low milk supply or perceptions that their infants were hungry and not getting enough (n = 9, 47.4%); experienced pain or difficulty latching (n = 4, 21.1%); felt the need for more sleep (n = 2, 10.5%); wanted to top-off their infants (n = 2, 10.5%); the infant was ‘cranky’ (n = 1, 5.2%); and the convenience to go out (n = 1, 5.2%). The intervention group participants gave comparable reasons for changing from exclusive breastfeeding, including perceptions of insufficient milk (n = 3, 18.8%); pain or difficulty latching (n = 3, 18.8%); a cranky baby (n = 2, 12.5%); low weight gain (n = 2; 12.5%); top-off infant (n = 2; 12.5%); need for more sleep (n = 2, 12.5%); need to free up time (n = 1, 6.3%); and convenience to go out (n = 1; 6.3%).

Table 17

<table>
<thead>
<tr>
<th>Infant feeding category</th>
<th>Time</th>
<th>High breastfeeding n (%)</th>
<th>Low breastfeeding n (%)</th>
<th>$\chi^2$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention group (55)</td>
<td>4 weeks</td>
<td>45 (81.8)</td>
<td>10 (18.2)</td>
<td>0.63</td>
<td>0.42</td>
</tr>
<tr>
<td>Control group (62)</td>
<td></td>
<td>47 (75.8)</td>
<td>15 (24.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention group (44)</td>
<td>8 weeks</td>
<td>39 (88.6)</td>
<td>5 (11.4)</td>
<td>2.0</td>
<td>0.15</td>
</tr>
<tr>
<td>Control group (49)</td>
<td></td>
<td>38 (77.5)</td>
<td>11 (22.5)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Depressive or Anxiety Symptomatology

Further analysis was conducted to determine whether the self-efficacy intervention had any impact on depressive or anxiety symptoms at both 4 and 8 weeks postpartum. In relation to depressive symptoms, using a cut-off score of > 12, only 3 participants scored positive (2 control group and 1 intervention group) at 4 weeks, and 2 participants (1 control group and 1 intervention group) scored positive at 8 weeks (see Table 18). Similarly, for anxiety symptoms only, 2 participants (1 control group; 1 intervention group) scored positive at 4 weeks, and 1 participant (control group) at 8 weeks, using the designated cut-off score of > 40. Thus, the low prevalence of depressive and anxiety symptoms at 4 and 8 weeks precluded conducting an analysis to determine whether the self-efficacy intervention had an effect on depressive or anxiety symptoms at 4 and 8 weeks.

Table 18

T Tests of Mean EPDS and STAI Scores by Group

<table>
<thead>
<tr>
<th>Time</th>
<th>Group</th>
<th>M</th>
<th>SD</th>
<th>t(df)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 week EPDS</td>
<td>Control</td>
<td>2.61</td>
<td>3.92</td>
<td>1.10 (139)</td>
<td>0.27</td>
</tr>
<tr>
<td></td>
<td>Intervention</td>
<td>1.97</td>
<td>2.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 week STAI</td>
<td>Control</td>
<td>22.69</td>
<td>4.59</td>
<td>0.12 (133)</td>
<td>0.90</td>
</tr>
<tr>
<td></td>
<td>Intervention</td>
<td>22.59</td>
<td>4.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 week EPDS</td>
<td>Control</td>
<td>1.36</td>
<td>2.25</td>
<td>0.68 (128)</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>Intervention</td>
<td>1.07</td>
<td>2.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 week STAI</td>
<td>Control</td>
<td>22.10</td>
<td>4.80</td>
<td>0.75 (131)</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>Intervention</td>
<td>21.56</td>
<td>3.17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional Analysis

Influencing Breastfeeding Self-Efficacy

Four open-ended questions were included on the Maternal Satisfaction with Self-Efficacy Intervention Questionnaire. Two of the questions were to determine whether the intervention group participants perceived that the researcher influenced their
breastfeeding confidence and if so, how. Sixty-one participants from the intervention group received the intervention and completed the questionnaire. The other two questions were to ascertain whether anyone else did anything to increase or decrease the participants’ breastfeeding confidence and if so, how. Seventy-one control group and 61 intervention group participants completed the two open-ended questions pertaining to both groups.

Researcher’s Influence on Breastfeeding Self-Efficacy

The majority of participants (n = 46, 75.4%) felt that the researcher assisted in increasing their confidence to breastfeed. The participants also provided specific comments. Using content analysis, three themes were identified: provision of support, intervention characteristics, and researcher characteristics.

Provision of support. Overwhelmingly, the majority of participants (n = 40, 86.9%) reported that the support they received from the researcher increased their breastfeeding confidence. The participants used general terms such as being provided with “extra information,” “advice,” “opportunities to answer questions,” “teaching,” “a second opinion,” “reassurance,” “extra support,” “encouragement,” and “helpful suggestions” to describe strategies that increased their breastfeeding confidence. Some participants included more specific examples, such as information and assistance with positioning, latching, infant output, and infant feeding needs. Additional comments included that the researcher reinforced that breastfeeding takes work and that it is not always easy in the beginning. For example, “She let me know that I was not alone and that breastfeeding takes work.” Several participants discussed feeling reassured that they were doing things “right” and that the researcher was reinforcing or confirming what they
were being told by the nurses and midwives. One participant commented, “You can’t always remember everything you are told, so hearing it more than once and by different people is reassuring.” Another participant responded, “I was happy to know that what my baby was doing was normal and expected.”

**Intervention characteristics.** Both “one on one” and “extra time” were frequently (n = 11, 23.9%) listed as increasing breastfeeding confidence. Specific comments included that the researcher “spent time” and did not just come “in and out.” For example, “She spent extra time with me and listened to my individual concerns and did not pressure me,” and “It is just nice to have that extra time and support.” Additional comments included that the discussions were individualized and specific to the participants’ needs. “She sat down and answered questions specific to my needs. She spent extra time, just focusing on the breastfeeding. Not rushed like the nurses who would be in and out and say everything was fine.”

**Researcher characteristics.** Several comments were made concerning characteristics of the researcher (n = 9, 19.5%) that increased breastfeeding confidence. These included that the researcher was “personable,” “knowledgeable,” “supportive,” “encouraging,” “unbiased and nonjudgemental,” “didn’t pressure,” “positive attitude,” “open and friendly,” “easy going and open to questions.” One participant commented, “She shared experiences, showing she understood what I was going through” and another noted, “Her open and friendly attitude made it easy to ask questions and discuss concerns.”
Although all of the participants (n = 61, 100%) indicated that the researcher did not do anything to decrease their breastfeeding confidence, approximately 25% (n = 15) felt that the researcher did not increase their breastfeeding confidence.

Influence of Others on Breastfeeding Self-Efficacy

Increasing breastfeeding self-efficacy. The majority of participants (n = 104, 78.8%) felt that someone else assisted in increasing their confidence to breastfeed. No significant differences were found between the groups in respect to maternal perceptions of others’ increasing their breastfeeding confidence ($\chi^2 = 0.16, p = .69$). The most prevalent source of increasing confidence was health professionals, including hospital nurse (n = 22, 17.3%); lactation consultant (n = 14, 11%); public health nurse (n = 13, 10.2%); midwife (n = 12, 9.4%); prenatal breastfeeding classes (n = 8, 6.3%); medical doctor (n = 2, 1.6%); followed by family members (n = 43, 33.8%); friend (n = 9, 7.1%); infant (n = 3, 2.4%); and LeLeche League (n = 1, 0.8%).

One hundred participants provided specific comments regarding how others increased their breastfeeding confidence. Three prevalent themes emerged from the analysis of specific examples. The most frequent was the provision of support (n = 60, 60%). Individuals stated that “support from my husband” or “my mother was supportive of breastfeeding” increased their breastfeeding confidence. Others commented specifically regarding “receiving support from friends with breastfeeding experience” or “the nurse supported my decision.” Additional frequent strategies included providing information and assistance (n = 50, 50%) regarding positioning, latching, and infant output. In addition, providing encouragement or reassurance was frequently noted as increasing confidence (n = 33, 33%). Less frequently mentioned sources of increasing
breastfeeding confidence included home visits/telephone support (n = 6, 6%); longer hospital stay (n = 1, 1%); and extra time with participants (n = 2, 2%).

*Decreasing breastfeeding self-efficacy.* Twenty-seven (n = 20.5%) participants perceived that someone decreased their confidence to breastfeed. In addition, significant differences were found between the groups in mothers’ perception of another individual decreasing breastfeeding their breastfeeding confidence ($X^2 = 3.83, p = .05$). In particular, almost twice as many participants in the intervention group (n = 17, 27.9%) found that another person(s) decreased their breastfeeding confidence, as compared to 14.1% (n = 10) in the control group.

Twenty-seven participants identified the individuals who decreased their confidence as health care providers (n = 20, 74.1%); family (n = 5, 18.5%); and people in general (n = 2, 7.4%). Among the 20 health care providers, the participants specified that hospital nurses (n = 17, 85%); lactation consultant (n = 2, 10%); and public health nurse (n = 1, 5%) decreased their breastfeeding confidence. Specific comments concerning the hospital nurses included that there was “conflicting advice” (n = 10, 50%) regarding latching, positioning, and length of time feeding. One participant commented, “Nurses need more consistency in the information they provide to new mothers about breastfeeding.” Another participant explained that one nurse offered her formula to help the baby settle after a lengthy feed and when the participant later requested formula from a different nurse for the same purpose, the nurse made her feel “guilty” for asking for the formula. Another participant commented that a nurse told her that she was not positioned correctly for breastfeeding, after she had been reassured by the previous nurse that everything was correct. Another participant stated, “They just latched the baby on the
breast and did not teach.” Another felt that “she forced the baby onto the nipple” and “they were very dismissive when I wanted to pump one breast and feed on the other as the baby would not latch on the one breast.”

The participants used phrases such as “feeling guilty,” “doing it wrong,” “lacking confidence,” and “feeling discouraged” concerning the conflicting information. Four participants discussed feelings of being uneasy or judged in relation to their breastfeeding skills. For example, 1 participant stated, “The nurses didn’t help me to feel confident that I was doing it correctly,” and another felt that “some nurses made me feel uncomfortable with my skills.” Another participant commented that several new nurses and student nurses lacked confidence with their own skills, a situation that affected the mother’s confidence.

The participants who indicated that a lactation consultant (n = 2) or public health nurse (n = 1) decreased their breastfeeding confidence gave responses related to supplementing with formula (n = 2) or expressed breast milk by bottle (n = 1). All 3 participants commented that they were made to feel “guilty” regarding giving the baby a bottle. In particular, 1 mother commented that while at home on Day 4, she was so engorged during the night that she could not get the baby to latch. She pumped her breast and fed the baby the expressed breast milk by bottle. In the morning, she still could not get the baby to latch, despite the lessened engorgement. When she contacted the public health nurse regarding the difficulty latching, the health nurse commented, “Please tell me you didn’t give her a bottle.” The mother reported that she broke down in tears and felt overwhelmed that she had been instrumental in the infant not latching.
Family (n = 5, 18.5%) was identified as the second source of decreased breastfeeding confidence. This included a husband and family, family in general, sister-in-law, mother, and boyfriend. One participant commented, “Our families were so uncomfortable with breastfeeding that it stopped my milk production,” and another responded that as breastfeeding problems increased, “my husband felt that it was a waste of time and too stressful.”

Lastly, 2 (7.5%) participants felt that people in general affected their breastfeeding confidence. In particular, there were comments that “there is too much pressure to breastfeed as people in general have a bias in favour of breastfeeding and it makes people feel guilty concerning formula.” One participant also discussed feeling reluctant to go out with her infant in case the baby needed to be fed while out. She was concerned regarding what people thought about breastfeeding in public, overall affecting her confidence to breastfeed in those types of situations.

**Baseline Variables Predictive of Breastfeeding at 4 Weeks**

Logistic regression analysis was performed to determine which baseline independent variables were predictive of continuation of breastfeeding at 4 weeks postpartum. Four weeks was chosen as the dependent variable because the greatest cessation of breastfeeding occurred in the first 4 weeks postpartum. Bivariate analyses examined the relationship between the independent baseline variables and the outcomes of interest (infant feeding at 4 weeks) using a chi-square test or Fisher’s exact test where appropriate. The bivariate analysis identified 10 variables that were significant at the $p < .10$ level (see Table 19) at 4 weeks postpartum: group, maternal smoking, type of delivery, planned breastfeeding duration, planned breastfeeding amount, decision to
breastfeed, type of feeding in hospital, total BSES-SF score, education, and income. Four other variables were added to control for potentially extraneous variables: age, race, primary care provider, and newborn complications. Sociodemographic variables such as age and race were identified as significant variables influencing breastfeeding outcomes. In addition, newborn complications were added to the model because the inclusion criteria specified healthy term newborns in the study. However, the intention-to-treat analysis included that all participants be analyzed as randomized, regardless of any changes in health status. Finally, health care provider also was included because the participants who had midwives as their primary care providers received additional support in the early postpartum period.

Table 19

*Bivariate Associates of Baseline Characteristics With Type of Feeding at 4 Weeks Postpartum*

<table>
<thead>
<tr>
<th>Baseline variable</th>
<th>Breastfeeding at 4 weeks n(%)</th>
<th>Bottle-feeding at 4 weeks n(%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>55 (85.9)</td>
<td>9 (14.1)</td>
<td>.09</td>
</tr>
<tr>
<td>Control</td>
<td>58 (74.4)</td>
<td>20 (25.6)</td>
<td></td>
</tr>
<tr>
<td>Primary care provider</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician</td>
<td>82 (76.6)</td>
<td>25 (23.4)</td>
<td>.38</td>
</tr>
<tr>
<td>Midwife</td>
<td>18 (85.7)</td>
<td>3 (14.3)</td>
<td></td>
</tr>
<tr>
<td>Both</td>
<td>13 (92.9)</td>
<td>1 (7.1)</td>
<td></td>
</tr>
<tr>
<td>Smoke</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10 (43.5)</td>
<td>13 (56.5)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>No</td>
<td>102 (87.2)</td>
<td>15 (12.8)</td>
<td></td>
</tr>
<tr>
<td>Delivery type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal</td>
<td>74 (81.3)</td>
<td>17 (18.7)</td>
<td>.01</td>
</tr>
<tr>
<td>Instrumental</td>
<td>16 (100.0)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Cesarean section</td>
<td>23 (65.7)</td>
<td>12 (34.3)</td>
<td></td>
</tr>
<tr>
<td>Maternal obstetric interventions/Complications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>85 (81.0)</td>
<td>20 (19.1)</td>
<td>.49</td>
</tr>
<tr>
<td>No</td>
<td>28 (75.7)</td>
<td>9 (24.3)</td>
<td></td>
</tr>
<tr>
<td>Infant complications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>11 (64.7)</td>
<td>6 (35.3)</td>
<td>.12</td>
</tr>
<tr>
<td>No</td>
<td>102 (81.6)</td>
<td>23 (18.4)</td>
<td></td>
</tr>
<tr>
<td>Planned breastfeeding duration</td>
<td>Breastfeeding at 4 weeks n(%)</td>
<td>Bottle-feeding at 4 weeks n(%)</td>
<td>p</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
<td>----</td>
</tr>
<tr>
<td>I don’t know</td>
<td>18 (75.3)</td>
<td>5 (21.7)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Less than 2 months</td>
<td>1 (33.3)</td>
<td>2 (66.7)</td>
<td></td>
</tr>
<tr>
<td>2-4 months</td>
<td>2 (25.0)</td>
<td>6 (75)</td>
<td></td>
</tr>
<tr>
<td>4-6 months</td>
<td>37 (82.2)</td>
<td>8 (17.8)</td>
<td></td>
</tr>
<tr>
<td>Longer than 6 months</td>
<td>55 (87.3)</td>
<td>8 (12.7)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Planned feeding</th>
<th>Breastfeeding at 4 weeks n(%)</th>
<th>Bottle-feeding at 4 weeks n(%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partial breastfeeding</td>
<td>1 (33.3)</td>
<td>2 (66.7)</td>
<td>.03</td>
</tr>
<tr>
<td>High breastfeeding</td>
<td>10 (62.5)</td>
<td>6 (37.5)</td>
<td></td>
</tr>
<tr>
<td>Almost exclusive</td>
<td>18 (72.0)</td>
<td>7 (28)</td>
<td></td>
</tr>
<tr>
<td>Exclusive breastfeeding</td>
<td>83 (85.6)</td>
<td>14 (14.3)</td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>1 (100.0)</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Decision to breastfeed</th>
<th>Breastfeeding at 4 weeks n(%)</th>
<th>Bottle-feeding at 4 weeks n(%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before pregnancy</td>
<td>66 (86.8)</td>
<td>10 (13.1)</td>
<td>.03</td>
</tr>
<tr>
<td>Early pregnancy</td>
<td>23 (65.7)</td>
<td>12 (34.3)</td>
<td></td>
</tr>
<tr>
<td>Mid pregnancy</td>
<td>13 (68.4)</td>
<td>6 (31.6)</td>
<td></td>
</tr>
<tr>
<td>Late pregnancy/birth</td>
<td>11 (91.7)</td>
<td>1 (8.3)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current feeding (in-hospital first 24 hrs)</th>
<th>Breastfeeding at 4 weeks n(%)</th>
<th>Bottle-feeding at 4 weeks n(%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast only</td>
<td>97 (86.6)</td>
<td>15 (13.4)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Breast with occasional supplement</td>
<td>14 (56.0)</td>
<td>11 (44)</td>
<td></td>
</tr>
<tr>
<td>Breast with supplement at every feeding</td>
<td>2 (40.0)</td>
<td>3 (60)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Breastfed as a baby</th>
<th>Breastfeeding at 4 weeks n(%)</th>
<th>Bottle-feeding at 4 weeks n(%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>46 (75.4)</td>
<td>15 (24.6)</td>
<td>0.29</td>
</tr>
<tr>
<td>Yes</td>
<td>57 (85.1)</td>
<td>(14.9)</td>
<td></td>
</tr>
<tr>
<td>Unsure</td>
<td>10 (71.4)</td>
<td>4 (28.6)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Partner support</th>
<th>Breastfeeding at 4 weeks n(%)</th>
<th>Bottle-feeding at 4 weeks n(%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very supportive</td>
<td>103 (80.5)</td>
<td>25 (19.5)</td>
<td>0.33</td>
</tr>
<tr>
<td>Somewhat supportive</td>
<td>3 (50)</td>
<td>3 (50)</td>
<td></td>
</tr>
<tr>
<td>Somewhat non supportive</td>
<td>1 (100)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Not very supportive</td>
<td>8 (85.7)</td>
<td>1 (14.3)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Another mother to talk with</th>
<th>Breastfeeding at 4 weeks n(%)</th>
<th>Bottle-feeding at 4 weeks n(%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>105 (78.9)</td>
<td></td>
<td>0.69</td>
</tr>
<tr>
<td>No</td>
<td>8 (88.9)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BSES-SF</th>
<th>M = 47.5 SD = 8.9</th>
<th>M = 42.5 SD = 10.2</th>
<th>t = 2.61; p = .01</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>STAI scores</th>
<th>M = 29.8 SD = 9.1</th>
<th>M = 32.8 SD = 11.4</th>
<th>t = -1.54; p = .12</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>EPDS scores</th>
<th>M = 4.9 SD = 3.8</th>
<th>M = 6.2 SD = 3.8</th>
<th>t = -1.45; p = .15</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Marital</th>
<th>Breastfeeding at 4 weeks n(%)</th>
<th>Bottle-feeding at 4 weeks n(%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married/Common-law</td>
<td>92 (78.6)</td>
<td>25 (21.4)</td>
<td>.76</td>
</tr>
<tr>
<td>Single</td>
<td>21 (84.0)</td>
<td>4 (16)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Breastfeeding at 4 weeks n(%)</th>
<th>Bottle-feeding at 4 weeks n(%)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 19</td>
<td>14 (82.4)</td>
<td>3 (17.7)</td>
<td>.59</td>
</tr>
<tr>
<td>20-24</td>
<td>26 (74.3)</td>
<td>9 (25.7)</td>
<td></td>
</tr>
<tr>
<td>25-29</td>
<td>35 (81.4)</td>
<td>8 (18.6)</td>
<td></td>
</tr>
<tr>
<td>30-34</td>
<td>30 (85.7)</td>
<td>5 (14.3)</td>
<td></td>
</tr>
<tr>
<td>&gt; 35</td>
<td>8 (66.7)</td>
<td>4 (33.3)</td>
<td></td>
</tr>
</tbody>
</table>
The logistic regression model was constructed using forward stepwise procedure to model the factors independently associated with breastfeeding at 4 weeks. The 10 baseline variables that emerged as significant in the bivariate analyses at 4 weeks and the additional 4 variables were subsequently entered into the logistic regression analysis as independent variables and breastfeeding as the dependent variable (controlling for follow-up at 4 weeks). The Wald statistic was used to calculate which predictors remained in the final model, with statistical significance set for $p < .05$.

Three independent predictors of breastfeeding at 4 weeks postpartum emerged from the logistic regression model (see Table 20). All three independent variables were negatively associated with breastfeeding. In particular, mothers who smoked, mothers who were supplementing breastfeeding with bottle-feeding in hospital, and those who had a cesarean delivery were less likely to be breastfeeding at 4 weeks postpartum. Taken together, these 3 factors explained approximately 22% of the variance in breastfeeding continuation at 4 weeks postpartum.
Table 20

Predictors of Breastfeeding at 4 Weeks Postpartum

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimate</th>
<th>Wald chi-Square</th>
<th>p</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>4.03</td>
<td>31.5</td>
<td>&lt; .001</td>
<td>14.0</td>
</tr>
<tr>
<td>Maternal smoking</td>
<td>-2.51</td>
<td>17.17</td>
<td>&lt; .001</td>
<td>14.0</td>
</tr>
<tr>
<td>Feeding in hospital</td>
<td>-1.11</td>
<td>6.51</td>
<td>.01</td>
<td>20.0</td>
</tr>
<tr>
<td>Delivery type</td>
<td>-0.63</td>
<td>4.02</td>
<td>.04</td>
<td>22.4</td>
</tr>
</tbody>
</table>

Baseline Variables Predictive of Breastfeeding Self-Efficacy (BSES-SF)

Multiple regression analysis was performed to determine the impact of baseline maternal and infant variables on BSES-SF scores at 4 weeks postpartum. Eight independent predictors identified as significant (p < .10) in the bivariate analysis were entered into the model, including group, planned length of breastfeeding, likelihood of achieving the breastfeeding goal, planned amount of breastfeeding, timing of decision to breastfeed, in-hospital method of feeding, whether the mother was breastfed as a baby, and baseline total BSES-SF scores. Using the stepwise regression procedure with the probability-of-F-to-enter ≤ .05 and probability-of-F-to-remove ≥ .10, the best-fit regression model revealed three variables that explained 24.1% of the variance in BSES-SF scores at 4 weeks postpartum (see Table 21). Significant variables retained in the model included infant feeding method in hospital, intended amount of breastfeeding (exclusive, partial, etc.), and baseline BSES-SF total scores. A test of the full model with all three variables against a constant only model was statistically significant (F = 14.6, p < .001).
Table 21

Predictors of BSES-SF at 4 Weeks Postpartum

<table>
<thead>
<tr>
<th>Variable</th>
<th>B unstandardized</th>
<th>SE</th>
<th>Beta</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>31.6</td>
<td>4.86</td>
<td>6.5</td>
<td>**</td>
</tr>
<tr>
<td>Method of breastfeeding (in hospital)</td>
<td>9.21</td>
<td>2.42</td>
<td>.30</td>
<td>2.42</td>
</tr>
<tr>
<td>BSES-SF scores totaled</td>
<td>.31</td>
<td>.11</td>
<td>.23</td>
<td>2.91</td>
</tr>
<tr>
<td>Intended level of breastfeeding</td>
<td>5.0</td>
<td>2.09</td>
<td>.18</td>
<td>2.42</td>
</tr>
</tbody>
</table>

Note. overall R = .49, R² = .24.1

*p = .05
**p < .01

The collinearity diagnostics identified that there may have been some degree of collinearity among the variables. In particular, intended level of breastfeeding had a condition index of 13.6 and variance proportions of .93 and .95, respectively (see Table 22). Criteria for multicollinearity, as suggested by Belsley, Kuh, and Welsch (1980), included a conditioning index > 30 for a given dimension coupled with at least two variance proportions for an individual variable of > .50.

Table 22

Collinearity Diagnostics

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Condition index</th>
<th>Variance proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Constant</td>
<td>Method of feeding in-hospital</td>
</tr>
<tr>
<td>Constant</td>
<td>1.0</td>
<td>.00</td>
</tr>
<tr>
<td>Method of feeding in hospital</td>
<td>3.9</td>
<td>.01</td>
</tr>
<tr>
<td>BSES-SF</td>
<td>5.1</td>
<td>.05</td>
</tr>
<tr>
<td>Intended level of breastfeeding</td>
<td>13.6</td>
<td>.93</td>
</tr>
</tbody>
</table>
CHAPTER 5: DISCUSSION

This chapter begins with a discussion related to the primary research questions addressing the feasibility and compliance of the trial protocol, and the acceptability of the self-efficacy intervention. Although this pilot trial was not powered to determine significant group differences, the effects of the self-efficacy intervention versus usual care are discussed related to trends in breastfeeding self-efficacy, duration, and exclusivity. The participants’ perceptions of what may have increased or decreased their breastfeeding self-efficacy are explored. Two regression models are discussed in relation to baseline variables predictive of breastfeeding at 4 weeks postpartum and variables predictive of breastfeeding self-efficacy at 4 weeks postpartum. The chapter concludes with a discussion of lessons learned and the strengths and limitations of the pilot trial.

Primary Research Question: Feasibility, Compliance, and Acceptability

Feasibility

Recruitment. The majority of the participants screened for participation in the pilot trial met the eligibility criteria. Of the eligible participants, fewer than 8% refused to participate in the pilot trial, suggesting that most new mothers were interested in participating in the study and potentially were receptive to the intervention. The participation rate for this pilot trial was higher than the goal of 80% and other reported Canadian breastfeeding studies (Clifford et al., 2006; Dennis et al., 2002).

Of the ineligible participants, almost half were due to maternal-infant situations that potentially may have interfered with breastfeeding, such as infant prematurity of less than 37 weeks gestation; infant admitted to the NICU, where discharge was not anticipated within the next 24 hours; and multiple births. Almost one quarter of the
women were excluded because they chose to bottle feed. These main reasons for nonparticipation or exclusion were similar to other breastfeeding studies (Dennis et al., 2002; Sheehan et al., 2006; Taveras et al., 2003). A small number of women were not recruited because the researcher was not available or the women were discharged home within the first 24 hours. These data suggested that the recruitment of postpartum women for a larger trial would be feasible.

*Timing of self-efficacy intervention sessions.* Overall, the large majority of participants received the self-efficacy intervention within the time period outlined in the protocol. The protocol for the timing of the self-efficacy intervention came from the self-efficacy and breastfeeding literature. Several variables indicated the need for early intervention with postpartum women. First, initiation of the self-efficacy intervention within 24 hours is important because an individual’s self-efficacy beliefs are largely gained from enactive mastery experiences (Bandura, 1986). Thus, a new mother’s breastfeeding self-efficacy may be altered through success, difficulty, or failure with early breastfeeding attempts. Furthermore, the breastfeeding self-efficacy theory suggests that a mother’s breastfeeding self-efficacy can also be responsible for determining (a) her decision to initiate breastfeeding, (b) the amount of effort that she will expend and the length of time she will endure in response to breastfeeding problems, (3) the thought patterns she may experience, and (4) her emotional reactions to breastfeeding (Dennis, 1999). Second, because breastfeeding research studies have indicated that breastfeeding outcomes are enhanced when breastfeeding is initiated soon after birth, most mothers should be encouraged to begin breastfeeding within the first hour after birth.
(WHO/UNICEF, 1992). Hence, by 24 hours postpartum, the majority of women will have had one or more breastfeeding attempts. In addition, with the decrease in length of postpartum stays, many low-risk mother-infant pairs will be discharged on their 2nd postpartum day. Therefore, in order to have two in-hospital sessions, the first session is required to be initiated within 24 hours of delivery.

The pilot trial findings indicated that the timing identified in the protocol was feasible and acceptable for the participants. However, achieving the aforementioned self-efficacy intervention session rates, particularly the first session, required a commitment from the researcher to return to the hospital throughout the day and/or evening to provide the intervention as intended rather than by making rounds on a once-daily basis. Thus, for a future trial, the decision would need to be made regarding the tradeoffs of delivering the first intervention within 24 hours, with the researcher being on site or travelling back and forth against the alternative of making rounds once a day and a greater number of interventions not being conducted within the first 24 hours.

**Duration of self-efficacy intervention sessions.** The average duration of a self-efficacy intervention session was approximately 15 to 20 minutes. Thus, the total dose of the intervention on average was approximately 45 to 60 minutes. Because the intervention was based on maternal need, there was no prescribed duration for any of the sessions. Focusing on maternal need has been identified as an important component of breastfeeding interventions (Dennis, 2002; Hannula et al., 2008) as interventions solely focusing on the technical aspect of breastfeeding have not been effective in improving breastfeeding outcomes (A. Henderson, Stamp, & Pincombe, 2001; Labarere et al., 2003).
Most studies of supportive interventions in the postpartum period have failed to identify the actual time spent with participants (Britton et al., 2007; Guise et al., 2003). However, this may not be a limitation because the few breastfeeding intervention studies that have specified the time spent with participants have found that the number and length of interactions were not related to the outcomes. In particular, a Canadian breastfeeding peer support trial that demonstrated significantly increased breastfeeding duration up to 12 weeks for the intervention group found that the occurrence and frequency of peer interactions with the study participants (primiparous breastfeeding women) were not significantly related to infant feeding method at 4, 8, or 12 weeks postpartum (Dennis et al., 2002).

Similarly, Guise et al.’s (2003) systematic review found no association between the length of breastfeeding education sessions and breastfeeding outcomes. The systematic review also found that educational programs had the greatest effect of any single intervention on short-term breastfeeding duration. Thus, it may be more the content of the intervention rather than the time spent with participants that is required to improve breastfeeding outcomes. Therefore, there appears to be no need to standardize the duration of the conversations for the self-efficacy intervention.

**Compliance**

*Content of self-efficacy intervention.* The components of the self-efficacy intervention are unique in that they are based on the assessment of maternal needs identified by the BSES-SF and the administration of efficacy-enhancing strategies utilizing the four sources of self-efficacy. Although the intervention being based on maternal need may not be considered novel, the use of the BSES-SF as an assessment
tool to identify high-risk mothers with low breastfeeding confidence is. Total scores on the BSES-SF have been validated and used to predict mothers at risk for early breastfeeding discontinuation (Dai & Dennis, 2003; Dennis, 2003a; Dennis & Faux, 1999; Torres et al., 2003; Wutke & Dennis, 2007). However, this pilot trial was the first to use the BSES-SF as an assessment tool upon which to administer individualized interventions.

The content of the self-efficacy intervention varied among the participants and the sessions, but the intervention was standardized in terms of the assessment of breastfeeding self-efficacy and the strategies to increase self-efficacy. Assessment with the 14-item BSES-SF identified that on average, the women had approximately an equal number of high-scoring and low-scoring items during Session 1. At the 1-week telephone follow-up, the average number of high-scoring items had increased, and the low-scoring items had decreased. This was consistent with other studies evaluating self-efficacy because self-efficacy beliefs increase over time, particularly when the individual experiences success in performing the targeted behavior (Ludman et al., 2003; Parent & Fortin, 2000).

The BSES-SF provided important assessment information upon which efficacy-enhancing strategies could be implemented to meet the unique needs of the new breastfeeding mother. For example, using ≤3 to indicate low-scoring items, the mothers lacked confidence in their ability successfully cope with breastfeeding, determine that the baby is getting enough milk, and ensure that the baby is properly latched during Session 1. Thus, efficacy-enhancing strategies were implemented to address these areas of concern. It is noteworthy that the BSES-SF identified different low-scoring items in
Session 3, indicating that the participants’ self-efficacy needs may change over time. This was congruent with the self-efficacy literature that an individual’s self-efficacy is context specific, meaning that self-efficacy may change in different situations and task complexity (Gist & Mitchell, 1992). In particular, perceptions of self-efficacy can change over time as new information and experiences are acquired (Brown et al., 2003; Huang & Acton, 2000). Thus, an individual’s breastfeeding self-efficacy may have changed from in hospital (Session 1) to at home (Session 3) for a variety of reasons, one of which may have been the change in environment. This further supports that the self-efficacy intervention should be based on maternal needs and that breastfeeding support should be based on maternal needs and preferences.

However, using a cut-off score of 4 or greater to indicate high-scoring items and 3 or lower to reflect low-scoring items was based on the response key of the BSES-SF. For example, an item score of 4 reflected confident, and an item score of 5 was very confident. Comparably, an item score of 3 or less indicated somewhat confident to not very confident to not at all confident. Thus, it seemed logical to designate the items accordingly, with scores of 4 or 5 representing high confidence and scores of 3 or lower representing low confidence. However, to date, there have been no published data indicating cut-off values for low- or high-scoring items. Currently, a receiver operating characteristic curve analysis is being conducted by the developer of the BSES-SF to address this gap in the literature.

Systematic reviews have identified numerous interventions that may improve breastfeeding outcomes (Britton et al., 2007; de Oliveira et al., 2001; Guise et al., 2003; Hannula et al., 2008). It has been recommended that important components of
breastfeeding interventions include (a) a variety of methods; (b) professional support and encouragement, in addition to technical information; and (c) delivery by health care providers who have received evidence-based breastfeeding education. The self-efficacy intervention included all of these components. In particular, the self-efficacy intervention was multifaceted as it included the provision of education, support, and encouragement included in-hospital and postpartum sessions; it also combined one-on-one, in-person, and telephone support by an experienced breastfeeding nurse.

*Observed breastfeeding session.* To observe at least one breastfeeding session with each participant was a planned component of the intervention. Since performance accomplishment has been identified as the strongest source of self-efficacy, it was anticipated that strategies implemented while a woman was breastfeeding may be more effective at increasing breastfeeding self-efficacy. However, as observed, breastfeeding occurred for just over half of the participants; strategies to enhance performance accomplishment were performed, in most cases, independent of the participant actively breastfeeding.

Barriers encountered in terms of observed breastfeeding included trying to maintain blinding of the health care providers to each mother’s group allocation. Because the nurses were blinded to the specific components of the intervention, the researcher was unable to request that the nurses on the unit call the researcher back for the participant’s next feeding. In addition, returning for an observed breastfeeding session may have lead to increased contacts for certain participants rather than the standardized two in-hospital postpartum sessions.
Dose and mode of delivery of the self-efficacy intervention. Compliance with the trial protocol was very good as the majority of the participants received all three sessions in the manner outlined. Having both in-person and telephone-based components of the self-efficacy intervention provided benefits from both types of delivery modes. In a systematic review of 34 trials involving 29,385 mother-infant pairs, the mothers who received face-to-face support were significantly less likely to discontinue breastfeeding (RR for giving up breastfeeding 0.85 [0.79-0.92]) than those who received mainly telephone support (RR 0.92 [0.91-1.09]; Britton et al., 2007). Additional evidence has supported that some component of the self-efficacy intervention be delivered in a face-to-face manner. de Oliveria et al.’s (2001) systematic review found that strategies that had no beneficial effect on breastfeeding outcomes generally were characterized by not having face-to-face interaction, having contradicting messages, and being small-scale interventions. Although small-scale intervention was not specifically defined, the systematic review found that interventions spanning more than one period (prenatal, in hospital, and postnatal) were generally more effective than those with only a postnatal (after discharge) component.

However, there also has been evidence for the benefits of telephone support. A meta-analysis from a systematic review of telephone support during pregnancy and the postpartum period found that telephone-based interventions had a significant effect on any breastfeeding (3 trials, 618; RR: 1.18; 95% CI: 1.05-1.33; Dennis & Kingston, 2008). In addition, more than one quarter of the participants in this pilot trial were from the Northwestern Ontario region (> 80 km from the hospital), where telephone contact was
the most efficient, cost-effective method of providing the third self-efficacy intervention session when the mother was discharged from hospital.

**Loss to follow-up.** Loss to follow-up in both groups was minimal at approximately 10%. This reported loss to follow-up was similar to other breastfeeding trials (Chien & Tai, 2007; McKeever et al., 2002) and provided additional evidence for the feasibility of the trial procedures. Although an alternate telephone number and e-mail address were obtained to aid in participant follow-up, additional strategies such as a mailout may have assisted in lowering the rate of attrition.

**Randomization procedure.** One hundred and fifty participants were randomized, with 81 being allocated to the control group and 69 to the intervention group. The uneven number of participants in the groups occurred randomly as 150 of the 200 envelopes were opened. Despite the unequal groups, baseline data were similar between the groups, indicating that the randomization procedure of creating groups with similar baseline characteristics was effective. Performing block randomization may have assisted to avoid the discrepant number of participants in each group.

**Intervention Acceptability**

Although a plethora of studies have examined the effect of diverse interventions on breastfeeding outcomes, many have failed to discuss how the participants perceived the intervention (Britton et al., 2007). In fact, Britton et al. recommended that further exploration of maternal satisfaction should be included in future trials. In perinatal studies that have included women’s perspectives, the majority of women were satisfied with the intervention or program provided (Dennis, 2003b; Dennis et al., 2002; Escobar et al., 2001; Hodnett et al., 2002; McKeever et al., 2002; Shaw, Levitt, Wong,
Kaczorowski, & the McMaster University Postpartum Research Group, 2006; Sheehan et al., 2001). Consistent with this research, the findings from this pilot trial also found high satisfaction with the intervention provided.

Although the content and dose of the self-efficacy sessions varied among the participants, the majority were satisfied with the intervention. The information provided by the participants indicated that the components of the intervention were acceptable. A large majority of the participants indicated that the researcher assisted them to feel more confident in their ability to breastfeed and achieve their infant feeding goals. However, more than half of the participants indicated that they were unsure whether they would prefer additional phone calls and that they would have liked to have been able to contact the researcher themselves. Although the reasons for these responses were not obtained, it is plausible that the participants may not have felt that the quantity of the telephone calls was as important as being able to speak to the researcher when a participant felt the need.

In addition, the participants may have had a preference to contact the researcher because a rapport had been established, as opposed to seeking assistance from an individual with whom they had had no prior contact. This finding was consistent with the qualitative literature in that access to timely support and the mother-health care provider relationship are important components of breastfeeding outcomes (McInnes & Chambers, 2008). Thus, in a future trial, consideration may be given to including a contact number for the participants to call if required.

This was substantiated in a population-based study of 4,544 U.S. mothers that found that the provision of a telephone number to call for breastfeeding help after discharge was one of five hospital practices reported to significantly affect breastfeeding
continuation to 16 weeks (Murray et al., 2007). Additional research has supported the beneficial effect of proactive telephone support on breastfeeding outcomes (Dennis & Kingston, 2008). However, no trials have exclusively evaluated reactive support, although patient-initiated interactions have been included as an adjunct to telephone support in other trials with postpartum mothers (Brooten et al., 2001; Frank et al., However, as a cointervention, it is impossible to identify the effect of reactive telephone support alone (Dennis & Kingston).

Secondary Research Questions

The secondary research questions addressed the effect of the self-efficacy intervention on diverse outcomes, including breastfeeding self-efficacy, breastfeeding duration, and breastfeeding exclusivity. Given that this pilot trial was not sufficiently powered to detect significant difference between the groups, it was not surprising that no significant results were found.

Effect of Self-Efficacy Intervention on Breastfeeding Self-Efficacy

Comparison of BSES-SF scores at 4 weeks and 8 weeks between groups identified no significant differences. Although this difference was not significant, it may have been clinically relevant because the intervention group participants had higher mean BSES-SF scores at both 4 and 8 weeks postpartum. Additional research is warranted to identify the significance of total BSES-SF scores. For example, determining whether there is a threshold that identifies high, moderate, or low breastfeeding self-efficacy is required.

A significant difference when evaluating change scores was found in breastfeeding self-efficacy among the participants who continued to breastfeed versus
those who discontinued breastfeeding. On average, the participants who were breastfeeding had BSES-SF scores that increased by 4 weeks postpartum and then remained constant. Alternatively, those who discontinued breastfeeding by 4 or 8 weeks postpartum had BSES-SF scores that either remained fairly constant or decreased from baseline. In addition, the decrease in self-efficacy scores among the participants who discontinued breastfeeding was greater among the control group participants.

These findings were consistent with other studies evaluating breastfeeding self-efficacy and breastfeeding self-efficacy theory. Efficacious mothers are more likely to have greater breastfeeding duration and breastfeed exclusively (Dennis, 1999). In addition, BSES scores during the first week postpartum have consistently predicted breastfeeding rates at 4, 6, 8 and 16 weeks postpartum in Canada (Dennis, 2003a); Australia (Blyth et al., 2002); China (Dai & Dennis, 2003); Puerto Rico (Torres et al., 2003); Poland (Wutke & Dennis, 2007); the UK (Mossman et al., 2008); and adolescent mothers (Mossman et al.). Thus, attention to women’s breastfeeding self-efficacy is important in the early postpartum period because it appears that the first 4 weeks is when the greatest changes in breastfeeding self-efficacy occur. Performance accomplishment is enhanced when breastfeeding is successful, ultimately increasing breastfeeding self-efficacy. The opposite also is true in that women who experience difficulty in establishing breastfeeding may be more likely to have low efficacy beliefs.

Effect of Self-Efficacy Intervention on Breastfeeding Duration

A trend was evident for more participants in the intervention group to be breastfeeding at 4 and 8 weeks postpartum than those in the control group. Although the difference was not statistically significant, it may have been clinically relevant. This
finding provided evidence that the self-efficacy intervention may improve breastfeeding duration, particularly in the short term.

On average, the rates of breastfeeding at 4 weeks in the intervention group (85.9%) were similar or higher than other reported Canadian breastfeeding studies. Alternatively, the breastfeeding rates at 4 weeks in the control group (74.4%) were lower than other reported studies. For example, the Ontario Mother and Infant Study II (TOMIS II) conducted a cross-sectional survey of 890 women from five Ontario hospitals and found that approximately 84% of the women continued to breastfeed at 4 weeks (Sheehan et al., 2006). This was slightly higher than TOMIS I, which reported a breastfeeding continuation rate of approximately 82% at 4 weeks (Sheehan et al.).

Similarly, a survey of 632 mothers of 6-month-old infants evaluating breastfeeding patterns in Quebec found that 83% of the mothers who initiated breastfeeding in hospital continued to breastfeed at 4 weeks (Haiek et al., 2007). Statistics Canada (2003) reported a lower rate of breastfeeding of 78% among women in Canada at 4 weeks postpartum. Thus, it appears that although breastfeeding duration rates were not significantly different between the groups at 4 weeks, the comparison to other Ontario studies suggested that the participants in the intervention group had similar or higher rates of breastfeeding than other reported studies at 4 weeks postpartum. Alternatively, breastfeeding duration rates of the control group were 5% to 12% less than the intervention group and other reported studies (Haiek et al.; Sheehan et al., 2001, 2006; Statistics Canada).

At 8 weeks postpartum, the difference between the groups and breastfeeding duration was less pronounced; approximately 5% more participants in the intervention
group (70.5%) continued to breastfeed, as compared to control group (65.6%). Statistics Canada (2003) found a similar rate of breastfeeding continuation of approximately 70% at 8 weeks. These findings provided additional evidence that the self-efficacy intervention may improve breastfeeding duration in the short term.

Significant differences were identified between the groups in the rate of decline of breastfeeding. For example, the rate of breastfeeding discontinuation remained fairly consistent for the intervention group participants, with a similar number of women stopping breastfeeding in the first 4 weeks (n = 9) and in the second month (n = 9). In comparison, the control group participants experienced a more severe decline; a significantly greater number of participants discontinued breastfeeding in the first 4 weeks (n = 20), followed by a slower decline in the subsequent 4 weeks (n = 5). This trend suggested that the self-efficacy intervention may have increased breastfeeding duration past the first 4 weeks among the intervention group participants. However, because the discontinuation rate was similar in both groups at 8 weeks, the data also suggested that a longer intervention may have been necessary to maintain breastfeeding confidence past the first 4 weeks postpartum. The self-efficacy intervention is based on maternal need, so a longer intervention should be able to address any variation in maternal breastfeeding needs throughout the postpartum period.

The reasons women discontinue breastfeeding in the early postpartum period have been described as multifactorial and complex, and that most women discontinue breastfeeding because of difficulties encountered rather than maternal choice (Dennis, 2002). This was evident in this trial; approximately three quarters of the participants
indicated that they intended to breastfeed for 16 weeks or longer, yet less than 70% were breastfeeding at 8 weeks.

The reasons cited for breastfeeding discontinuation in the first 4 weeks varied between the two groups. Considerably more women in the control group stopped breastfeeding because of perceptions of IMS. Research has indicated that perceptions of IMS or perceptions that the infant is not satisfied are one of the leading reasons for early breastfeeding discontinuation (Gatti, 2008; Hill, 1991; Li, Fein, Chen, & Grummer-Strawn, 2008). Approximately one fifth of the participants in the intervention group reported perceptions of IMS, and more than 60% of the participants in the control group cited perceptions of IMS. In addition, perceptions of IMS have been associated with low breastfeeding confidence (Dunn et al., 2006; Hill & Humenick, 1996; Otsuka et al., 2008). This finding may have suggested that the self-efficacy intervention assisted to decrease the number of participants with perceptions of IMS.

Two items on the BSES-SF specifically addressed participants’ self-efficacy in relation to perceived milk supply, namely, “I can always determine that my baby is getting enough milk” and “I can always keep up with my baby’s breastfeeding demands.” This provided an indirect assessment of perceptions of milk supply and opportunities for discussion to enhance knowledge and self-efficacy regarding milk production, infant feeding, and growth spurts. In addition, the intervention provided opportunities to reassure the women who perceived their milk supply to be low that their milk supply was, in most cases, adequate. For example, many of the participants questioned whether their infants were getting enough nourishment in the first few days postpartum. This provided the opportunity to provide the women with information on ways to assess their infants’
intake, recognize cues of infant satiety, and reduce the potential negative impact of supplementation on milk production.

Similarly, the intervention also addressed the participants’ breastfeeding self-efficacy in other areas frequently associated with early discontinuation, including latching difficulties (Kirkland & Fein, 2003; Li et al., 2008) and sore nipples (Sheehan et al., 2001; Wambach et al., 2005). Breastfeeding supplementation in hospital also has been identified by researchers as a significant risk factor for the discontinuation of breastfeeding (Dennis, 2002; Sheehan et al., 2006; Wambach et al.). However, although formula supplementation occurred for approximately 22% of all of the participants, there were no significant differences between the groups.

**Effect of Self-Efficacy Intervention on Breastfeeding Exclusivity**

More participants in the intervention group were exclusively breastfeeding at both time periods (4 and 8 weeks) than those in the control group. Although this difference was not statistically significant, it may have been clinically relevant. The exclusive breastfeeding rates in this pilot trial were low, with less than 60% of the mothers in both groups breastfeeding exclusively at 8 weeks postpartum. Although the majority of studies have identified that exclusive breastfeeding rates are well below the recommendations, precise levels of exclusive breastfeeding are difficult to compare because different studies have reported various outcome points.

A peer support trial conducted in Ontario reported that 68 (54.8%) women in the control group continued to exclusively breastfeed at 8 weeks. Similarly, a longitudinal U.S. survey found a rate of breastfeeding exclusivity of approximately 60% at 8 weeks (Shealy, Scanlon, Labiner-Wolfe, Fein, & Grummer-Strawn, 2008). Haiek et al. (2007)
reported a steep decline in exclusive breastfeeding, with less than 50% of the study participants exclusively breastfeeding at 1 week postpartum in the Monteregie region of Quebec.

Despite these diverse rates of breastfeeding exclusivity, the participants in this study demonstrated a significant gap in meeting current breastfeeding recommendations of exclusive breastfeeding for the first 6 months of life and beyond with the addition of complementary foods (AAP, 2005; Canadian Pediatric Society, 2005; WHO, 2001). Perhaps even more important, many of the participants did not meet their intended breastfeeding goal. Only approximately 3% of mothers planned to partially breastfeed.

Numerous factors have been identified as affecting exclusive breastfeeding rates, including sociodemographic, psychosocial, hospital, and intrapartum variables (Clifford et al., 2006; Dennis et al., 2002; Santo, de Oliveira, & Giugliani, 2007; Shealy et al., 2008; Wambach et al., 2005). In fact, many variables related to breastfeeding duration also are associated with breastfeeding exclusivity. In particular, mothers in Canada and the United States are more likely to breastfeed exclusively if they are older, married, better educated, more affluent, nonsmoking, and foreign born, and have delayed return to employment (Semenic, Loiselle, & Gottlieb, 2008). Breastfeeding self-efficacy has been consistently identified as a potentially modifiable variable affecting breastfeeding exclusivity by diverse researchers (Blyth et al., 2002; Dennis, 2003a; Dennis & Faux, 1999; Gregory et al., 2008; Mossman et al., 2008; Wutke & Dennis, 2007). Other potentially modifiable variables, such as perceptions of IMS, in-hospital formula supplementation and pacifier use, maternal attitude toward breastfeeding, prenatal education, lack of support from health care providers or family members, and return to
work, have been less consistently associated with breastfeeding exclusivity (Semenic et al.; Wambach et al.).

Perception of IMS was a frequent cause for formula supplementation in this study, particularly among the control group participants. Many participants who partially breastfed may have done so out of a lack of confidence to exclusively breastfeed their infants (Dunn et al., 2006). This finding was consistent with several studies that have found that perceived IMS has been correlated with decreased breastfeeding exclusivity (Arora, McJunkin, Wehrer, & Kuhn, 2000; Gatti, 2008; Hill & Humenick, 1996). Thus, perceptions of IMS or lack of infant satiety within this study also may have contributed to decreased rates of exclusivity among the control group participants. Because fewer mothers in the intervention group reported perceptions of IMS, the self-efficacy intervention also might have assisted to increase breastfeeding exclusivity. Preliminary research studies have supported that a lack of breastfeeding confidence has been linked to maternal perceptions of IMS (Hill & Humenick; McCarter-Spaulding & Kearney, 2001; Segura-Millan et al., 1994).

Additional Analysis

Positive Influences on Breastfeeding Self-Efficacy

The majority of participants in the intervention group believed that the researcher increased their confidence to breastfeed. Thus, the self-efficacy intervention administered purposefully to increase breastfeeding confidence was perceived as effective by the majority of participants. Participants also agreed that others, including health care providers, family, and friends, assisted in increasing their confidence to breastfeed.
Because this was the first study evaluating a breastfeeding self-efficacy intervention, there were no direct comparisons in the breastfeeding literature. However, the themes identified by the participant’s specific to the researcher increasing their breastfeeding confidence were consistent with the breastfeeding literature and components of effective breastfeeding interventions. In this pilot trial, the participants indicated that they valued the extra assistance, additional information, and encouragement provided by the researcher as components of support. This finding also was substantiated in the literature in that interventions that combine information, guidance, and support have been effective in improving breastfeeding duration (de Oliveira et al., 2001). Similarly, educational programs that provide information and advice also have been found to be effective in increasing breastfeeding duration (Guise et al., 2003). Although the intervention was based on the sources of self-efficacy, it also included components of other supportive interventions, such as information, advice, feedback, and encouragement.

Although support from the researcher was the most prevalent theme identified by the intervention group participants, characteristics of the intervention and the researcher also were perceived as effective in increasing breastfeeding confidence. In particular, the participants valued the time spent with the researcher, the information provided, the attention to individual needs, and the unbiased manner in which the researcher interacted with the new mothers. A qualitative synthesis of breastfeeding support found that mothers described supportive health professionals as being nonjudgemental, encouraging, reassuring, sympathetic, patient, and understanding (McInnes & Chambers, 2008). Similarly, breastfeeding studies have identified that for breastfeeding education to be
effective, professionals require knowledge and skill in providing breastfeeding support (Dennis et al., 2002; Hannula et al., 2008). In addition, new mothers require assistance based on individual and cultural needs so that they may be supported to meet their infant feeding goals (Dykes, 2006; Hannula et al.).

Although the sources of efficacy information were not mentioned specifically by the participants, they were evident in their comments. Performance accomplishment (i.e., assistance, information, and support with breastfeeding) and verbal persuasion (i.e., encouragement, positive reinforcement) were identified frequently as sources of efficacy information in the comments. For example, the women’s comments included such statements as, “She reinforced that what I was doing was correct,” and “She positively encouraged me without making me feel pressured.” Attention to physiologic cues also was identified in the participants’ comments regarding anticipatory guidance that difficulties are often encountered. Examples included, “She let me know that many women have difficulties,” and “Breastfeeding is not always easy in the beginning.”

Others. Of the approximately three quarters of the participants who felt that another person assisted in increasing their breastfeeding confidence, the most frequent “others” included health care professionals, followed by family and friends. This was not a surprising finding because the majority of participants indicated that they had supportive family and were in contact with health care providers in the early postpartum period. The breastfeeding literature has provided evidence that support from professionals, peers, and family may be effective in improving breastfeeding outcomes (Bar-Yam & Darby, 1997; Britton et al., 2007; de Oliveira et al., 2001; Dennis, 2002; Dennis et al., 2002; Guise et al., 2003; Hannula et al., 2008; McInnes & Chambers,
2008). However, how “others” may influence breastfeeding confidence has not been explicit in the breastfeeding literature.

The participants’ perceptions regarding how others increased their breastfeeding confidence was similar to that of the researcher and included support, information, and encouragement. These data also may have reflected the sources of self-efficacy. Performance accomplishment, vicarious experience, verbal persuasion, and attention to physiologic cues were provided to the intervention group participants purposefully as part of the self-efficacy intervention. Some of the strategies also could have been provided to the participants in both groups to some degree through interactions with a physician, a public health nurse, a lactation consultant, family members, or friends. However, there were no significant differences between the groups in the number of participants who felt another individual assisted in increasing their breastfeeding confidence. This finding indicated that if a cointervention did occur, it was equal between groups.

Vicarious experience and verbal persuasion are two antecedents of self-efficacy that may commonly be part of interactions with others. For example, observation of a family member or friend who is breastfeeding successfully, that is, without any adverse effects, may assist in increasing a woman’s breastfeeding self-efficacy (Bandura, 1977). This effect also may be enhanced if the individual sees herself as similar to the individual being modeled, such as a sister or a good friend. In addition, verbal persuasion from health care providers, family, and friends may be effective in increasing self-efficacy. For example, when individuals from a woman’s support network provide positive reassurance and advice, the woman may be more inclined to believe that she can succeed. The effect of persuasive information on an individual’s self-efficacy also may be partly reliant on
the perceived reliability, skill, expertise, and ability of the persuasive source (Holloway & Watson, 2002). This effect has been supported in the breastfeeding literature by women who have reported that they value reassurance and encouragement from family members (Graffy & Taylor, 2005). In general, women are more likely to breastfeed if members of their social network have breastfed or support their decision to breastfeed (Bar-Yam & Darby, 1997; Dennis & Kingston, 2008; McInnes & Chambers, 2008).

**Negative Influences on Breastfeeding Self-Efficacy**

One distinct difference was identified between the participants’ perceptions of the researcher and others influencing their breastfeeding confidence. No participants identified that the researcher decreased their confidence to breastfeed, but more than 20% of all participants felt that someone else decreased their breastfeeding confidence. Thus, as some mothers in this study identified that other individuals, including health care providers, family, and friends, increased their confidence to breastfeed, others also found that they had decreased their breastfeeding confidence.

Although formal and informal sources of support have been identified as positively influencing breastfeeding, they also have been identified as potential negative sources of support (Dennis, 2002; McInnes & Chambers, 2008; Wambach et al., 2005). In this study, approximately one fifth of all participants indicated that someone had decreased their breastfeeding confidence. This occurred in nearly twice as many intervention group participants (27.9%) as control group participants (14.1%). This finding suggested that the participants who received the self-efficacy intervention had more negative perceptions of others decreasing their breastfeeding self-efficacy than those who did not receive the intervention. Having gained breastfeeding confidence
through the self-efficacy intervention or having been exposed to another approach may have made the participants more aware of threats to their confidence.

The participants identified health care providers as the most common “other” that decreased breastfeeding self-efficacy. Lack of consistent information and conflicting advice were the most frequently reported examples of decreasing breastfeeding self-efficacy. This finding was consistent with the literature that health care professionals can be a negative source of support when they provide women with inconsistent, inaccurate, and/or inadequate breastfeeding information and advice (Dennis, 2002; McInnes & Chambers, 2008). Furthermore, conflicting advice has been identified by researchers as undermining women’s breastfeeding confidence (Dennis; Dykes, 2006; Dykes & Williams, 1999).

The manner in which conflicting advice decreased confidence was not identified in this study. However, several avenues are plausible. Conflicting advice may cause stress in a new breastfeeding mother because she may be unsure which advice to follow. This physiologic arousal can be interpreted by the mother as a decreased ability to breastfeed because high levels of stress or anxiety may affect perceived self-efficacy (Dennis, 1999). Similarly, having one health care provider tell a new mother that she is breastfeeding incorrectly after another provider has positively reinforced the proper technique could affect performance accomplishment. Furthermore, if the new mother does not consider the health care providers credible because of inconsistent advice, verbal persuasion may be ineffective at raising self-efficacy beliefs (Bandura, 1977).

The breastfeeding research has suggested that the provision of substandard advice or conflicting information from health care professionals usually occurs because of a
weak knowledge base rather than negative attitudes toward breastfeeding (Dennis, 2002). This may be true of diverse health care providers, including nurses, physicians, and pediatricians, who typically receive little education regarding lactation during their training (Wambach et al., 2005). Conflicting information has been identified as a barrier to breastfeeding; however, it has not been intentional to undermine breastfeeding.

Other barriers also have been identified regarding professionals’ provision of support to breastfeeding mothers, including a shortage of time; hospital practices, such as rooming in; and formula supplementation (Dennis, 2002; McInnes & Chambers, 2008; Wambach et al., 2005). As such, women have reported not receiving the breastfeeding help that they needed and when they did, it often was rushed or hurried (Graffy & Taylor, 2005). Because women are in contact with diverse health care providers in the early postpartum period when breastfeeding is being established, access to and support from knowledgeable health professionals is important for breastfeeding success.

Family members were less frequently identified by the participants as negatively influencing breastfeeding confidence. This finding was consistent with the breastfeeding literature in that family members and friends may be sources of negative support. In particular, breastfeeding can be undermined by a women’s social network if those who are supposed to be providing the support lack adequate knowledge or have negative attitudes and beliefs (Dennis et al., 2002; McInnes & Chambers, 2008). In addition, friends and family members also have been identified as a source of conflicting or inappropriate advice (Graffy & Taylor, 2005). Researchers have found that a woman’s partner (i.e., the infant’s father) may be one of the strongest influences upon her decision to initiate and continue to breastfeed (Bar-Yam & Darby, 1997; Scott, Landers, Hughes,
& Binns, 2001). However, the majority of the literature concerning informal and formal support and breastfeeding has focused on the relationship between different types of support (e.g. family members, friends, and health care providers) and rates of breastfeeding. Thus, scant literature has discussed how these types of support may specifically influence breastfeeding confidence.

The primary focus of the open-ended questions in this pilot study was to identify the participants’ perceptions regarding what may have increased or decreased their breastfeeding confidence to inform a future intervention. However, the responses provided often were one-word answers that did not reflect specific examples of how others increased or decreased breastfeeding confidence. This should not be considered a limitation because the information provided was adequate to determine that no part of the intervention was perceived as detrimental to any individual’s breastfeeding confidence and provided feedback to identify whether modifications should be made to the self-efficacy intervention. However, because the participants in this study identified that other individuals influenced their breastfeeding confidence either positively or negatively, further investigation should be conducted to identify explicit actions that may influence breastfeeding confidence.

Baseline Variables Predictive of Breastfeeding at 4 Weeks

This analysis sought to identify key baseline variables predictive of breastfeeding at 4 weeks postpartum. Three independent factors were associated with breastfeeding continuation at 4 weeks: maternal smoking, method of infant feeding in hospital, and type of delivery.
**Maternal smoking.** Smoking has long been recognized as an important factor in the early discontinuation of breastfeeding. Consistent with the findings from this study, other researchers have concluded that women who smoke tend to breastfeed for a shorter duration than women who do not smoke (Dennis, 2002; Donath, Amir, & ALSPAC Study Team, 2004; Giglia, Binns, & Alfonso, 2006; Ladomenou, Kafatos, & Galanakis, 2007; Liu, Rosenberg, & Sandoval, 2006). Various theories have been proposed related to the inverse relationship between smoking and breastfeeding duration. In particular, low milk supply has been implicated among women who smoke because of the physiological effects of nicotine on levels of prolactin (Howard & Lawrence, 1998), although few studies have actually measured milk supply (Amir, 2001).

Donath et al. (2004) argued that if smoking has negative physiologic effects on breastfeeding, the effects should be seen universally among all smokers. Their longitudinal study of more than 14,000 women found that although the women who smoked were less likely than the nonsmoking women to breastfeed their infants, it was largely because of psychosocial factors such as breastfeeding intentions rather than the physiologic effects of smoking. Other researchers have proposed that the infants of women who smoke have been observed as having more crying and that this irritability may be interpreted as hunger and a low milk supply (Reijneveld, Lanting, Crone, & Van Wouwe, 2005). Because smoking has been identified as having negative health consequences, women may have concerns about the effects of nicotine and other substances in their milk on their newborn infants. Furthermore, women who smoke may be less likely to be concerned about health promotion activities such as breastfeeding and,
therefore, have lower intentions or commitment regarding breastfeeding (Giglia et al., 2006).

In this pilot trial, diverse reasons for breastfeeding discontinuation were noted among the participants who smoked. Consistent with previous research findings, the most frequent reason for breastfeeding discontinuation among smokers included low milk supply, followed by fussy infant not settling and mothers changing their minds about wanting to breastfeed. However, because IMS was the most common reason for breastfeeding discontinuation in this study, the reasons for breastfeeding discontinuation were not different between the smokers and the nonsmokers in this study. Cigarette smoking tends to be underreported, particularly during pregnancy, which may be due to the stigma associated with cigarette smoking and pregnancy (Donath et al., 2004). In addition, many women quit smoking during pregnancy and then relapse in the postpartum period (Liu et al., 2006). Thus, rates of smoking may have been underrepresented in this study.

Method of infant feeding in hospital. The participants in this study who indicated that they were exclusively breastfeeding in hospital were more likely to continue to be breastfeeding at 4 weeks. Conversely, the participants who gave supplementary feeds in hospital in the early postpartum period were significantly more likely to have discontinued breastfeeding by 4 weeks. Formula supplementation in hospital has been well recognized as a significant variable related to the cessation of breastfeeding (Dennis, 2002; Dunn et al., 2006; Gagnon et al., 2005; Semenic et al., 2008; Sheehan et al., 2006). For example, a study of 564 Canadian mother-infant pairs found that the risk for formula supplementation was affected by births occurring between 7 pm and 9 am and high
maternal trait anxiety (Gagnon et al.). Alternatively, variables identified as protective against supplementation included: planning to exclusively breastfeed, planning to breastfeed $\geq$ to 3 months, childbirth education, mother born in Canada, completion of community college, male infant, and breastfeeding at delivery.

Formula supplementation in hospital may affect the establishment of a woman’s milk supply (Gatti, 2008). Nonmedically indicated supplementation may be detrimental to breastfeeding and is not recommended (Gartner et al., 2005; WHO/UNICEF, 1992). This is not to say that new mothers were not able to supplement with formula in the study if they chose. Rather, the intervention group participants were provided with information regarding the potential effects of formula supplementation so that they could make an informed choice regarding any further formula supplementation. In particular, the law of supply and demand was discussed in relation to milk production as the more the breasts are stimulated, the more milk may be produced. Therefore, it is of importance that new mothers are aware that formula supplementation may lead to decreased breast stimulation and decreased milk supply. Thus, it is important for mothers who want to increase their milk supply to breastfeed more often. If formula is provided to an infant in place of breastfeeding, consideration may be given to pumping the breasts to continue to stimulate milk production.

The reasons for in-hospital formula supplementation were not determined. Thus, it was difficult to ascertain explicitly why the infants were being supplemented, particularly in the very early newborn period. In addition, formula is not readily accessible to new mothers and requires the assistance of the nurse to obtain the formula. Thus, health care providers often are influential in the provision or avoidance of formula.
Despite the current recommendations regarding limiting formula supplementation to medical indications, they appear to be not well adhered to in practice. However, it was unknown in this study whether the decision to supplement was based on maternal preferences or the suggestion of the nurses. Supplementation may have been initiated by either in different circumstances. It addition, formula supplementation was identified as a source of conflicting information within this study.

Type of delivery. Type of delivery was predictive of breastfeeding at 4 weeks. In particular, the women who had a cesarean delivery, emergency or planned, and who initiated breastfeeding were significantly less likely to be breastfeeding at 4 weeks than those women who had a spontaneous or an instrumental vaginal birth. This finding was similar to other studies (Chien & Tai, 2007; Ladomenou et al., 2007; Leung, Lam, & Ho, 2002; Perez-Escamilla, Maulen-Radovan, & Dewey, 1996). For example, a recent study of 2,064 women in Taiwan found that women with a cesarean delivery had lower odds of breastfeeding at 4 weeks (OR: 0.69; 95% CI: 0.55-0.86) and 12 weeks postpartum (OR: 0.70; 95% CI: 0.56-0.88) than those who had an unassisted vaginal birth (Chien & Tai). However, a review of the literature on breastfeeding duration found that the relationship between mode of delivery and breastfeeding outcomes is inconsistent (Dennis, 2002).

The reasons that the mothers with cesarean delivery in this study were less likely to be breastfeeding at 4 weeks were unknown. Potential consequences of cesarean delivery, such as postbirth mother-infant separation, postsurgical pain, and longer postpartum recovery, may present greater barriers for breastfeeding mothers (Ladomenou et al., 2007; Semenic et al., 2008). Furthermore, women having a cesarean delivery may
be less likely to initiate breastfeeding in the first hour postpartum (Kramer et al., 2001) as recommended by the BFHI to improve breastfeeding outcomes (WHO/UNICEF, 1992).

Other variables. Many nonmodifiable variables that have been identified as consistent predictors of breastfeeding behaviours, including maternal age, education, socioeconomic status, and ethnicity, were not significant in the model. This may have reflected the fairly homogeneous sample of participants in this study. However, this model does demonstrate that among this cohort of breastfeeding women, the combination of the three variables of smoking, infant feeding method in hospital, and type of delivery explained approximately 22.4% of the variance of breastfeeding continuation at 4 weeks postpartum.

This finding suggested that a large percentage of the variables influencing breastfeeding at 4 weeks were not baseline variables present in the early postpartum period. In other words, perhaps the most influential variables affecting breastfeeding duration are those that occur in the early days or weeks postpartum rather than the first 24 hours after birth. For example, breastfeeding self-efficacy has been identified as a salient variable affecting breastfeeding duration (Blyth et al., 2004; Dennis, 1999, 2002, 2006; Semenic et al., 2008). However, baseline breastfeeding self-efficacy was not significant in the model, suggesting that it is not the level of breastfeeding self-efficacy a mother has in the first 24 hours postpartum, but the experiences that affect breastfeeding self-efficacy in the early days or weeks postpartum. This has been supported in other regression models as breastfeeding self-efficacy has been identified as a significant predictor of breastfeeding duration (Dennis, 2006; Dunn et al., 2006; Kronberg & Vaeth, 2007; Mossman et al., 2008; Semenic et al., 2008). However, the evaluation of breastfeeding
self-efficacy was obtained later than this pilot trial, namely, 24 to 72 hours postbirth (Semenic et al.); 1 week postpartum (Dennis; Dunn et al.; Mossman et al.); and 3 weeks postpartum (Kronberg & Vaeth).

Variables Predictive of Breastfeeding Self-Efficacy at 4 Weeks Postpartum

This analysis sought to determine which baseline variables significantly influence breastfeeding self-efficacy at 4 weeks postpartum, as measured by the BSES-SF. Three independent baseline variables were identified as significant predictors of BSES-SF scores, including method of infant feeding in hospital, baseline BSES-SF total scores, and intended amount of breastfeeding. This suggested that personal factors were more strongly associated with breastfeeding self-efficacy at 4 weeks postpartum than sociodemographic or obstetrical variables as no sociodemographic or obstetrical variables were retained in the model.

Method of infant feeding in hospital. Participants in this study who were exclusively breastfeeding in-hospital had higher BSES-SF scores at 4 weeks postpartum. Comparably, those who were both breast and formula feeding in hospital had lower breastfeeding self-efficacy at 4 weeks postpartum. This was not surprising as supplementation with formula has been associated with low breastfeeding confidence and/or breastfeeding self-efficacy (Dykes et al., 2003; Hill & Humenick, 1996; Otsuka et al., 2008).

The relationship between method of infant feeding and breastfeeding self-efficacy has been well documented in the breastfeeding literature. In particular, studies involving mothers in Canada (Dennis, 2003; Mossman et al., 2008); Australia (Blyth et al., 2002); China (Dai & Dennis, 2003); Puerto Rico (Torres et al., 2003); the UK (Mossman et al.,
2008); and Poland (Wutke & Dennis, 2007) have demonstrated that BSES-SF scores in the first week postpartum have consistently predicted breastfeeding rates at 4, 6, 8 and 16 weeks postpartum. For example, mothers with higher BSES-SF scores during the first week postpartum were more likely to be breastfeeding, be breastfeeding exclusively, and have higher breastfeeding self-efficacy at 4 weeks postpartum (Gregory et al., 2008). Thus, the findings from this study and the breastfeeding literature suggested that both infant feeding method and breastfeeding self-efficacy in the early postpartum period are predictive of breastfeeding outcomes at 4 weeks postpartum.

**Baseline BSES-SF scores.** The finding that baseline BSES-SF scores predicted BSES-SF scores at 4 weeks was not surprising as the saliency of breastfeeding self-efficacy in the early postpartum period, as mentioned previously, has been well documented. Breastfeeding self-efficacy determines how much effort an individual will spend on breastfeeding, how long she will persevere when confronted with obstacles, and how resilient she will be when confronted with breastfeeding difficulties (Dennis, 1999). This is important as many mothers experience breastfeeding difficulties in the early postpartum period. As such, mothers with high breastfeeding self-efficacy are more likely to persevere and continue to breastfeed to achieve their breastfeeding goals. This was evident in the breastfeeding literature and is congruent with self-efficacy theory as performance accomplishment (successfully breastfeeding) has been found to increase self-efficacy. For example, a Canadian study of 189 first-time mothers found that during the first 6 weeks, breastfeeding self-efficacy significantly increased among mothers that continued to breastfeed and decreased among mothers that were supplementing with formula or had weaned \(F[2,148] = 31.2, p < .001\); Semenic et al., 2008). Thus, mothers
who are efficacious and experience breastfeeding success will likely experience increases in their breastfeeding self-efficacy.

*Intended amount of breastfeeding.* Participants who intended to breastfeed exclusively had higher breastfeeding self-efficacy scale scores at 4 weeks postpartum than those who intended to breastfeed and bottle-feed. The relationship between exclusive breastfeeding and breastfeeding self-efficacy has been well documented as mothers who exclusively breastfeed had higher breastfeeding self-efficacy than those who were either partially breastfeeding or bottle-feeding (Blyth et al., 2002; Creedy et al., 2003; Dai & Dennis, 2003; Torres et al., 2003; Wutke & Dennis, 2008).

This was consistent with the literature as intent has been identified as a strong predictor of actual behaviour (Shaker, Scott, & Reid, 2004). This relationship also may be partially explained by social learning theory in that motivation plays a key role in relation to self-efficacy (Bandura, 1977). In particular, self-efficacy has been identified as an important motivational construct as it influences choices, goals, emotional reactions, effort, coping, and persistence (Gist & Mitchell, 1992). Thus, mothers who set a goal to exclusively breastfeed may have higher motivation to persevere in the face of adversity to meet their infant feeding goals, thus ultimately increasing their self-efficacy. This is particularly true when the activity such as breastfeeding has significance for them as little effort is spent on devalued activities (Bandura, 1977). However, individuals motivate themselves and guide their actions based upon what they think they can accomplish rather than their true abilities (Bandura, 1997).

A multifactorial predictive model of breastfeeding self-efficacy in the first week postpartum was developed in a longitudinal study of 522 Canadian breastfeeding women.
Dennis, 2006). Similarities existed between the two models in that they both evaluated in-hospital maternal and obstetrical variables and breastfeeding self-efficacy. However, the dependent variable (BSES-SF) was measured at different times, namely, 1 week and 4 weeks postpartum. Dennis’s model identified eight variables that explained 54% of the variance in breastfeeding self-efficacy (BSES-SF) at 1 week postpartum, including maternal education, support from other women with children, type of delivery, satisfaction with labour pain relief, satisfaction with postpartum care, perceptions of maternal breastfeeding progress, infant feeding method as planned, and maternal anxiety.

Contrary to findings from this pilot study, the sociodemographic variable of education and the obstetrical variables type of delivery, pain relief and postpartum care were significant in the 1-week model. In addition, the 1-week model predicted a substantially larger percentage of variability in BSES-SF scores. While there is no existing literature to interpret these findings, they may reflect several issues. First, obstetric variables such as type of delivery, pain relief in labour, and postpartum care are significant influences on a mother’s breastfeeding self-efficacy in the early postpartum period (1 week), but they do not necessarily extend to 4 weeks postpartum. Thus, variables affecting breastfeeding self-efficacy at 4 weeks may be early postpartum experiences and/or challenges that new mothers experience in hospital or at home. For example, a large percentage of participants intended to breastfeed and initiated breastfeeding in hospital. However, these intentions did not translate into long-term breastfeeding for some participants. This may have been because many mothers did not foresee the difficulties of breastfeeding, including pain, sleep deprivation, interference
with social life, and so on (Persad & Mensinger, 2008). Furthermore, these early postpartum experiences may not have been captured in the model.

In addition, the participants in the pilot trial were asked questions such as whether they had another mother with children to talk to and whether their partners were supportive of breastfeeding. As this was asked in the first 24 hours postpartum, the response may have reflected more of the participants’ perceptions of support rather than the actual support or quality of the support received after discharge. This highlighted that the early postpartum period may not be reflective of participants’ experiences after discharge and may influence the continuation or cessation of breastfeeding.

However, when comparing the similar variables of feeding infant as planned (breastfeeding intention) and perception regarding breastfeeding progress (breastfeeding self-efficacy), both were identified as significant in 1-week and 4-week models. This suggested that broadly defined variables such as breastfeeding intentions and progress are strong predictors of breastfeeding self-efficacy at both 1 and 4 weeks postpartum.

The identification of the variables predictive of a mother’s breastfeeding self-efficacy has significant clinical utility for health care providers caring for breastfeeding mothers. In particular, assessment of these key variables may be used to identify new mothers who may be at risk for low breastfeeding self-efficacy and early cessation of breastfeeding. In particular, type of birth, postpartum pain, breastfeeding intentions, and perception are examples of the variables that may alter a woman’s confidence in performing a new task such as breastfeeding in the first week postpartum (Dennis, 2006). Furthermore, a strong commitment to achieving goals (i.e., breastfeeding intentions, breastfeeding self-efficacy in hospital, and method of infant feeding in hospital) may be a
strong predictor of breastfeeding self-efficacy as efficacious individuals tend to set challenging goals and heighten their efforts when confronted with challenges (Bandura, 1977).

Lessons Learned

Many lessons were learned throughout the study period. A few of them are discussed here, including the randomization procedure, the delivery of the intervention within 24 hours, missing data, the pitfalls of avoiding cointervention, and the provision of support for the participants who no longer wanted to breastfeed. The uneven number of participants in the intervention and control groups was evident approximately two thirds of the way through the study. It was anticipated that the numbers would eventually balance out with more participants recruited. However, the groups did not even out by the targeted recruitment of 150 participants. In retrospect, the discrepant number could have been avoided with block randomization. Thus, block randomization is recommended in future studies.

Delivering the first session of the intervention within the first 24 hours was challenging. However, it was not the delivery of the intervention specifically; rather, it was the process involved in conducting the research, such as obtaining consent, collecting baseline data, and randomizing the sample prior to administering the intervention, while respecting that the new mothers had other priorities after the birth of their infants. Thus, it is a worthwhile consideration for a future trial to have the person(s) delivering the intervention on site daily. This would allow greater flexibility in obtaining consent, gathering baseline information, and providing the intervention. Having an individual on
site would likely be feasible for larger hospitals, where the birth rates are high and many new mothers would be receiving the intervention daily.

The RA responsible for collecting the data forms from the participants was to check the forms for any missing data. However, in a few cases, omissions in baseline data were not identified until data entry. With short hospital stays postpartum, as well as the limited time of the intervention, the opportunity to fill in the missing responses often was not available. Direct data entry into a computer or a portable device would have assisted in further decreasing the small number of omissions or missing data that occurred. In addition, reasons for noneligibility were recorded for all potential participants who did not meet the eligibility criteria. However, reasons for refusal were not ascertained during this study and are recommended for a future study to determine the reasons for refusal.

To avoid any potential cointervention by nurses for the control group participants, it was important that the nurses on the unit remained blinded to who was receiving the intervention and the content of the intervention. It could be hypothesized that if nurses were aware of the participants in the intervention group, they could provide additional support to those in the control group. Keeping nurses blinded to group allocation created a situation that was different from the way nurses tend to communicate with each other and relay a plan of care. In particular, the information (i.e., assessment) that the researcher gained from the participants was not shared with the unit nurses. One example included a mother who was experiencing difficulty latching in the early postpartum period and continued on Day 2 to have latching difficulties, but had not been instructed to start pumping her breasts to stimulate milk production. The researcher instructed the new mother to initiate pumping and use of the breast pump without relaying this information.
to the nurse providing care to the mother and her infant. Although this was never identified as a problem by the participants or the nurses, it may have been advantageous to have nurses included in the intervention. However, to include nurses in the intervention, the methodology would need to be a cluster RCT, whereby the unit of randomization could be hospitals, not participants.

Finally, providing support to the intervention group participants who no longer wanted to breastfeed was not an anticipated component of the self-efficacy intervention. Although it was expected that some women in the intervention group would discontinue breastfeeding, it was not foreseen that the participants would look to the researcher for support. This occurred with 2 intervention group participants; 1 participant experienced severe anxiety in the early postpartum period requiring treatment, and the other participant had an infant who had excessive weight loss secondary to low maternal milk supply with a history of breast reduction surgery.

Although strategies from the self-efficacy intervention were used with both participants initially, there came a time when each of the 2 participants became considerably distressed with her infant feeding method and wanted to discontinue breastfeeding. In both instances, they looked to the researcher to support their decision. Because it was the intention of the self-efficacy intervention to support the mothers to meet their individual goals, each of these participants was supported in her decision to switch to bottle-feeding as their goals had changed. There was some mention in the breastfeeding literature suggesting that there may be a fine line between health care professionals’ support for mothers to breastfeed and pressure on mothers who cannot or will not breastfeed (McInnes & Chambers, 2008). In addition, studies have indicated that
some mothers experience feelings of guilt and self-doubt about not continuing to 
breastfeed (Mozingo et al., 2000). Thus, for a future trial, the self-efficacy intervention 
manual should include information on what to do when the mother changes her mind 
about breastfeeding. In addition, because some breast reduction surgeries have been 
identified as a factor in decreased milk production, consideration should be given to 
adding breast reduction surgery to the exclusion criteria (Amir, 2006; Souto, Giugliani, 
Giugliani, & Schneider, 2003). Similarly, high anxiety was not listed as an exclusion 
criterion, nor did the methodology discuss calculating baseline STAI or EPDS scores 
prior to randomization, which may be another consideration for a future trial.

Study Strengths and Limitations

The methods utilized in this pilot trial were robust and addressed some of the 
methodological weaknesses noted in prior studies evaluating breastfeeding outcomes 
(Britton et al., 2007; de Oliveira et al., 2001; Guise et al., 2003; Renfrew et al., 2007).
The strengths of this pilot trial included explicit inclusion and exclusion criteria, precise 
definitions of study variables, a well described intervention, randomization of 
participants, the use of reliable and valid measures, blinded outcome assessments, and an 
evaluation of maternal satisfaction with the intervention provided.

For this pilot trial, mothers were recruited from a single-site maternity ward in the 
early postpartum period primarily by an RA. The high participation rate facilitated the 
recruitment of a large majority of eligible participants during the study period. The RA 
also collected baseline data and confirmed the eligibility of the participants prior to 
randomization. The randomization procedure used consecutively numbered, sealed, 
opaque envelopes developed by university faculty who were not involved in the study.
The researcher was notified of the intervention group participants and administered the self-efficacy intervention to all participants randomized to the intervention group, thus minimizing the risk of contamination. Because the researcher was highly invested in the success of the study and the protocol was familiar to her, the study protocol was consistently implemented, as identified in the Self-Efficacy Intervention Activity Log. There was no control over the participants in either group to receive additional support related to breastfeeding from professionals, family, or friends in hospital or after discharge. This potential cointervention, or the provision of unintended additional support, became apparent in the participants’ responses about others influencing breastfeeding confidence. However, this occurred among participants in both groups and was distinctly different from the self-efficacy intervention; therefore, it did not threaten the integrity of the trial results.

Outcome data were collected at 4 and 8 weeks postpartum by another RA, who was blinded to group allocation to prevent detection bias. The Maternal Satisfaction with Self-Efficacy Intervention Questionnaire was the last questionnaire to be administered; group allocation was then revealed with a sealed, opaque envelope. To further reduce measurement bias, this pilot trial used measurement tools such as the BSES-SF, EPDS, and STAI for outcome measures that were used in previous studies with Canadian breastfeeding women by telephone (Dennis et al., 2002, 2009).

Attrition was similar in both groups and comparable or lower than other reported breastfeeding intervention studies. The primary reason for loss to follow-up was the inability of the researcher to contact the participants to complete the outcome measures. Data were entered into a Microsoft Access® database, and logic and range checks verified
the accuracy of the data. Double data entry was done for all primary outcomes data. Intent-to-treat analyses ensured that all of the participants remained in the group to which they were randomized for data analysis.

Limitations of the pilot trial included the use of self-reports to obtain breastfeeding outcomes. Although researchers have documented a high level of accuracy of self-reports of infant feeding practices (Launer et al., 1992), the underreporting of formula supplementation may have occurred because preventative health behaviours tend to be overestimated by self-report measures (Bowman, Redman, Dickinson, Gibberd, & Sanson-Fisher, 1991). In addition, although the EPDS has demonstrated high levels of sensitivity, specificity, and positive predictive value, some researchers have suggested that response bias may exist in relation to questions concerning mental illness (Bradburn, 1983). Finally, the use of vicarious experience in the observation of others’ breastfeeding or the sharing of experiences was not utilized in hospital because of the study exclusion criteria. Specifically, only 1 mother could be randomized from each room to minimize the risk of contamination of the participants.

This pilot trial was not powered to prevent the risk of Type I or Type II errors. However, the purpose of this pilot trial was to determine feasibility, compliance, and acceptability rather than significant differences between groups. In addition, the study participants represented a fairly homogeneous group of breastfeeding primiparous mothers with healthy, full-term infants from one geographic area of Northwestern Ontario. Therefore, the generalizability of these findings was limited.
CHAPTER 6: SUMMARY, IMPLICATIONS, AND CONCLUSION

Summary of the Study

Although approximately 84% of Canadian women initiate breastfeeding, less than half continue to breastfeed at 6 months, and only 19% (Statistics Canada, 2003) meet the current recommendations of breastfeeding exclusively for 6 months and beyond as recommended by the WHO (2001). The reasons for early discontinuation are multifactorial and complex, and include a variety of modifiable and nonmodifiable variables (Dennis, 2002). One potentially modifiable variable affecting breastfeeding duration and exclusivity is breastfeeding self-efficacy. Several studies have supported the saliency of breastfeeding self-efficacy on duration and exclusivity (Blyth et al., 2002; Dai & Dennis, 2003; Dennis & Faux, 1999; Gregory et al., 2008; Mossman et al, 2008; Torres et al., 2003; Wutke & Dennis, 2007). However, no study has sought to identify whether a mother’s breastfeeding self-efficacy may be enhanced and lead to improved breastfeeding outcomes.

Thus, using the breastfeeding self-efficacy theory (Dennis, 1999), the researcher developed a self-efficacy intervention. The main purpose of this pilot study was to evaluate the feasibility and compliance with the self-efficacy intervention trial protocol and the acceptability of the intervention. In addition, an estimate of the mean and variability for the outcome measure (BSES-SF) was used to determine a sample size calculation for the main trial. An analysis was conducted to determine any trends among the participants in the intervention group on breastfeeding self-efficacy, duration, and exclusivity. Finally, two regression models were constructed to determine baseline
variables associated with breastfeeding continuation (logistic regression) and breastfeeding self-efficacy (multiple regression) at 4 weeks postpartum.

One hundred and fifty primiparous breastfeeding mothers were randomly allocated to receive standard in-hospital and community care (control group) or standard care plus the self-efficacy intervention (intervention group). The majority of the participants were married/common-law and Caucasian, and planned to breastfeed for 4 months or longer, and planned to breastfeed exclusively. However, only half of the participants felt that they were somewhat likely or very likely to meet their breastfeeding goals. The average age of the participants was 27. Baseline demographic and delivery and postpartum characteristics were obtained at recruitment, as were the assessment of breastfeeding self-efficacy (BSES-SF) and depressive (EPDS) and anxiety (STAI) symptomatology. No clinically important baseline differences were identified between the two groups. Outcome data were obtained from all participants at 4 and 8 weeks postpartum, including the Infant Feeding Questionnaire, the BSES-SF, the EPDS, and the STAI. In addition, the Maternal Satisfaction with the Self-Efficacy Intervention Questionnaire was completed at 8 weeks by the women in the intervention group.

Primary Outcomes

The primary research question was to examine the feasibility of and compliance with the trial protocol and the acceptability of the self-efficacy intervention. The findings concerning this question were positive. In particular, the acceptance rate for enrollment in the pilot trial was high, with 92.5% of the eligible participants agreeing to participate. Sixty-eight of the 69 mothers allocated to the intervention group received the self-efficacy intervention; 1 mother withdrew from the study. Loss to follow-up was similar in
both groups, with an overall attrition of 16 participants (10.7%) at 8 weeks. The total trial sample at 8 weeks was 134 mothers, 61 in the intervention group and 73 in the control group.

Compliance with the trial protocol was acceptable, with 58 (85%) of the participants receiving the complete intervention (three sessions) and more than 80% having the sessions within the designated time. The first session was provided to 54 (80.6%) of the participants within 24 hours, the second session to 63 (98.4%) of the participants occurred within 24 hours of the first session, and the third session was a telephone call to 54 (88.5%) of the participants at 1 week after discharge. This level of compliance was maintained with minimal difficulty.

The majority of participants perceived that the intervention was beneficial at increasing their breastfeeding confidence. Very few women responded negatively to the intervention, with only 1 indicating that she would not recommend this type of support to her friends and she felt that the assistance was not specific to her individual needs. Similarly, only 3 participants (4.9%) strongly agreed that additional support was not required. Overall, the self-efficacy intervention was widely acceptable to the vast majority of participants.

Secondary Outcomes

Because this was a new intervention, an estimate of the mean and variability of breastfeeding self-efficacy (BSES-SF) scores between groups did not exist to perform a sample size calculation for this pilot trial. Thus, the study was not sufficiently powered to detect significant differences between groups. However, trends were examined in relation to breastfeeding self-efficacy, duration, and exclusivity as secondary outcomes.
Despite not having statistically significant differences, the participants in the intervention group tended to have improved outcomes on all measures at both 4 and 8 weeks postpartum. In particular, the participants in the intervention group had higher mean BSES-SF scores, increased breastfeeding duration, and higher levels of breastfeeding at both 4 and 8 weeks postpartum. The participants in the control group experienced a steeper decline in breastfeeding in the first 4 weeks when compared to the intervention group. Furthermore, significant differences in breastfeeding self-efficacy (BSES-SF) were identified in relation to feeding type. The mothers who continued to breastfeed had significantly higher breastfeeding self-efficacy than those who were bottle-feeding at 4 and 8 weeks.

Responses to the open-ended questions also contributed to the researcher’s understanding of the participants’ perceptions of what, if anything, increased or decreased their breastfeeding confidence. More than 75% of the participants felt that the researcher increased their confidence to breastfeed. Themes identified through content analysis suggested that the provision of support, which included information, guidance, assistance, and encouragement from the researcher, was the strategy that most frequently increased breastfeeding confidence. No participants indicated that the researcher did anything to decrease their breastfeeding confidence. This finding provided additional support for the perceived value of the self-efficacy intervention by the participants and identified that no negative outcomes arose from the intervention.

Close to 80% of the participants believed that someone else assisted in increasing their breastfeeding confidence. Health care providers, followed by family and friends, were the most frequent “others” identified as increasing breastfeeding confidence. The
participants indicated that support, information, and encouragement assisted in increasing their breastfeeding confidence. No significant differences between the groups were found in the receipt of additional support to increase breastfeeding confidence. Thus, if a cointervention occurred, it was equal between the groups.

Although other individuals were perceived as influential in increasing the mothers’ breastfeeding confidence, approximately 20% of the participants also felt that someone else decreased their breastfeeding confidence. Health care providers were identified as the most frequent source of increasing breastfeeding confidence, but they also were implicated as the primary source of decreasing breastfeeding confidence. In addition, significantly more mothers in the intervention group than in the control group felt that someone else decreased their breastfeeding confidence.

The regression models identified independent predictors of breastfeeding duration and breastfeeding self-efficacy at 4 weeks postpartum. These are noteworthy because several of the variables are potentially modifiable, and targeted interventions addressing these variables may help to improve breastfeeding duration and breastfeeding self-efficacy.

**Research Implications**

Because the findings from the pilot trial identified good feasibility, compliance, and acceptability of the trial protocol and self-efficacy intervention, the primary implication is to conduct a larger trial. An estimate of the variability of the effect of the self-efficacy intervention on breastfeeding self-efficacy, as measured by the BSES-SF, informed the sample size calculation for a future trial. Using the mean BSES-SF score and standard deviation from the control group participants at 4 weeks, the researcher
performed sample size calculations to achieve 80% power using an independent t test at
alpha 0.05 (two-tailed; see Table 23). A total of 481 participants would be required for
each group. Assuming a fairly conservation attrition rate of 10%, 529 completers would
be required for each arm. However, the clinical significance of a 3.5 versus 5- or 7-point
difference in BSES-SF scores in practice is unknown. Breastfeeding duration may have
more clinical significance in practice and should be considered as the primary outcome
for a future trial. As such, to achieve 80% power to detect the 10% difference in
breastfeeding duration that was observed between groups in this pilot trial at 4 weeks
postpartum, a total of 335 participants would have been required for each group.
Assuming a fairly conservative attrition rate of 10%, 369 completers would have been
required for each arm.

Table 23

Sample Size Calculation

<table>
<thead>
<tr>
<th>MD in BSES-SF Scores</th>
<th>SD</th>
<th>N per group</th>
<th>Attrition</th>
<th>Final completers/Arm</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5</td>
<td>12</td>
<td>481</td>
<td>10%</td>
<td>529</td>
</tr>
<tr>
<td>5.0</td>
<td>12</td>
<td>344</td>
<td>10%</td>
<td>379</td>
</tr>
<tr>
<td>7</td>
<td>12</td>
<td>240</td>
<td>10%</td>
<td>264</td>
</tr>
</tbody>
</table>

Further evaluation of the total BSES-SF scores in the postpartum period also is
required because the use of the BSES-SF total scores as an evaluation tool for measuring
breastfeeding self-efficacy has not been established. Specifically, BSES-SF scores have
not been published to classify them as high, moderate, or low. However, this should not
be considered a limitation of this pilot trial as the main use of the BSES-SF was to
identify mothers at high risk for breastfeeding discontinuation due to low breastfeeding
self-efficacy, assess breastfeeding behaviours and cognitions to individualize efficacy-
enhancing strategies, and evaluate the effectiveness of various interventions and guide program development (Dennis, 2003a).

Recruitment of a considerably larger number of mothers for a future trial would likely require a multisite study. Thus, consideration should be given to the methodology of a multisite study in terms of the unit of randomization. Replication of this study with multiple sites could continue with randomizing the participants at each site and hiring a person(s) to deliver the intervention. Alternatively, one could consider a cluster RCT whereby hospitals are randomized to deliver the intervention either by a person designated to deliver the intervention or by hospital nurses versus usual care. The advantages and disadvantages associated with each method would have to be considered. However, conducting a cluster RCT would address two of the limitations identified in this pilot trial of not being able to communicate and formulate a plan with the nurses on the unit and the limited use of vicarious experience in the intervention.

The findings from the trial also supported some modification to the self-efficacy intervention and protocol. The data from the pilot trial demonstrated that the timing and duration of the intervention were appropriate and that there was no need to standardize the intervention time. However, because the greatest cessation of breastfeeding occurred in the first 4 weeks postpartum, a longer intervention should be considered. In particular, extending the length of follow-up to weekly telephone calls to 4 weeks may be beneficial as longer interventions in the postpartum period have been associated with improved rates of breastfeeding duration and exclusivity (de Oliveira et al., 2001; Hannula et al., 2008). In addition, longer follow-up will help to identify whether maternal needs or
concerns change through the first weeks postpartum in terms of breastfeeding self-efficacy (BSES-SF) and breastfeeding concerns.

Because the mothers indicated that they would have liked to be able to contact the researcher, future participants should be provided with the option of initiating telephone follow-up as an adjunct to the self-efficacy intervention. Thus, contact information should be given to the participants so that they may be able to connect with the person(s) delivering the intervention after discharge. Part of the intervention would then give the participants the opportunity to access a health care provider postpartum with whom they have established a relationship. In addition, this would give participants the opportunity to contact the person(s) delivering the intervention when they feel that the need arises. This further supports the premise of the self-efficacy intervention being individualized and based on maternal need. New data forms will be required to collect the additional information, such as the number of participant lead contacts, the reasons for contact, and the strategies implemented to address maternal concerns.

Having the researcher as the sole person delivering the intervention was associated with several advantages. In particular, the researcher was highly committed to delivering the intervention in the time provided, in a consistent manner, and with attention to the quality of each interaction. In a larger trial, there would be more than one person delivering the intervention. Thus, there would be a need for training, further development of the self-efficacy intervention manual, and documentation logs to monitor the intervention. In addition, intervention fidelity checks would need to be conducted to ensure the reliability of the interventions being provided.
Because observation of breastfeeding occurred during the intervention approximately only 50% of the time, consideration also should be given to having the individual providing the intervention on site so that he or she would be readily available to the participants when they were breastfeeding. If having an on-site person deliver the intervention is not feasible, a pager or a cellular phone number could be provided to each participant to contact the intervention individual directly when breastfeeding observation is required.

A future study also may consider collecting data on areas that were identified as requiring more information. First, the open-ended questions regarding what may have increased breastfeeding confidence most frequently identified support, but support was not defined, nor was the specific type of support identified. Similarly, information and advice often were identified as increasing breastfeeding confidence, but without any specifics regarding the type of information that was provided and valued. Thus, more specific information would be helpful to identify the types of support and information perceived as increasing breastfeeding confidence. Consideration also may be given to using another questioning method. For example, response-type questions (yes/no or often, sometimes, never), in combination with actions that may increase or decrease breastfeeding confidence, may lead to additional information. For example, providing an itemized list of breastfeeding information (positioning, latching, help in the community, etc.) may assist in identifying specific information that the participants value.

Similarly, this could be done with other variables, such as support (practical, emotional, information) or infant supplementation (medically indicated, mother’s request, suggested by health care provider), which may provide more explicit information on the
components of effective and ineffective support. In addition, because perception of IMS was the most common reason for the discontinuation of breastfeeding and supplementation, more information should be gathered on the factors contributing to mothers’ perceptions of IMS. Finally, more information should be ascertained on the variables identified as predictors of continuation of breastfeeding and breastfeeding self-efficacy, such as smoking and type of delivery, to assess what the association may be.

Finally, this pilot trial included a fairly homogeneous sample of primiparous, married, Caucasian mothers. Future research is required to evaluate the effect of the self-efficacy intervention on diverse populations, including high-risk mothers (young, single, low-income, or immigrant). A significant number of potential participants were excluded from the pilot trial because of conditions such as infant prematurity or admission to the NICU. It also may be feasible for a future study to evaluate the breastfeeding self-efficacy intervention among mothers whose babies are premature or in the NICU. Prior to conducting a study such as this, validation of the BSES-SF should be conducted with mothers who have infants in the NICU.

Practice Implications

In this pilot trial, there was a trend that the participants in the intervention group had higher breastfeeding self-efficacy, duration, and exclusivity. The question of whether these trends are clinically relevant is difficult to determine. For example, a 10% difference was identified between the groups at 4 weeks postpartum, with the participants in the intervention group having increased breastfeeding duration. Similarly, at 8 weeks postpartum, 10% more participants in the intervention group than in the control group were practicing a higher level of breastfeeding. Although assisting more mothers to meet
their breastfeeding goals and more infants to be breastfed exclusively is clinically important, further evaluation of the effect of the self-efficacy intervention is required before practice recommendations can be made.

Despite these findings and the high rate of breastfeeding initiation within the study, many women did not meet their intended duration or level of breastfeeding. This was evident as the majority of participants in this study (approximately 75%) had intentions of breastfeeding for longer than 16 weeks and planned to be practicing high to exclusive breastfeeding (> 90%). Even with these intentions, at 8 weeks postpartum, less than 70% of the participants were breastfeeding and less than 50% were exclusively breastfeeding. This outcome was consistent with the literature because many women do not meet their intended breastfeeding goals (Chezem et al., 2003; Declercq, Labbok, Sakala, & O’Hara, 2009; Kronborg & Vaeth, 2004). In addition, the rates of breastfeeding duration among the participants in the control group were 5% to 12% less than other Ontario studies, which may have indicated that breastfeeding duration rates were lower among this cohort of participants.

The high acceptance rate of participation in this study suggested that the mothers were receptive to potentially receiving extra support, should they have been randomized to the intervention group. This finding was substantiated by the responses of the participants in the intervention group regarding the acceptability of the intervention. In particular, the majority of participants indicated that (a) they would recommend this type of support to their friends, (b) the information that the researcher provided made them feel more confident to breastfeed, and (c) they were overall satisfied with the support from the researcher.
The findings from systematic reviews recommended that new mothers be provided with supplementary support as part of routine care (Britton et al., 2007) and that the support should comprise various methods, including education, support, and assistance with problematic situations by well-trained professionals (Hannula et al., 2008). Despite these recommendations, diverse clinical practices have been reported regarding postpartum support and breastfeeding. In addition, congruent with the findings from this pilot trial, perceptions of insufficient milk, sore nipples, and difficulty latching have been identified consistently by researchers as common reasons for breastfeeding discontinuation, thus suggesting that effective strategies to deal with these common problems are not being addressed in practice.

The quality of the support that new mothers receive in the postpartum period is important. Individuals, including health care providers, family, and friends, were identified by the participants as positive and negative sources of influence on the mothers’ breastfeeding confidence. The participants in this study valued receiving advice, assistance, encouragement and reassurance, and extra time from the researcher as well as the nurses on the unit. These findings were consistent with those from other studies that the mother-health care provider relationship, the skilled help received, and the pressures of time influence mothers’ perceptions of breastfeeding support (McInnes & Chambers, 2008).

For example, the participants in the intervention group identified that the characteristics of the researcher helped to increase their breastfeeding confidence. This also was apparent in the breastfeeding literature as professionals who were perceived as helpful provided praise and encouragement while building the mothers’ confidence.
Comparatively, professionals perceived as unsupportive were described as bossy, judgemental, and inaccessible individuals who approached care in a more authoritarian manner. Graffy and Taylor (2005) identified five components of breastfeeding support that women want: information about breastfeeding and what to expect, practical help with positioning the baby to breastfeed, effective advice and suggestions, acknowledgement of the mothers’ experiences and feelings, and reassurance and encouragement. As such, the education of health care professionals regarding breastfeeding should not only focus on knowledge and management skills but also include an emphasis on interpersonal communication skills (McInnes & Chambers, 2008).

Despite the evidence of components of effective support, the women in this study experienced conflicting and incorrect advice, intrusive assistance, and a perceived lack of assistance; these findings were consistent with the literature (Dennis, 2002; McInnes & Chambers, 2008). In addition, many infants are being supplemented in hospital, even though formula supplementation has been widely associated with the premature discontinuation of breastfeeding (Declercq et al., 2009; Sheehan et al., 2001). Therefore, attention needs to be given to addressing inconsistencies about breastfeeding information for new mothers because they have been identified as potentially undermining new mothers’ breastfeeding confidence. Adherence to hospital policies also needs to be encouraged so that breastfeeding mothers receive assistance that will help to ensure optimal breastfeeding outcomes. Consistent with the BFHI, mothers should be assisted to (a) initiate breastfeeding within 1 hour postpartum, (b) breastfeed on demand, (c) room in with their infants, and (d) give no supplementary food or drink unless it is indicated medically (WHO/UNICEF, 1992). In addition, health care staff should receive training in
the skills necessary to support breastfeeding mothers. Finally, since the majority of mothers indicated that they received support from various family and friends, it is important that health care providers include significant others in breastfeeding promotion and advice.

Conclusion

Although the majority of new mothers initiate breastfeeding in Canada (Statistics Canada, 2003), many discontinue breastfeeding prematurely prior to current recommendations and individual goals. Evidence from this study demonstrated that the administration of the self-efficacy intervention was feasible and acceptable. In addition, compliance with the trial protocol was clearly documented. Trends in the data analysis suggested that the self-efficacy intervention may help to improve breastfeeding outcomes, including breastfeeding self-efficacy, duration, and exclusivity, in the first 4 to 8 weeks postpartum. However, because this was the first trial evaluating the self-efficacy intervention, a larger trial is required to determine the effect of the self-efficacy intervention that is delivered by a health care professional in person and with telephone follow-up versus standard care on breastfeeding self-efficacy, breastfeeding duration, and breastfeeding exclusivity.
REFERENCES


Statistics Canada. (2003). Breastfeeding practices, females aged 15 to 55 who had a baby in the previous 5 years, Canada, provinces, territories. Ottawa: Author.


### APPENDIX A: STUDIES OF BREASTFEEDING

Table A1

*Studies of Confidence and Breastfeeding Outcomes*

<table>
<thead>
<tr>
<th>Authors</th>
<th>Purpose of Study/ Research Questions/ Hypotheses</th>
<th>Design/ Participants</th>
<th>Method of Assessing Maternal Confidence</th>
<th>Results Summary</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buxton et al., 1991</td>
<td>To gain an understanding of why women who intended to breastfeed prenatally never attempted to breastfeed or discontinued breastfeeding within 7 days postpartum</td>
<td>Design not specified 187 US women whom intended to breastfeed their newborn</td>
<td>Questionnaire that assessed mother’s degree of confidence to breastfeed in 10 different circumstances with responses from 1-6 with 1 (<em>very unsure</em>) to 6 (<em>very confident</em>).</td>
<td>Significant differences were found between group mean confidence scores among the non-initiators, early cessation and those who breastfed for at least 7 days ($F = 8.69$, $df = 2$, $p = .02$). Lower confidence in ability to breastfeed was identified as 1 of 4 variables predicting early discontinuation of breastfeeding (&lt; 7 days) among women that initiated breastfeeding.</td>
<td>Classified breastfeeding “failure” as discontinuing breastfeeding within 7 days. Thus, findings are limited to discontinuation of breastfeeding within first 7 days.</td>
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<tr>
<td>Dunn et al., 2006</td>
<td>To determine whether vulnerability factors are associated with breastfeeding outcomes at 6 weeks postpartum after controlling for age and education.</td>
<td>Secondary analysis of a cross-sectional telephone survey of 526 women who initiated breastfeeding</td>
<td>Family-Centered Maternity Care Survey (FCMC) questionnaire</td>
<td>Women who reported low confidence were significantly more likely to discontinue breastfeeding by 6 weeks postpartum. Confidence with breastfeeding was independently related to breastfeeding outcome after controlling for age and education. Each 1-unit increment up the confidence scale increased the likelihood of continuing breastfeeding [OR 1.85 (95% CI: 1.50-2.27), $p &lt; .001$] when compared to low confidence.</td>
<td>Potential for re-call bias at 6-week interview. Potential for Hawthorne effect if mothers thought that confidence was associated with outcomes.</td>
</tr>
<tr>
<td>Dykes &amp; Williams, 1999</td>
<td>To provide insight into the lived experience of breastfeeding</td>
<td>A longitudinal, phenomenological study with 10 mothers in England</td>
<td>Interviews at 6, 12 and 18 weeks postpartum</td>
<td>A lack of breastfeeding confidence in the early postpartum period was a factor in the discontinuation of breastfeeding.</td>
<td>Small sample of participants from one geographical area of Northern England limits generalizability.</td>
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<tr>
<td>Study</td>
<td>Objective</td>
<td>Methodology</td>
<td>Findings/Notes</td>
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<tr>
<td>Dykes et al., 2003</td>
<td>To assess the experiences and support needs of adolescent breastfeeding mothers</td>
<td>Qualitative study using focus groups and interviews with 7 adolescent mothers in the UK</td>
<td>Lacking confidence was 1 of 5 themes that emerged regarding early discontinuation of breastfeeding. Findings limited to adolescents in North West England community. Lack of multiparous adolescents further limits generalizability to primiparas</td>
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<tr>
<td>Ertem, Votto &amp; Leventhal, 2001</td>
<td>To determine the prevalence and correlates of the early discontinuation of breastfeeding among mothers eligible for the Women, Infants and Children (WIC) programs</td>
<td>A longitudinal, observational study of 64 women who initiated breastfeeding</td>
<td>Mother’s who lacked confidence within 48 hours of delivery that they would still be breastfeeding at two months, were more likely to discontinue breastfeeding within the first 2 weeks postpartum. Those mothers who were not confident that they would still be breastfeeding up to 2 months were almost 12 times more likely to stop breastfeeding before 2 months than those that were confident. Study included participants from one WIC centre which limits generalizability. With the high rate of cessation of breastfeeding a larger sample is required to obtain information at the 2- and 4-month time periods.</td>
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<tr>
<td>Hill &amp; Humenick, 1996</td>
<td>To evaluate the psychometric properties of the H &amp; H lactation scale</td>
<td>2 separate samples (110 mothers of low-birth-weight infants and 120 mothers with term infants)</td>
<td>Mothers who decreased their level of breastfeeding tend to report low maternal confidence/commitment to breastfeeding. Primary interest of the study was the psychometric properties of the H&amp;H scale. Relationship between perceptions of IMS and confidence was secondary data within the study.</td>
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<tr>
<td>Loughlin et al., 1985</td>
<td>To define the frequency of breastfeeding cessation and to identify factors that would predict mothers and infants at risk for early discontinuation</td>
<td>Design not reported 94 mothers &amp; infants</td>
<td>Maternal lack of confidence in breastfeeding was significantly (p &lt; .001) associated with discontinuation of breastfeeding by 8 weeks. Anticipated duration of breastfeeding was significantly correlated with low confidence in breastfeeding (r = .34). Did not identify how may participants were approached and refused. Low confidence was defined as anything less than “reasonably confident.”</td>
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<tr>
<td>O’Campo et al., 1992</td>
<td>To examine the associations between psychosocial, medical and demographic factors identified prenatally and breastfeeding duration</td>
<td>Prospective study of 198 urban breastfeeding women in the US</td>
<td>Maternal confidence was one of five important influences on breastfeeding duration. Maternal confidence, parity and plans to return to work were the most significant factors affecting anticipated length of breastfeeding. All data was collected by telephone interview, requiring that all participants had a telephone.</td>
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<tr>
<td>Study</td>
<td>Objective</td>
<td>Methods</td>
<td>Findings</td>
<td>Limitations</td>
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<tr>
<td>Papinczak &amp; Turner, 2000</td>
<td>To determine the degree to which certain social maternal risk factors were associated with initiation and duration of breastfeeding</td>
<td>Qualitative and quantitative data was gathered from 3 different questionnaires administered to 159 mothers in Brisbane, Australia</td>
<td>Initiating breastfeeding was shown to be significantly associated with enhanced self-confidence for a short term. In contrast, breastfeeding duration was influenced by greater maternal self-confidence to breastfeed for a long time (9 months).</td>
<td>Self-report used largely to collect data, voluntary participation may lead to selection bias, potential confounding factors were not assessed such as timing of first feeding</td>
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<tr>
<td>Segura-Millan, Dewey &amp; Perez-Escamilla, 1994</td>
<td>Identify factors associated with perceived IMS</td>
<td>Design not reported 165 women in two different hospitals Low-income urban population in Mexico</td>
<td>Lack of confidence in breastfeeding was significantly (p &lt; 0.05) associated with perceived IMS.</td>
<td>Homogeneous low-income population in Mexico which is not generalizable. Dichotomously categorized confidence based on “yes” or “no.”</td>
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<tr>
<td>Taveras et al., 2003</td>
<td>To (1) describe reasons for breastfeeding discontinuation at 2 and 12 weeks postpartum and (2) evaluate associations between breastfeeding discontinuation and modifiable factors.</td>
<td>Prospective cohort study of 1,163 US low-risk, mother-newborn pairs</td>
<td>Maternal confidence in ability to breastfeed was associated with breastfeeding continuation at both 2 and 12 weeks. Mothers who lacked confidence at 1-2 days postpartum were more likely to have discontinued breastfeeding by 2 weeks.</td>
<td>Focused on a medically and socially low-risk population limiting generalizability to more socioeconomically disadvantaged population or mothers with medical conditions. May have some recall bias as mothers were asked to recall events from 12 weeks earlier.</td>
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Table A2

**Studies of Breastfeeding Self-Efficacy and Outcomes**

<table>
<thead>
<tr>
<th>Authors</th>
<th>Purpose of Study/Research Questions/Hypotheses</th>
<th>Design/Participants</th>
<th>Method of Assessing Maternal Confidence</th>
<th>Results Summary</th>
<th>Limitations</th>
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<tbody>
<tr>
<td>Blyth et al., 2002</td>
<td>To assess the effect of maternal confidence (breastfeeding self-efficacy) on breastfeeding duration</td>
<td>Prospective survey of 300 women in Brisbane, Australia</td>
<td>Breastfeeding self-efficacy scale (BSES) administered antenatally and postnatally at 1 week and 4 months</td>
<td>Significant differences in antenatal BSES scores were found among mothers at 1-week who were breastfeeding or bottle-feeding ($t_{274} = 3.68, p &lt; .001$). Women who were exclusively breastfeeding at 1 week ($M = 129.50 \pm 21.71$) reported higher breastfeeding self-efficacy antenatally than mothers that were partially breastfeeding ($M = 109.08 \pm 26.11$) at 1-week. Significant differences were also found among 1-week BSES scores among mothers who were breastfeeding and bottle-feeding at 4 months ($t_{252} = 7.17, p &lt; .001$).</td>
<td>Data limited to self-report</td>
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<tr>
<td>Blyth et al., 2004</td>
<td>To assess the effect of modifiable antenatal variables on breastfeeding duration at 1 week and 4 months</td>
<td>Prospective longitudinal study of 300 women in Brisbane, Australia</td>
<td>Self-report measure of variables including provision of information, perceived support, breastfeeding intentions, and breastfeeding confidence as measured by the (BSES).</td>
<td>Breastfeeding information, support, intended duration of breastfeeding and maternal confidence were the variables associated with breastfeeding at 1-week. Maternal age, education and previous breastfeeding experience were significantly associated with breastfeeding duration at 4 months. Additionally, antenatal intention to breastfeed and breastfeeding self-efficacy continued to be associated with breastfeeding duration. Logistic regression identified that intended duration of breastfeeding, BSES and maternal age as the most significant variables affecting breastfeeding duration.</td>
<td>Data limited to self-report</td>
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<tr>
<td>Study</td>
<td>Objective</td>
<td>Methodology</td>
<td>Findings</td>
<td>Recommendations</td>
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<tr>
<td>Dai &amp; Dennis, 2003</td>
<td>To translate the Breastfeeding Self-Efficacy Scale (BSES) into Mandarin and determine the psychometric properties</td>
<td>Methodological study of 186 breastfeeding mothers in China</td>
<td>Significant differences were found in postpartum breastfeeding self-efficacy scale scores among mothers who at 4 weeks were breastfeeding ($M = 127.57, SD = 15.85$) or bottle-feeding ($M = 110.68, SD = 18.78$; $t[179] = 4.32, p &lt; .001$). The significant differences were also present at 8 weeks postpartum among mothers who were breastfeeding ($M = 128.24, SD = 16.05$) or bottle-feeding ($M = 114.40, SD = 16.60$; $t[179] = 4.286, p &lt; .001$). The difference in mean breastfeeding self-efficacy scale scores was also significant among mothers that were exclusively breastfeeding and partially breastfeeding ($F[2] + 16.91, p &lt; .001$). This indicates that higher breastfeeding scale scores in the early postpartum period are predictive of longer duration and exclusivity of breastfeeding.</td>
<td>Needs to be validated with diverse groups of Chinese speaking mothers from differing cultures. Exploratory factor analysis suggests item-reduction is required.</td>
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<tr>
<td>Dennis &amp; Faux, 1999</td>
<td>Develop and conduct psychometric assessments of an instrument to measure confidence in new breastfeeding mothers</td>
<td>Methodological study of 130 Canadian mothers</td>
<td>Analysis supported the predictive ability of the BSES and infant feeding patterns at 6 weeks postpartum. A significant difference ($p &lt; .05$) was found in BSES scores between mothers that were exclusively breastfeeding, combination feeding and exclusively bottle-feeding.</td>
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<tr>
<td>Gregory et al., 2008</td>
<td>To psychometrically test the BSES-SF among a multicultural UK sample and to examine the relationship between breastfeeding self-efficacy and maternal demographic variables</td>
<td>Cohort study of 165 breastfeeding women from one hospital in the UK</td>
<td>The Cronbach’s alpha coefficient was .90. The predictive validity of the BSES-SF was demonstrated as mothers that were exclusively breastfeeding at 4 weeks postpartum had significantly higher in hospital BSES-SF scores ($M = 49.4, SD = 12.9$) than mothers who were partially breastfeeding ($M = 44.7, SD = 9.5$) or bottle-feeding ($M = 44.4, SD = 12.1$; $F[2] = 1.62, p &lt; .001$).</td>
<td>Low response rate (54%) to the 4 week follow-up which may have led to sampling bias.</td>
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<tr>
<td>Kingston, Dennis &amp; Sword, 2007</td>
<td>To explore the influence of efficacy-enhancing experiences on breastfeeding self-efficacy</td>
<td>Descriptive study of a convenience sample of 63 postpartum mothers</td>
<td>The mothers who observed breastfeeding role models through videotapes or received praise from their partners or their own mothers had significantly higher levels of breastfeeding self-efficacy than mothers who did not. Additionally,</td>
<td>Homogeneous sample of mostly white, married, and educated mothers.</td>
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</table>
mothers who experienced pain or received professional assistance with breastfeeding difficulties had significantly lower levels of breastfeeding self-efficacy than those who did not.  

<table>
<thead>
<tr>
<th>Study</th>
<th>Research Question</th>
<th>Methodology</th>
<th>Findings</th>
<th>Study Limitations</th>
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</thead>
<tbody>
<tr>
<td>Mossman et al., 2008</td>
<td>To examine the influence of adolescent mothers’ breastfeeding attitudes and confidence on breastfeeding initiation and duration</td>
<td>Prospective correlational study of 100 pregnant adolescents BSES-SF and Breastfeeding Attitude Questionnaire (BAQ)</td>
<td>Significantly more mothers with higher prenatal breastfeeding attitudes scores initiated breastfeeding. Mothers with higher prenatal breastfeeding attitude scores and higher prenatal and postnatal confidence scores were more likely to continue breastfeeding at 4 weeks postpartum.</td>
<td>Convenience sample from a single site</td>
</tr>
<tr>
<td>Otsuka et al., 2008</td>
<td>To examine the relationship between perceptions of insufficient milk supply and breastfeeding confidence</td>
<td>Cross sectional study of 262 in-hospital breastfeeding mothers in Japan BSES-SF scores measured in-hospital and perceptions of insufficient milk measured at 4 weeks postpartum</td>
<td>Mothers’ perception of insufficient milk at 4 weeks postpartum was significantly related to breastfeeding self-efficacy in-hospital in the immediate postpartum period ($r = .45, p &lt; .001$).</td>
<td>Convenience sampling resulted in a homogeneous sample of mainly married, educated, middle income women. 30% loss to follow-up between the first and second survey.</td>
</tr>
<tr>
<td>Kronborg &amp; Vaeth, 2004</td>
<td>To examine to what extent psychosocial factors are related to the length of breastfeeding</td>
<td>Observational cohort study of 471 Danish mothers Questionnaire examining variables including breastfeeding intention, experience with breastfeeding, social influence, social support, self-efficacy, resources, knowledge and outcome evaluation.</td>
<td>Multivariate analysis revealed that duration of schooling, mother’s intention to breastfeed, previous experience breastfeeding, breastfeeding self-efficacy, degree of confidence regarding the amount of milk infant receives and knowledge about breastfeeding as statistically positively associated with breastfeeding duration.</td>
<td>Self-report questionnaire. Variables measured had been pilot tested in a small study; although not otherwise validated. Self-efficacy was measured on a 5-point scale regarding a mother’s confidence in her ability to carry out breastfeeding.</td>
</tr>
<tr>
<td>Torres, Torres, Rodriguez &amp; Dennis, 2003</td>
<td>To translate the BSES into Spanish and determine the psychometric properties</td>
<td>Methodological study of 100 breastfeeding mothers in Puerto Rico BSES</td>
<td>Significant mean differences were found among mothers who were exclusively breastfeeding ($X = 139.64 \pm 17.38$) and mother who were both breastfeeding and supplementing with formula ($x + 126.17 \pm 23.46$; $t = 2.96, p &lt; .001$). Mothers BSES and infant feeding method was evaluated only once. Therefore, unable to determine any predictive qualities of the tool.</td>
<td>BSES and infant feeding method was evaluated only once. Therefore, unable to determine any predictive qualities of the tool.</td>
</tr>
</tbody>
</table>
Wutke & Dennis, 2007

To translate the BSES-SF into Polish and assess its psychometric properties among breastfeeding mothers

Methodological study of 105 in-hospital breastfeeding mothers from 5 hospitals in Poland

BSES-SF

In hospital BSES-SF scores significantly predicted breastfeeding duration and exclusivity at 8 and 16 weeks postpartum. The BSES-SF may be a valid and reliable measure of breastfeeding self-efficacy among the sample of Polish mothers

Professional translators were not used in the initial translation of the BSES-SF. Non random, homogeneous sample of married women from Lodz, Poland.
**Table A3**  

**Randomized Controlled Trials of Self-Efficacy-Enhancing Interventions**

<table>
<thead>
<tr>
<th>Author(s), Date Published</th>
<th>Study Objectives</th>
<th>Participants</th>
<th>Instrument to Assess Self-Efficacy</th>
<th>Intervention</th>
<th>Results</th>
<th>Limitations</th>
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<tbody>
<tr>
<td>Brown et al., 2003</td>
<td>RCT to determine if motivational interviewing (MI) would lead to improved smoking cessation outcomes versus brief advice (BA), with pre and post-intervention assessment of self-efficacy and intention to change.</td>
<td>191 US adolescents (13-17 years of age) admitted for a psychiatric hospitalization with previous smoking history</td>
<td>Smoking cessation self-efficacy (SCQ) at baseline, 1, 3, 6, 9 and 12 month follow-up. Additional measures: point prevalence abstinence, timeline follow back, Fagerström tolerance questionnaire (nicotine dependence), Columbia diagnostic interview (diagnostic status), intent to change, situational confidence questionnaire.</td>
<td>MI consisted of 2, 45 minute individual sessions. BA was 5-10 minutes of advice and information on how to quit smoking. Both groups were offered the transdermal patch upon discharge.</td>
<td>MI was more effective at increasing self-efficacy to quit smoking over BA (B = 3.46, SE = 1.78, sr² = 0.02, p = .04. There were no differences in smoking outcomes among the two groups including the number of quit attempts, cigarettes per day, or point prevalence abstinence. However, higher discharge SCQ scores were associated with significantly less smoking during follow-up and greater odds of abstinence.</td>
<td>High refusal rate (39%) may lead to an overrepresentation of participants interested in smoking cessation. Limited generalizability due to homogeneous sample of adolescents with psychiatric or substance use disorders.</td>
</tr>
<tr>
<td>Damush et al., 2003</td>
<td>RTC to assess the effectiveness of a self-management program compared to usual care for patients with acute low back pain (ALBP).</td>
<td>211 US patients from inner city neighborhood health centers.</td>
<td>Self-efficacy to manage back pain was assessed using a 6-item version of the Arthritis Self-Efficacy Scale at baseline, 4 and 12 months. Additional measures: functional status, fear/avoidance of activity, self-management and patient</td>
<td>Control group received usual care based on physician’s judgment, which could include referral to OT, PT, pain clinic and back exercises. Intervention group could receive any of the above in addition to the intervention which consisted of 3 in-person classes, class handouts of</td>
<td>Intervention patients reported significantly better scores on self-efficacy to manage ALBP 0.62 (0.06 - 1.18, p = .03). Additionally, outcomes evaluated reported that the intervention group had significantly better scores on the Roland Disability Questionnaire, mental.</td>
<td>High rate of nonparticipation (48%). Many participants did not complete the intervention, and there was a high rate of attrition. Mobile population.</td>
</tr>
<tr>
<td>Study</td>
<td>Design/Participants</td>
<td>Intervention</td>
<td>Assessment</td>
<td>Outcome</td>
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<tr>
<td>Huang &amp; Acton, 2004</td>
<td>2 group pre-test-post-test design with random assignment to examine the effect of a multifactorial intervention designed to prevent falls by increasing self-efficacy to prevent falls, improving knowledge of medication safety and decreasing the number of environmental risks in older persons living in a Taiwanese community.</td>
<td>Falls self-efficacy scale was used to identify how confident the individual felt about performing each of the activities without falling at baseline and 4 months. The higher the score the more confidence in not falling. Test-retest reliability 0.71. Additional measures: falls record checklist, Tinetti mobility scale, family APGAR index, medication checklist and the environmental safety checklist.</td>
<td>Control group received standardized fall-prevention information. Experimental group participants received standardized and individualized prevention teaching strategies based on individually assessed risk factors during 3 home visits occurring over 4 months. Additionally, two major risk factors were targeted for all experimental participants including: environmental hazards and medication safety.</td>
<td>The experimental group improved their fall self-efficacy over the control group although the difference was not significant. The incidence of falls was reduced in both groups when compared to the pretest baseline.</td>
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<tr>
<td>Kara &amp; Asti, 2004</td>
<td>The purpose of the study was to examine the effect of a structured education program on self-efficacy expectation</td>
<td>COPD Self-Efficacy Scale (CSES) was used to assess the patients' level of confidence regarding their ability to manage or avoid</td>
<td>Control group received only educational advice at the initial visit. The experimental group received a 4-week structured education</td>
<td>Both groups demonstrated significantly improved CSES from pre-to post intervention and at 1 month. However, the Small sample size and short duration of follow-up.</td>
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</table>
in patients with COPD.

breathing difficulty while participating in certain activities at 1-month and 2-month post initial interview. The scale was adapted for Turkish patients by the researchers with a test-retest reliability ($r = .89$) and internal consistency (Cronbach’s alpha = .94).

program which employed self-efficacy theory and a brochure was given which was developed by the researcher.

study group demonstrated increased CSES and when inter group differences were analyzed; there was significant improvements at all measurement times for each of the 5 subscales. For the control group the inter-group changes were not significant for all subscales or not maintained after 1 month.

<p>| Ludman et al., 2003 | To assess whether a low-intensity 12-month intervention would improve patient’s self-efficacy for managing depression and increase self-management behaviours including self-monitoring, identification of high-risk situations and pleasant events scheduling. The study also evaluated whether these changes would result in improved depression outcomes over time. | 386 US patients at high risk for depression recurrence or relapse following successful acute phase treatment self-efficacy (Bush et al. 2001) self-management behaviours were evaluated at baseline, 3, 6, 9, and 12 months and medication use (adherence). | Experimental group received a primary care-based relapse prevention program (Lundman et al., 2000). This was a multifaceted intervention that included an educational book (Keaton et al., 2002), a videotape, two in-person visits, three scheduled telephone monitoring contacts (2, 5, and 9 months) and four personalized monitoring mailings (3, 6, 10, 12 months after enrolment). Three depression prevention specialists (DPS), a psychologist, a psychiatric nurse and a social worker were trained to provide the intervention. Patients assigned to the usual care group were Intervention patients had a significantly greater self-efficacy for managing depression ($p &lt; .01$), tracking depressive symptoms, monitor early warning signs and plan for coping with high risk situation at all times compared to usual care control patients. | Homogeneous sample of employed, well educated participants with a family physician from one region of the country. Many tools were retrospective self-reports which may be subject to bias. |
| Parent &amp; Fortin, 2000 | To determine whether vicarious experience reduces anxiety and increases self-efficacy expectation and self-reported activity in patients after cardiac surgery | RCT involving 56 Canadian male patients undergoing 1st time coronary artery bypass graft (CABG) surgery | Jenkins’s self-efficacy expectation scales were used to assess postoperative self-efficacy expectation at 5 days and at 4 weeks after surgery. Additional outcomes included anxiety (state-trait anxiety inventory) and self-reported activity (Jenkins’ activity checklist). | The control group and experimental group both received routine information on surgery and recovery by health care professionals. The experimental group also received the intervention which included 3 (1-1) supportive visits by a volunteer former patient. The intervention provided vicarious experience of a successful surgery and rehabilitation program. The intervention was provided by three former male patients who had had CABG and were scheduled the first 24 hours before surgery, the fifth postoperative day and 4 weeks after surgery. The visitors were provided with 6 hours of training by the research coordinator on interaction principles and on cardiovascular disease and treatment. | The experimental group reported higher levels of self-efficacy expectation for general activities: walking, climbing stairs than the control group. However, both groups showed increases over time and by 4 weeks the differences were no longer significant. Only the experimental group demonstrated a significant decrease in anxiety during hospitalization. At all measurement times after the first intervention the experimental group reported significantly lower levels of anxiety compared to the control group. | Potential interview and subject bias as they were aware of group allocation. Construct validity of the intervention is questionable as one is unable to determine what exactly was manipulated in the intervention. Limited generalizability as small sample size conducted only with men. |</p>
<table>
<thead>
<tr>
<th>Study (Year)</th>
<th>Design</th>
<th>Population</th>
<th>Intervention</th>
<th>Outcomes</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>van der Ven et al., 2005</td>
<td>RCT to assess the effect of cognitive behavioural group training (CBGT) versus blood glucose awareness training (BGAT) among type 1 diabetics with poor glycemic control</td>
<td>107 patients in the Netherlands with poor glycemic control (HBA1C ≥ 8%).</td>
<td>Diabetes self-efficacy was assessed using the Confidence in Diabetes Self-Care scale (CIDS). Diabetes-related emotional distress was assessed using the Problem Areas in Diabetes Scale (PAIDS). Assessment of depressive symptoms was assessed with the Centre for Epidemiologic Studies Scale for Depression (CES-D).</td>
<td>Intervention group participants received the CBGT which included cognitive restructuring and goal setting. Control group participants received BGAT aimed at preventing and correcting extreme glucose fluctuations. Both groups received a patient manual and 6 weekly, two hour group sessions.</td>
<td>There was a statistically significant increase in diabetes self-efficacy (p=0.01) and decrease in diabetes emotional distress (p = 0.01) and depressive symptoms (p &lt; 0.001) over the control group from T2 to T3. However, mean changes in HBA1C were not significant from T2-T3.</td>
</tr>
<tr>
<td>Weber et al., 2002</td>
<td>Pilot RCT to test the effects of a dyadic intervention (1-1 peer support program) among men recently treated by radical prostatectomy and long-term survivors.</td>
<td>30 US men who had radical prostatectomy that resulted in urinary and sexual dysfunction</td>
<td>Self-efficacy was assessed with the Stanford Inventory of Cancer Patient Adjustment (SICPA) at baseline and at 8 weeks. Cronbach’s alpha 0.82 to 0.92. Additional outcomes included depression symptomatology and health related control variables (incontinence and erectile dysfunction).</td>
<td>Control received usual care. Experimental group match with support person who met 8 times during an 8 week period. The emphasis on the intervention was on producing a supportive atmosphere for the men to discuss typical problems such as emotional and physical factors.</td>
<td>At 8 weeks self-efficacy was significantly higher in the intervention group (t = 2.5, p &lt; .05) than the control group. Also demonstrated a high negative correlation between self-efficacy and depression (r = -.65, p &lt; .01). Small sample size. Despite randomization groups differed in self-efficacy scores at baseline.</td>
</tr>
<tr>
<td>Wong, Wong &amp; Chan, 2005</td>
<td>An RCT to determine whether nurse-initiated telephone follow-up would increase patients’ self-efficacy to manage dyspnea and decrease the use of health care services in patients with COPD.</td>
<td>60 Chinese participants with COPD.</td>
<td>Self-efficacy was assessed with the modified Chinese Self-Efficacy Scale (CSES) at baseline and at 29 to 35 days. The CSES Cronbach’s alpha 0.62. Additional outcomes included data on health care use.</td>
<td>Telephone follow-up provided by PI, which was guided by a protocol developed and validated for the study. 2 phone calls (days 3-7) and 14-20. Data outcome measures determined by an RA blind to group allocation.</td>
<td>The self-efficacy scores in the telephone support group increased significantly for some measures (i.e., physical exertion, weather/environment) of self-efficacy but not all.</td>
</tr>
</tbody>
</table>
APPENDIX B: BSES-SF

For each of the following statements, please choose the answer that best describes how confident you are with breastfeeding your new baby. Please mark your answer by circling the number that is closest to how you feel. There is no right or wrong answer.

1 = Not at all confident
2 = Not very confident
3 = Somewhat confident
4 = Confident
5 = Very confident

<table>
<thead>
<tr>
<th>Statement</th>
<th>Not at all confident</th>
<th>Not very confident</th>
<th>Somewhat confident</th>
<th>Confident</th>
<th>Very confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I can always determine that my baby is getting enough milk.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. I can always successfully cope with breastfeeding like I have with other challenging tasks.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. I can always breastfeed my baby without using formula as a supplement.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. I can always ensure that my baby is properly latched on for the whole feeding.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. I can always manage the breastfeeding situation to my satisfaction.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. I can always manage to breastfeed even if my baby is crying.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. I can always keep wanting to breastfeed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. I can always comfortably breastfeed with my family members present.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. I can always be satisfied with my breastfeeding experience.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. I can always deal with the fact that breastfeeding can be time-consuming.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. I can always finish feeding my baby on one breast before switching to the other breast.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. I can always continue to breastfeed my baby for every feeding.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. I can always manage to keep up with my baby’s breastfeeding demands.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14. I can always tell when my baby is finished breastfeeding.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Total score = 14 to 70

Total ________________

Date ________________
<table>
<thead>
<tr>
<th>Author/Intervention</th>
<th>Description of intervention and control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown et al., 2003</td>
<td>MI consisted of 2, 45 minute individual sessions with therapist. Examples of discussion included pros and cons of smoking and of quitting, smoking norms costs etc. Comprehensive manual Pamphlet “I Quit” 6 telephone follow-up calls Parent component BA was 5-10 minutes of advice and information on how to quit smoking. Participants were clearly advised that they should quit smoking Pamphlet “I Quit”</td>
</tr>
<tr>
<td>Damush et al., 2003</td>
<td>Intervention group: Self-management program 3 in-person classes (1 per week) focusing on evidence-based treatment recommendations, behaviour changes, self-efficacy and reducing negative affect Class handouts (written materials) Physician letter of support Telephone follow-up at 4, 6 and 8 weeks to assess achievement of goals, assist with problem solving and set new goals. Maintenance calls were then made monthly. Also provided usual care (see below) Usual care: Based on individual needs assessed by physician could include referral to occupational therapist, physical therapy, or a neurological center; nonnarcotic/narcotic analgesics; and back exercises</td>
</tr>
<tr>
<td>Huang &amp; Acton, 2004</td>
<td>Experimental group: Standardized and individual fall-prevention teaching based on individually assessed specific fall-related risk factors. Individualized teaching and an individualized brochure based on fall-related risk factors (medication safety and environmental safety). Standardized fall prevention brochure Control group: Received standardized fall-prevention information Standardized fall prevention brochure</td>
</tr>
<tr>
<td>Kara &amp; Asti, 2004</td>
<td>Experimental group: Participants were asked to attend the pulmonary outpatient clinic with a family member or caregiver 3 to 4 times per week. Education was tailored to meet the individual needs of the participants including areas they lacked confidence as assessed by the COPD self-efficacy scale Structured education classes Training and workout sessions 3-5 participants were included in each class The 4 sources of self-efficacy expectations were included into the program including mastery experiences, modeling, verbal persuasion and decreasing emotional/physical arousal. Control group: Received educational advice at the initial interview</td>
</tr>
<tr>
<td>Ludman et al., 2003</td>
<td>Experimental group: Educational booklet and videotape about effective management of depression 2 in-person visits with a depression prevention specialist 3 schedule telephone monitoring contacts</td>
</tr>
<tr>
<td>Study</td>
<td>Interventions and Components</td>
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<td>-----------------------------</td>
</tr>
<tr>
<td>Parent &amp; Fortin, 2000</td>
<td><strong>Peer support for first-time cardiac surgery with males</strong>&lt;br&gt;<strong>Vicarious experience</strong>&lt;br&gt;Experimental group: Each participant received 3 support visits by a volunteer former patient. Visits occurred 24 hours before surgery, 5th postoperative day and 4 weeks after surgery. One-on-one support through vicarious experience as former patients were living proof of survival and recovery. Intervention was tailored to individual participants needs and questions.&lt;br&gt;Control group: usual care.</td>
</tr>
<tr>
<td>van der Ven et al., 2005</td>
<td><strong>Cognitive-behavioural group training (CBGT) versus an adaptation of the Dutch blood glucose awareness training (BGAT)</strong>&lt;br&gt;Experimental group: The main components of CBGT include cognitive restructuring and individual goal setting. Themes are: (a) individual goal-setting, (b) the roles of cognition and emotions in diabetes self-care, (c) stress, (d) diabetes and interpersonal relationships and (e) diabetes management as teamwork. Sessions include review of homework, introduction to the theme, exercise and group discussion.&lt;br&gt;Control group: The BGAT aimed at preventing and correcting extreme blood glucose fluctuations. Both groups received a patient manual and the interventions consisted of six weekly 2-hour sessions, delivered to groups of six to eight patients by a diabetes nurse specialist (DNS) and a psychologist.</td>
</tr>
<tr>
<td>Weber et al., 2002</td>
<td><strong>Dyadic (one-to-one) support from individuals who were long-term survivors of prostate cancer and had radical prostatectomy. Vicarious experience</strong>&lt;br&gt;Experimental group: Dyad intervention provided a supportive environment for participants to discuss problems encountered after radical prostatectomy (RP). Discussions were based on individuals needs/concerns. Each dyad met 8 times in 8 weeks.&lt;br&gt;Control group: usual care.</td>
</tr>
<tr>
<td>Wong, Wong &amp; Chan, 2005</td>
<td><strong>(1 to 1 telephone support and education) versus usual care.</strong>&lt;br&gt;Experimental group: Received structured, individualized educational and supportive telephone follow-up program which consisted of two telephone contacts on days 3-7 and days 14-20. The telephone contacts consisted of three parts: assessment (Chinese self-efficacy scale), management options (sources of self-efficacy) and evaluation (referral). Performance accomplishment: goal setting. Verbal persuasion: praise and encouragement. Emotional arousal: minimalized by teaching stress-management techniques, methods to reduce stress. The protocol was developed based on Bandura’s self-efficacy theory. However, did not include vicarious experience.&lt;br&gt;Control group: usual care.</td>
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</tbody>
</table>
APPENDIX D: SELF-EFFICACY INTERVENTION ACTIVITY LOG

SESSION 1            Date:

PART I - ASSESSMENT

1. Session provided within 24 hours of delivery:
   1. ○ Yes   2. ○ No: when provided: ___________ hours post-delivery
2. Duration of contact: ____________ minutes
3. Planned breastfeeding duration: ___________ months

5. Breastfeeding Self-Efficacy Assessment

<table>
<thead>
<tr>
<th>Item</th>
<th>Score 1</th>
<th>Score 2</th>
<th>Score 3</th>
<th>Score 4</th>
<th>Score 5</th>
</tr>
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<tbody>
<tr>
<td>I can always determine that my baby is getting enough milk</td>
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<td>I can always tell when my baby is finished breastfeeding</td>
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</tbody>
</table>

6. Total BSES-SF score: ____________

7. Total number of low (≤3) scoring items: ____________

8. Total number of high (>4) scoring items: ____________

9. Pain: (no pain) 1 2 3 4 5 6 7 8 9 10 (extreme pain) → Discussed management strategies: 1. ○ Yes 2. ○ No
10. Anxiety: (no anxiety) 1 2 3 4 5 6 7 8 9 10 (extreme anxiety) → Discussed management strategies: 1. ○ Yes 2. ○ No
11. Fatigue: (no fatigue) 1 2 3 4 5 6 7 8 9 10 (extreme fatigue) → Discussed management strategies: 1. ○ Yes 2. ○ No

PART II – MANAGEMENT STRATEGIES

Check all that apply
1. ○ Identified and reinforced past and present successes and accomplishments
2. ○ Gave attention to successful or improved aspects of bf performance
3. ○ Suggested strategies about how to improve future bf performances
4. ○ Set achievable short-term goals
5. ○ Provided anticipatory guidance about bf difficulties that may be encountered
6. ○ Used visual aids to make unobservable bf skills apparent
7. ○ Used visual aids to demonstrate bf techniques
8. ○ Provided written materials to supplement learning
9. ○ Provided positive feedback highlighting bf skills (high scoring BSES-SF items)
10. ○ Corrected inaccurate and low perceptions of performance capability
11. ○ Dispelled myths about bf
12. ○ Created optimistic beliefs (e.g., you have what it takes to succeed)
13. ○ Provided support when handling disappointment or failure
14. ○ Encouraged mother to envision successful performances and manage self-defeating thoughts
15. ○ Encouraged participation from family/friends to support new mothers’ efforts
16. ○ Provided anticipatory guidance - anxiety, pain, and fatigue - explicitly acknowledged and normalized
17. ○ Provided information on practices that may help to overcome anxiety, pain, and fatigue
18. ○ Other:
PART III – EVALUATION

1. Was breastfeeding observed? 1. ☐ Yes 2. ☐ No
2. Does the mother feel her breastfeeding self-efficacy has increased from the start of the session? 1. ☐ Yes 2. ☐ No

Notes:
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Plan:
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Other:
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_____________________________________________________________________________________________________________
_____________________________________________________________________________________________________________
SESSION 2  Date

PART I - ASSESSMENT

1. Session provided within 24 hours of session 1:
   - ○ Yes  2. ○ No: when provided: __________ hours post session 1

2. Duration of contact: __________ minutes

3. Breastfeeding Self-Efficacy Assessment

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
<th>Score</th>
<th>Score</th>
<th>Score</th>
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</tr>
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<tr>
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<td>5</td>
</tr>
<tr>
<td>I can always finish feeding my baby on one breast before switching to the other breast</td>
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<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I can always continue to breastfeed my baby for every feeding</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I can always manage to keep up with my baby’s breastfeeding demands</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>I can always tell when my baby is finished breastfeeding</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

4. Total BSES-SF score: __________

5. Total number of low (<3) scoring items: __________

6. Total number of high (>=4) scoring items: __________

7. Pain: (no pain) 1 2 3 4 5 6 7 8 9 10 (extreme pain) → Discussed management strategies: 1. ○ Yes 2. ○ No
8. Anxiety: (no anxiety) 1 2 3 4 5 6 7 8 9 10 (extreme anxiety) → Discussed management strategies: 1. ○ Yes 2. ○ No
9. Fatigue: (no fatigue) 1 2 3 4 5 6 7 8 9 10 (extreme fatigue) → Discussed management strategies: 1. ○ Yes 2. ○ No

PART II – MANAGEMENT STRATEGIES

Check all that apply

1. ○ Identified and reinforced past and present successes and accomplishments
2. ○ Gave attention to successful or improved aspects of bf performance
3. ○ Suggested strategies about how to improve future bf performances
4. ○ Set achievable short-term goals
5. ○ Provided anticipatory guidance about bf difficulties that may be encountered
6. ○ Used visual aids to make unobservable bf skills apparent
7. ○ Used visual aids to demonstrate bf techniques
8. ○ Provided written materials to supplement learning
9. ○ Provided positive feedback highlighting bf skills (high scoring BSES-SF items)
10. ○ Corrected inaccurate and low perceptions of performance capability
11. ○ Dispelled myths about bf
12. ○ Created optimistic beliefs (e.g., you have what it takes to succeed)
13. ○ Provided support when handling disappointment or failure
14. ○ Encouraged mother to envision successful performances and manage self-defeating thoughts
15. ○ Encouraged participation from family/friends to support new mothers’ efforts
16. ○ Provided anticipatory guidance - anxiety, pain, and fatigue - explicitly acknowledged and normalized
17. ○ Provided information on practices that may help to overcome anxiety, pain, and fatigue
18. ○ Other: ________________________________________________________________
### PART III – EVALUATION

1. Was breastfeeding observed? 1. ○ Yes 2. ○ No

2. Does the mother feel her breastfeeding self-efficacy has increased from the start of the session? 1. ○ Yes 2. ○ No

#### Notes:

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

#### Plan:

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

#### Other:

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________
### SESSION 3  Date:

#### PART I - ASSESSMENT

1. Session provided within 1 week of hospital discharge:
   - 1. Yes
   - 2. No: when provided: ___________ hours post-delivery
2. Duration of telephone conversation: ____________ minutes
3. Planned breastfeeding duration: ___________ months
4. Plans to breastfeed exclusively:
   - 1. Yes: how long: _______________
   - 2. No

5. Breastfeeding Self-Efficacy Assessment

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can always determine that my baby is getting enough milk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can always successfully cope with breastfeeding like I have with other challenging tasks</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I can always breastfeed my baby without using formula as a supplement</td>
<td></td>
<td></td>
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<tr>
<td>I can always ensure that my baby is properly latched on for the whole feeding</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>I can always manage the breastfeeding situation to my satisfaction</td>
<td></td>
<td></td>
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<tr>
<td>I can always manage to breastfeed even if my baby is crying</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>I can always keep wanting to breastfeed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can always comfortably breastfeed with my family members present</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can always be satisfied with my breastfeeding experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can always deal with the fact that breastfeeding can be time consuming</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can always finish feeding my baby on one breast before switching to the other breast</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I can always continue to breastfeed my baby for every feeding</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>I can always manage to keep up with my baby’s breastfeeding demands</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>I can always tell when my baby is finished breastfeeding</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

6. Total BSES-SF score: ___________
7. Total number of low (<3) scoring items: ___________
8. Total number of high (>4) scoring items: ___________
9. Pain: (no pain) 1 2 3 4 5 6 7 8 9 10 (extreme pain) → Discussed management strategies: 1. Yes 2. No
10. Anxiety: (no anxiety) 1 2 3 4 5 6 7 8 9 10 (extreme anxiety) → Discussed management strategies: 1. Yes 2. No
11. Fatigue: (no fatigue) 1 2 3 4 5 6 7 8 9 10 (extreme fatigue) → Discussed management strategies: 1. Yes 2. No

#### PART II – MANAGEMENT STRATEGIES

Check all that apply

1. Identified and reinforced past and present successes and accomplishments
2. Gave attention to successful or improved aspects of bf performance
3. Suggested strategies about how to improve future bf performances
4. Set achievable short-term goals
5. Provided anticipatory guidance about bf difficulties that may be encountered
6. Used visual aids to make unobservable bf skills apparent
7. Used visual aids to demonstrate bf techniques
8. Provided written materials to supplement learning
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11. Dispelled myths about bf
12. Created optimistic beliefs (e.g., you have what it takes to succeed)
13. Provided support when handling disappointment or failure
14. Encouraged mother to envision successful performances and manage self-defeating thoughts
15. Encouraged participation from family/friends to support new mothers’ efforts
16. Provided anticipatory guidance - anxiety, pain, and fatigue - explicitly acknowledged and normalized
17. Provided information on practices that may help to overcome anxiety, pain, and fatigue
18. Other:
### PART III – EVALUATION

1. Does the mother feel her breastfeeding self-efficacy has increased from the start of the session? 1. Yes  2. No

Notes:

- 
- 
- 
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- 
- 

Plan:

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- 
- 
- 
- 

Other:

- 
- 
- 
- 
- 
- 

APPENDIX E: MATERNAL SATISFACTION WITH SELF-EFFICACY INTERVENTION QUESTIONNAIRE

We are interested in hearing from you, so that we may be able to learn more about the breastfeeding support that you received. Please feel free to give us your honest opinion, positive or negative. There is also space provided for any additional comments.

1. Were you provided with the extra breastfeeding support by the research nurse?
   1) Yes, please complete the remainder of the survey
   2) No, please proceed to Question 4

   Interviewer to check group allocation for accuracy; no longer blinded

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Unsure</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>The discussions with the research nurse were beneficial.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>The research nurse provided assistance that was specific to my breastfeeding needs.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>I would recommend this type of additional support to my friends.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>The time I spent with the research nurse was too short.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>I would have preferred more visits from the research nurse in the hospital.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>I would have liked more telephone calls after discharge from the research nurse.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>I would have liked to have been able to contact the research nurse when I needed assistance.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>The assistance from the nursing staff was good and additional support was not required.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10</td>
<td>The information the research nurse provided made me feel more confident to breastfeed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>The research nurse assisted me to reach my breastfeeding goals.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12</td>
<td>Overall, I am satisfied with the support from the research nurse.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

2. Did the research nurse do anything that helped you feel more confident to breastfeed your baby?
   1) Yes

   What?
2. O No

3. Did the research nurse do anything that decreased your confidence to breastfeed your baby?
   1. O Yes
      What? ____________________________________________________________
      ____________________________________________________________
      ____________________________________________________________
      ____________________________________________________________
      ____________________________________________________________
   2. O No

4. Did anyone else do anything that increased your confidence?
   1. O Yes
      Who? ______________________________________________________________________
      What? ______________________________________________________________________
      ____________________________________________________________
      ____________________________________________________________
      ____________________________________________________________
   2. O No

5. Did anyone else do anything that decreased your confidence?
   1. O Yes
      Who? ______________________________________________________________________
      What? ______________________________________________________________________
      ____________________________________________________________
      ____________________________________________________________
      ____________________________________________________________
   2. O No

6. Do you have any additional comments regarding the extra breastfeeding support you received from the research nurse while in the hospital or at home?
   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________
   ______________________________________________________________________
APPENDIX F: INFANT FEEDING QUESTIONNAIRE

Hello, ________, my name is ________. I am a research assistant working for the breastfeeding research study you agreed to participate in while you were in the hospital. I would like to ask you some questions about your experience feeding your baby and how you are feeling. It will take approximately 5-10 minutes. Is this a convenient time for you? If not, is there a better time that I could call you back? Date:____________ Time:____________

1. How are you currently feeding your baby?
   1. O Breastfeeding only
   2. O Breastfeeding and bottle-feeding
   3. O Bottle-feeding
   *If bottle-feeding: Please give date started fully bottle-feeding _________________
   Reason(s) for switching to bottle-feeding _______________________________
   Continue with question # 3

2. What else besides breast milk has your baby been receiving?
   1. O Nothing, breast milk only (Exclusive breastfeeding includes vitamins, minerals and medicines)
   2. O Less than 1 bottle/week of non-human milk or other fluids (Almost exclusively breastfeeding)
   3. O More than 1 bottle/week and < daily bottle of non-human milk (High breastfeeding)
   4. O 1 bottle/day or more of non-human milk (Partial breastfeeding)
   5. O Mainly bottle-feeding; breast is used for comfort (Token breastfeeding)

If the mother is not exclusively breastfeeding (above answer 2, 3, 4 or 5), select the appropriate infant feeding category and ask the corresponding question.

<table>
<thead>
<tr>
<th>Infant Feeding other than Exclusive Breastfeeding</th>
<th>Reason(s) for adding other fluids</th>
<th>Date changed from exclusive breastfeeding if participant was exclusively breastfeeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>O Almost exclusively breastfeeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O High breastfeeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O Partial breastfeeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O Token breastfeeding</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Is this a change from when you were discharged from the hospital?
   1. O Yes
   2. O No

4. Are you feeding your baby the way you planned?
   1. O Yes
   2. O No
5. Are you satisfied with how you are feeding your baby?
   1. O Very satisfied
   2. O Satisfied
   3. O Neither satisfied nor dissatisfied
   4. O Unsatisfied
   5. O Very Unsatisfied

6. How is breastfeeding progressing?
   1. O Very well – only a couple, if any, minor difficulties
   2. O Good – a few minor difficulties
   3. O Satisfactory – some minor and/or major difficulties
   4. O Not well – several major difficulties
   5. O Terrible – many major difficulties
   6. O I am no longer breastfeeding

7. Are you satisfied with the breastfeeding support you have received from your partner?
   1. O Very satisfied
   2. O Satisfied
   3. O Neither satisfied nor dissatisfied
   4. O Unsatisfied
   5. O Very Unsatisfied

8. Overall, how would you rate the breastfeeding support you have received from your family and/or friends?
   1. O Very satisfied
   2. O Satisfied
   3. O Neither satisfied nor dissatisfied
   4. O Unsatisfied
   5. O Very Unsatisfied

9. Overall, are you satisfied with the breastfeeding support you received from health care providers (nurses in-hospital, public health, physicians)
   1. O Very satisfied
   2. O Satisfied
   3. O Neither satisfied nor dissatisfied
   4. O Unsatisfied
   5. O Very Unsatisfied
APPENDIX G: EPDS

Please indicate how you have been feeling \textit{IN THE PAST 7 DAYS}, not just how you feel today.

1. I have been able to laugh and see the funny side of things:
   1. O As much as I always could
   2. O Not quite so much now
   3. O Definitely not so much now
   4. O Not at all

2. I have looked forward with enjoyment to things:
   1. O As much as I ever did
   2. O Rather less than I used to
   3. O Definitely less than I used to
   4. O Hardly at all

3. I have blamed myself unnecessarily when things go wrong:
   1. O Yes, most of the time
   2. O Yes, some of the time
   3. O Not very often
   4. O No, never

4. I have felt worried and anxious for no good reason:
   1. O No, not at all
   2. O Hardly ever
   3. O Yes, sometimes
   4. O Yes, very often

5. I have felt scared or panicky for no very good reason:
   1. O Yes, quite a lot
   2. O Yes, sometimes
   3. O No, not much
   4. O No, not at all

6. Things have been getting on top of me:
   1. O Yes, most of the time I haven’t been able to cope at all
   2. O Yes, sometimes I haven’t been coping as well as usual
   3. O No, most of the time I have coped quite well
   4. O No, I have been coping as well as ever
7. I have been so unhappy that I have had difficulty sleeping:
   1. O Yes, most of the time
   2. O Yes, sometimes
   3. O Not very often
   4. O No, not at all

8. I have felt sad or miserable:
   1. O Yes, most of the time
   2. O Yes, quite often
   3. O Not very often
   4. O No, not at all

9. I have been so unhappy that I have been crying:
   1. O Yes, most of the time
   2. O Yes, quite often
   3. O Only occasionally
   4. O No, never

10. The thought of harming myself has occurred to me:
    1. O Yes, quite often
    2. O Sometimes
    3. O Hardly ever
    4. O Never
APPENDIX H: STAI-STATE

Please read each statement and circle the appropriate number to indicate how well you FEEL RIGHT NOW, that is, at this moment. There are no right or wrong answers.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Not at all</th>
<th>Somewhat</th>
<th>Moderately</th>
<th>Very much so</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I feel calm</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2. I feel secure</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. I am tense</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4. I feel strained</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. I feel at ease</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6. I feel upset</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7. I am presently worrying over possible misfortunes</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8. I feel satisfied</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9. I feel frightened</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10. I feel comfortable</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11. I feel self-confident</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12. I feel nervous</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>13. I am jittery</td>
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<td>2</td>
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<td>4</td>
</tr>
<tr>
<td>14. I feel indecisive</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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<tr>
<td>15. I am relaxed</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16. I feel content</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17. I am worried</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18. I feel confused</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19. I feel steady</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20. I feel pleasant</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
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</tbody>
</table>

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APPENDIX I: ELIGIBILITY ASSESSMENT

Inclusion Criteria

Does the mother meet the following criteria?

1. Singleton Birth
   1. O Yes
   2. O No

2. Term infant (37 weeks gestation or greater at delivery)
   1. O Yes
   2. O No

3. Initiated breastfeeding
   1. O Yes
   2. O No

4. Can read and speak English
   1. O Yes
   2. O No

5. Anticipate discharge of mother and infant together
   1. O Yes
   2. O No

Exclusion Criteria

Does the mother have any of the following?

1. Infant with congenital anomaly
   1. O Yes
   2. O No

2. Condition (mother or infant) that would interfere with breastfeeding
   1. O Yes
   2. O No

3. Infant in NICU for longer than 24 hours and discharge is not anticipated with mother
   1. O Yes
   2. O No
Assessment of Eligibility

1. Is the mother eligible to participate in the study?
   1. O Yes
   2. O No

2. Does the mother give consent to participate?
   1. O Yes
   2. O No

3. Mother randomized to:
   1. O Intervention group
   2. O Control group
APPENDIX J: PARTICIPANT CONSENT FORM

Improving Breastfeeding Outcomes: A Pilot RCT with Primigravidas

I am being invited to participate in the “Improving Breastfeeding Outcomes Trial.” This study is being conducted by Karen McQueen, RN, MA(N), in partial fulfillment of the requirements for the PhD in Nursing Science Degree at the University of Toronto. This study is being carried out under the supervision of Dr. Cindy-Lee Dennis, RN, PhD, Associate Professor in the Graduate Department of Nursing Science, University of Toronto. This study has received approval from the University of Toronto and Thunder Bay Regional Health Sciences Centre.

The research study and its procedures as outlined on the attached form have been explained to me and I have a copy. I have had the opportunity to ask questions and any questions I have had have been answered to my satisfaction. I am aware that participation in this study is voluntary and that I have a right to refuse or withdraw at any time period. My care and my baby’s care at this institution will not be affected by my decision to participate or not participate in this study. I understand that there are no anticipated risks involved for me to participate in this study.

I have been informed that all information provided in this study will be kept confidential, and all survey forms will be kept in a secured area for seven years. I have been assured that no information will be released or printed that would disclose my or my babies name. I understand that if I consent to participate I have the right to withdraw at any time. If I decide to withdraw or not participate my decision will not affect my care/my babies care or our relationship with the caregivers of this hospital. If I have any further questions about this study, I can contact the primary researcher, Karen McQueen, at 807-766-7124, the research supervisor, Dr. Cindy-Lee Dennis, at 416-946-8608, or the
research coordinator at Thunder Bay Regional Health Sciences Centre, Heather Poulter, at 807-684-6422.

I hereby consent to participate.

Signature of participant ________________________________

Print name ____________________________________________

Date _________________________

Signature of researcher _________________________________

Date _________________________
APPENDIX K: BASELINE QUESTIONNAIRE

As new mothers often have different goals and experiences, we would like to know more about you and your plans. The following questions ask about you, your labour and birth, sources of support and plans for infant feeding in the first 8 weeks. There are no right or wrong answers.

Please complete the following information so that we can keep in contact with you by telephone throughout the study.

YOUR NAME: ____________________________________________________
ADDRESS: _______________________________________________________
City:_____________________________________________________________
POSTAL CODE:___________________________________________________
PHONE NUMBER: _________________________________________________
EMAIL ADDRESS:_________________________________________________

This page will be removed following completion of the questionnaire and stored separately from all other forms in order to maintain your confidentiality. You will be given a code number, which will be used on all future questionnaires.

As people often move and can be difficult to follow, could you please give us the telephone number of two relatives or friends who will know your whereabouts if you move or change telephone numbers.

1. Relative/friend’s first name and telephone number:
   __________________________________________

2. Relative/friend’s first name and telephone number:
   __________________________________________
Demographic Data

Part A: The following information (questions 1-12) will be obtained from the participant’s medical record.

1. What is the mother’s date of birth? ________________________
2. What is the mother’s marital status?
   1. Married/common-law
   2. Single (never married)
   3. Divorced
   4. Separated
   5. Widowed
3. Does the mother smoke?
   1. Yes, number of cigarettes per day _________________________
   2. No
4. What is the infant’s date of birth? ________________
5. What type of delivery did the mother have?
   1. Vaginal birth
   2. Vaginal birth with vacuum extraction
   3. Vaginal birth with forceps
   4. Elective cesarean section (booked or scheduled in advance)
   5. Cesarean section with labour (emergency or unplanned)
6. Was the primary caregiver a midwife or doctor?
   1. Midwife
   2. Physician
   3. Both
7. What type of pain medications did the patient receive during labour?
   1. None
   2. Epidural
   3. Entonox
   4. Injection of pain medication (demerol, fentanyl). If yes, how many? ______
   5. General anesthetic
   6. Other _______
8. How long was the labour?
   1. O Less than 6 hours
   2. O 6-11 hours
   3. O 12-23 hours
   4. O 24 hours or more

9. Did any of the following happen to the mother during labour or birth? (*Circle all that apply*)
   1. O An intravenous drip or artificial rupture of membranes was done after labour had started
   2. O Excessive bleeding BEFORE the baby was born
   3. O Excessive bleeding AFTER the baby was born
   4. O Vaginal tear that needed stitches
   5. O Episiotomy
   6. O High blood pressure
   7. O Manual removal of the placenta
   8. O Meconium stained amniotic fluid
   9. O Other (please specify) ______________________
   10. O None of the above

10. Did any of the following happen to the baby after the birth? (Please circle all that apply)
    1. O Baby was admitted to the special care nursery/NICU reason:
       ______________________
    2. O Baby needed antibiotics
    3. O Baby had jaundice and needed phototherapy
    4. O None of the above

11. Were mother and infant separated after the birth?
    1. O Yes
    2. O No

12. How long were the mother and infant separated?
    1. O Briefly for assessment only
    2. O Less than 12 hours
    3. O Between 12 and less than 24 hours
    4. O More than 24 hours

PART B: The following information (questions 13-28) will be obtained from the mother.

13. How satisfied are you with the pain relief you received during labour?
    1. O Very satisfied
    2. O Satisfied
    3. O OK
    4. O Unsatisfied
    5. O Very unsatisfied
14. How long do you plan to breastfeed?
   1. O Longer than 6 months
   2. O Between 4 and 6 months
   3. O Between 2 and 4 months
   4. O Less than 2 months
   5. O I don’t know

15. What is the likelihood that you will meet the above duration of breastfeeding?
   1. O Very likely
   2. O Somewhat likely
   3. O Unsure
   4. O Somewhat unlikely
   3. O Very unlikely

16. Do you plan to:
   1. O Exclusively breastfeed (breast milk only; includes vitamins, minerals and medicines)
   2. O Almost exclusive breastfeeding (< 1 bottle/week of non-human milk)
   3. O High breastfeeding (more than 1 bottle/week of nonhuman milk)
   4. O Partial breastfeeding (1 bottle/day of nonhuman milk)
   5. O Token breastfeeding (breast is used for comfort)

17. When did you make the decision to breastfeed?
   1. O Prior to becoming pregnant
   2. O During the first trimester (up to 12 weeks)
   3. O During the second trimester (12-28 weeks)
   4. O During the last trimester (29 weeks to birth of infant)

18. How are you currently feeding your baby?
   1. O Breastfeeding only
   2. O Breastfeeding and supplementing with formula occasionally
   3. O Breastfeeding with formula supplementation at every feed

19. How is breastfeeding progressing?
   1. O Very well – only a couple, if any, minor difficulties
   2. O Good – a few minor difficulties
   3. O Satisfactory – some minor and/or major difficulties
   4. O Not well – several major difficulties
   5. O Terrible – many major difficulties

20. Were you breastfed as a baby?
   1. O Yes
   2. O No
21. Is your partner supportive of your breastfeeding?
   1. O Very supportive
   2. O Somewhat supportive
   3. O Somewhat not-supportive
   4. O Not supportive at all

   If not supportive, could you provide us with a few details about your situation?

________________________________________________________________________
________________________________________________________________________

22. List any significant others that are supportive of your breastfeeding (check all)
   1. O Mother
   2. O Mother-in-law
   3. O Friend
   4. O Sister
   5. O Other __________________

23. List any significant others that are not-supportive of your breastfeeding (check all)
   1. O Mother
   2. O Mother-in-law
   3. O Friend
   4. O Sister
   5. O Other __________________

   If not supportive, could you provide us with a few details about your situation?

________________________________________________________________________
________________________________________________________________________

24. Do you have another mother with children to talk to?
   1. O Yes
   2. O No

25. What is your highest level of education?
   1. O Elementary school
   2. O High school
   3. O Some college/trade school
   4. O Graduate of college/trade school
   5. O Some university (Undergraduate degree)
   6. O Graduate of university (Undergraduate degree)
   7. O Completed Graduate degree

26. Which of the following best describes you?
   1. O Caucasian
   2. O First Nations
   3. O Other
27. Were you born in Canada?
   1. O Yes
   2. O No  If no, where were you born? ________________________
       How long have you been in Canada? ________________

28. What is your annual household income before taxes?
   1. O $0 - $19,999
   2. O $20,000 – 39,999
   3. O $40,000 - $59,999
   4. O $60,000 - $79,999
   5. O $80,000 or more
APPENDIX L: LETTER OF EXPLANATION FOR REGISTERED NURSES

My name is Karen McQueen and I am going to be conducting a research study on the maternal-infant unit with primiparous mothers that are breastfeeding healthy, term newborns and discharge home is anticipated to be with the mother. This study is being conducted in partial fulfillment of the requirements for the PhD in Nursing Science Degree at the University of Toronto. The purpose of this study is to evaluate the usefulness of additional breastfeeding support compared to usual care on breastfeeding outcomes such as breastfeeding duration and breastfeeding exclusivity. Other pertinent data will be collected such as mothers’ intended duration of breastfeeding, difficulties experienced and maternal satisfaction with infant feeding.

Mothers will be randomly assigned (like a coin toss) to one of two groups. Mothers who are randomized to the “usual care group” will receive all components of the usual in-hospital maternal-infant care and follow-up. No care will be withheld. Mothers randomized to receive “additional breastfeeding support” will receive the same in-hospital care as all other breastfeeding mothers. In addition, a research nurse will visit the new mother in the hospital, twice for a short period of time to see how the mother is doing and identify any needs that she may have. The research nurse also will telephone the new mother at home within 1 week of discharge from the hospital to further assess her needs.

Your assistance would be greatly appreciated in assisting me to identify new mothers on the postpartum unit that may be eligible to participate in this study. First, verbal permission must be obtained from the new mother prior to me approaching them. Therefore, I will be asking the nurses to provide eligible new mothers with the
information letter and ask for permission for me to contact them for a short period to
discuss the study. Secondly, any questions pertaining to the study should be directed to
myself at 766-7124 or may be relayed on the unit.

The recruitment of participants will be conducted for a six month time period and
your assistance is greatly appreciated. As part of my appreciation for you taking the time
to discuss my study with new mothers I will have a monthly prize draw on the 4th Friday
of every month. Additionally, I will provide you with the results of this study when
completed. This would also be a great time to get your input for a larger trial to be
conducted in the future. If you have any questions or comments about this study, please
do not hesitate to contact me at 766-7124. I look forward to the commencement of
recruitment and working with you.

Sincerely,

Karen McQueen RN, MA(N)
APPENDIX M: LETTER OF EXPLANATION FOR PARTICIPANTS

You are being asked to participate in a study being conducted by Karen McQueen RN, MA(N) with first-time mothers who are breastfeeding. The purpose of this study is to learn more about extra breastfeeding support and how it may influence whether a mother continues to breastfeed or not. This study is being conducted to partially fulfill the requirements of a PhD in Nursing Degree with the Faculty of Nursing, University of Toronto. This study has received ethical approval from the University of Toronto and Thunder Bay Regional Health Sciences Centre. We would appreciate you taking the time to consider participating in this study.

If you are eligible and agree to participate, you will be asked to complete a questionnaire so that we may learn more about the participants in the study. You then will be randomly assigned to receive either standard postpartum care or standard postpartum care plus extra breastfeeding support. Randomization means that neither you nor the researchers choose which type of support you will receive, rather the type of support is chosen by random or by chance. The process of determining which type of study group you are randomized to is very important to be able to answer the research question of how helpful extra breastfeeding support may be.

If you are randomized to receive “standard postpartum care” you will receive all of the regular in-hospital nursing care that is provided to new breastfeeding mothers. You will also receive a call from a research assistant at 4 and 8 weeks after you enroll in the study and she will ask you questions about how you are feeding your baby, any difficulties you have experienced, your satisfaction with infant feeding and what health services you have used.
If you are randomized to receive “additional breastfeeding support” you will receive the same in-hospital care as all other breastfeeding mothers and telephone calls from the research assistant at 4 and 8 weeks. In addition, a research nurse will visit you in the hospital twice for a short period of time to see how you are doing and identify any needs that you may have and then telephone you at home within a week of discharge from the hospital.

Regardless of the group you are assigned, a few of the questions will ask about the presence of depressive symptoms. If you receive a high score on the depression scale, with your permission we will refer you to your family physician for follow-up. If you disclose at any time that you may harm yourself or your infant you will be referred for an emergency assessment. You may refuse to answer any question you are uncomfortable with. To maintain confidentiality, you will be assigned a code number so that your name will not appear on any of your questionnaires. In addition, all information will be kept in a locked filing cabinet and no identifying information will be used in any written report of the study. Only Karen McQueen and the research team members involved in this study will have access to the data. Your participation in this study will be kept completely confidential. A summary of research findings will be made available to you, if requested, at the end of the study.

You may refuse to participate in this study with no effect on your future use of health services. If you agree to participate you may withdraw from the study at any time. While you may not directly benefit from participating in this study, you will be providing information that will assist us in helping new breastfeeding mothers. There are no known risks to participating in this study.
If you have any questions or desire further information with respect to this study, you may contact the primary researcher, Karen McQueen, at 807-766-7124, the research supervisor at the University of Toronto, Dr. Cindy-Lee Dennis, 416-946-8608 or the research coordinator at Thunder Bay Regional Health Sciences Centre, Heather Poulter, 807-684-6422.
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APPENDIX O: WRITTEN MATERIALS

BREASTFEEDING

Early Start
- Put baby to the breast to nurse as soon as possible after birth.

How Often?
- Baby needs to nurse 10-12 times in 24 hours. The more you nurse, the more milk you will have.
- Frequent breastfeeding stimulates milk production. It is not true that resting the breasts results in more milk.

Latching On
- Sit back comfortably (don’t lean over baby).
- Support your breast with one hand.
- Place baby’s head in crook of elbow. Pull baby’s feet in close to your other side. Hold baby at level of breast.
- Baby’s face and body are turned toward mother.
- Tickle baby’s lower lip, wait for him to open wide.
- Pull baby closer to you when ready to latch on.
- Make sure that a large part of the areola is drawn into baby’s mouth.

Baby Needs Night Feeding
- Easily digested human milk passes quickly through the digestive system. This is why breastfed babies wake at night to eat.

Engorgement
- Cold compresses or cabbage leaves decrease breastfeeding, to reduce engorgement.
- Warm showers or compresses before feeding:
- Soften breasts by expressing some milk.
- Nurse often!

Colostrum
- Produced in first few days.
- Small in quantity (teaspoons, not ounces).
- Protects against infection.
- Clears meconium—Helps reduce jaundice.
- Satisfies baby’s thirst and hunger.

Sore Nipples
Remember: Correct positioning and latch-on are most important for preventing sore nipples.
- Break suction before taking baby off the breast.
- Offer the least sore breast first.
- Avoid plastic against nipples.
- Use only plain water for washing.
- Use an ultra pure, modified lanolin to speed healing.
- Check with an L.L. Leader for more help.

Blocked Duct
- If milk becomes blocked a tender lump may appear in the breast.
- Apply heat
- Get plenty of rest
- Nurse frequently
- Check positioning

Growth Spurts
- Baby may nurse more often at these to build milk supply. “Frequency days” often occur around 3 weeks of age.

Why No Bottles?
- Baby feeds from breast.
- Baby learns to know when he’s hungry.
- Baby learns to eat at breast.
- Baby learns to self-soothe.
- Baby learns to self-regulate.
- Baby learns to which is best for feeding.

Enough Milk?
After milk comes in:
- 6-8 wet diapers in 24 hours.
- 3-5 bowel movements per day mean baby is getting enough milk.

Milk Too Weak?
- Never! Milk changes throughout the feeding. Express one drop of milk before and after a feeding and see the difference. Foremilk is watery to satisfy thirst. hindmilk is creamier to satisfy hunger.

Too Much Milk
- Offer only one breast at a feeding.
- Offer the same breast if baby wants more soon after a feeding.
- Feeding against gravity may slow the flow.

Back to Work
- Find out about facilities at work for expressing and storing your milk.
- Stay with your baby as long as you can before starting work.
- Pump or express milk at work.
- Take milk home for the next day’s feedings.
- Frequent breastfeeding when at home.

La Leche League Canada
Box 29, 18C Industrial Drive
Chesterfield, Ontario KOC 1E0
Tel: 613-448-1842 • Fax: 613-448-1845
Email: haleche@ogs.net
www.lalecheleaguecanada.ca
Breastfeeding

GUIDELINES FOR CONSULTANTS

Observe the mother breastfeed her baby. This is the key to prevention and early identification of breastfeeding problems.

Assess positioning and proper alignment of the mother and baby. Ensure maternal comfort. Use pillows if necessary.

Assess the latch. The baby's mouth is wide open, the lips are flanged and the chin is pressed into the breast. Observe the baby swallowing.

Assess baby: number of wet and soiled diapers, mouth moist, eyes bright and alert, gaining weight and is generally healthy.

If nipple discomfort, decreased output, poor weight gain or other problems persist, reassess mom, baby, latch and feed, and consider referral to a physician.

METHODS TO INCREASE MOTHER'S MILK SUPPLY AND BABY'S INTAKE
- Correct latch and position
- Increase number of feeds
- Express milk after feeds

ACCEPTABLE MEDICAL REASONS FOR SUPPLEMENTATION
Babies with hypoglycemia that does not improve with increased effective breastfeeding.
Babies with dehydration that does not improve with increased effective breastfeeding.
Maternal medications that are contraindicated with breastfeeding (refer to Mothensk 416-813-6780 or www.mothensk.org).
Babies with inborn errors of metabolism such as galactosemia or PKU.
Babies who are unable to feed at the breast due to congenital malformation.
Babies and mothers who are separated due to severe illness or geographic separation.

ACCEPTABLE BREASTFEEDING SUPPLEMENTS
Best Choice: Expressed mother's breast milk
Second choice: Pasteurized donor breast milk
Third choice: Cow's milk formula
Fourth choice: Vegetable based formula such as soy

PROVIDING BREASTFEEDING SUPPLEMENTS
When supplementation is required, one of the following techniques may be used:
- Supplemental nursing device at the breast
- Cup, spoon, dropper or finger feeding
- Bottle feeding (last choice)

Continue to promote skin-to-skin contact as much as possible between the parents and the baby while supplemental feedings are in progress.
## Your Baby's Age

<table>
<thead>
<tr>
<th>Your Baby's Tummy Size</th>
<th>WEEK 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 DAY</td>
<td>2 DAYS</td>
</tr>
<tr>
<td>Size of a cooked chick pea or hazelnut</td>
<td>Size of a cherry or medium grape</td>
</tr>
</tbody>
</table>

### How Much Milk Your Baby Needs

**Per day, on average over 24 hours**

- **10 to 100 mL or 1 tablespoon to ½ cup**
- **200 mL or almost 1 cup**
- **400 to 600 mL or about 1 ½ to 2 ½ cups**
- **700 to 800 mL per day or about 2 ½ to 3 ½ cups**

### How Often Should You Breastfeed?

**Per day, on average over 24 hours**

- **At least 1 WET**
- **At least 2 WET**
- **At least 3 WET**
- **At least 4 WET**
- **At least 6 HEAVY WET**
- **At least 3 larger per day, dark and seedy YELLOW**
- **At least 1 larger every 3 to 7 days, bright Yellow**

### Wet Diapers:

**How Many, How Wet**

- **In the first month: 8 to 12 feeds per day (every 1 ½ to 3 hours)**
- **By about two months or less: 6 to 8 feeds per day**

### Soiled Diapers:

**Number and Colour of Stools**

- **Most babies lose about 5 to 7% of their birth weight in the first 3 to 4 days after birth.**
- **For example, a 3.2 kilogram or 7-pound baby will lose about 30 grams or ½ a pound.**
- **Your baby should return to his or her birth weight by 10 to 14 days.**
- **Your baby should gain about 112 to 226 grams a week for the first 3 months.**

### Growth Spurts

- **Babies often experience a sudden burst in growth—a growth “spurt”—at certain times within their first few weeks.**
- **During these growth spurts your baby may want to nurse more than usual.**

---

Breast milk is all the food a baby needs for the first six months — At six months of age begin introducing solid foods while continuing to breastfeed until age two or older.

BABY'S SECOND NIGHT

You've made it through your first 24 hours as a new mom. Maybe you have other children, but you are a new mom all over again...and now it's your baby's second night.

All of a sudden, your little one discovers that he's no longer back in the warmth and comfort - albeit a bit crowded - womb where he has spent the last 8 - 9 months - and it is SCARY out here! He isn't hearing your familiar heartbeat, the swooshing of the placental arteries, the soothing sound of your lungs or the comforting gurgling of your intestines. Instead, he's in a crib, swaddled in a diaper, a T-shirt, a hat and a blanket. All sorts of people have been handling him, and he's not yet become accustomed to the new noises, lights, sounds and smells. He has found one thing though, and that's his voice...and you find that each time you take him off the breast where he comfortably drifted off to sleep, and put him in the bassinet - he protests, loudly!

In fact, each time you put him back on the breast he nurses for a little bit and then goes to sleep. As you take him off and put him back to bed - he cries again...and starts rooting around, looking for you. This goes on - seemingly for hours. A lot of moms are convinced it is because their milk isn't "in" yet, and the baby is starving. However, it isn't that, but the baby's sudden awakening to the fact that the most comforting and comfortable place for him to be is at the breast. It's the closest to "home" he can get. It seems that this is pretty universal among babies - lactation consultants all over the world have noticed the same thing.

So, what do you do? When he drifts off to sleep at the breast after a good feed, break the suction and slide your nipple gently out of his mouth. Don't move him except to pillow his head more comfortably on your breast. Don't try and burp him - just snuggle with him until he falls into a deep sleep where he won't be disturbed by being moved. Babies go into a light sleep state (REM) first, and then cycle in and out of REM and deep sleep about every half hours or so. If he starts to root and act as though he wants to go back to breast, that's fine...this is his way of settling and comforting.

Another helpful hint...his hands were his best friends in utero...he could suck his thumb or his fingers anytime he was the slightest bit disturbed or uncomfortable. And all of a sudden, he's had them taken away from him and someone has put mittens on him! He has no way of soothing himself with those mittens on. Babies need to touch - to feel - and even his touch on your breast will increase your oxytocin levels which will help boost your milk supply! So take the mittens off and loosen his blanket so he can get to his hands. He might scratch himself, but it will heal very rapidly - after all, he had fingernails when he was inside you, and no one put mittens on him then!

By the way - this might happen every once in a while at home too. Don't let it throw you - sometimes babies just need some extra snuggling at the breast.

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Submitted to Parenting: Pueblos of Wisdom by Dr. David Cruz

North York General Hospital
Embracing Health
APPENDIX P: REFERRAL FORM FOR PHYSICIANS

Date: ________________________________________________

Client Name: __________________________________________

Date of Birth: __________________________________________

Dear _________________________________________________

(name of provider)

The above client has been participating in a research study at Thunder Bay Regional Health Sciences Centre regarding the provision of extra support and infant feeding outcomes. The participant was identified with:

☐ An Edinburgh Postnatal Depression Score of ______

☐ Positive score for self-harm

and has been referred to: 1) Yourself the primary care physician or midwife and/or 2) Emergency Services at the Thunder Bay Regional Health Sciences Centre for further care.

The participant has consented to the release of this information to you.

☐ Yes

☐ No

Thank you very much for your attention.

Sincerely,

__________________________________________
Karen McQueen, RN, MA(N)
Principal Investigator
Improving Infant Feeding Outcomes Trial
Tel: (807) 766-7124
APPENDIX Q: MATERNAL SELF-HARM DOCUMENTATION FORM

Date of session (year/month/day): □□□□/□□/□□
Participant’s ID number: □□-□□□□
Participant’s date of birth (year/month/day): □□□□/□□/□□

It takes a lot of courage for a new mother to admit to thoughts of self-harm. Any positive score should be taken seriously and the self-harm protocol initiated.

INSTRUCTIONS: If a mother scores positive (1, 2, or 3) on self-harm item # 10 on the EPDS, further assessment of the situation is required using the question template below. Please follow the appropriate protocol and complete the following form. Make sure to notify the Principal Investigator as soon as possible, either in-person or on the telephone about the events and course of action taken.

EPDS Item 10

<table>
<thead>
<tr>
<th>The thought of harming myself has occurred to me…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, quite often                          3</td>
</tr>
<tr>
<td>Sometimes                                 2</td>
</tr>
<tr>
<td>Hardly ever                               1</td>
</tr>
<tr>
<td>Never                                     0</td>
</tr>
</tbody>
</table>

1. Immediately assess further, using questions below. Is this an immediate risk to self or to infant?

   1. Do you have a suicide plan?  Yes □ No □
   2. Have you ever attempted suicide? Yes □ No □
   3. Do you think about suicide often Yes □ No □
   4. Are you alone with the baby? Yes □ No □
   5. Have you ever thought of harming your baby? Yes □ No □
   6. Is there a partner or close relative or friend that we can call? Yes □ No □

Immediate Risk of Self-Harm

Partner or support person present

1. Arrange for transportation to emergency
2. Follow protocol for contacting emergency
**Mother Alone**

1. Call 9-1-1
2. Obtain contact for partner if possible
3. Complete documentation

**Documentation**

EPDS score: □ □
Sent to emergency? □ Yes □ No
Was 9-1-1 called? □ Yes □ No

Questionnaire administered by: Principal Investigator □ Research Assistant □

Assessment Period Baseline □ 4-week □ 8-week □

Referral given: Community Mental Health □ Family Physician □
Postpartum Support Group □ Emergency □

Other comments/notes:
APPENDIX R: EMERGENCY DEPARTMENT REFERRAL PROCESS

- Phone the emergency department triage desk (684-6100) to inform them that a new mother is being referred for the Mental Health Assessment Team (MHAT) and is on route.

- Complete cover letter to the ER physician.

- Fax documentation to the triage desk at the ER (346-8113):
  - Cover letter to the ER physician
  - Edinburgh Depression Scale

Arrange for transportation of client to the ER.

Upon presentation to the ER, the client should be assessed by the ER Physician and a member of the Mental Health Assessment Team.

According to the PPD protocol, a referral to the Thunder Bay Mental Health Programs Common Intake should be made by the ER physician or MHAT team.

If the participant has a family physician or primary health care provider please send the notification of referral
APPENDIX S: PROTOCOL FOR DATA COLLECTORS IF A MOTHER INDICATES HARM TO INFANT

If a mother at any time discloses thoughts or plans to harm her infant the Principal Investigator needs to notified immediately and the infant self-harm protocol initiated.

Not an Immediate Safety Issue: If a Data Collector suspects that a mother may harm her infant, but the Data Collector feels that it is not an emergency situation, please notify the Principal Investigator, Karen McQueen, who will contact the research supervisor, Dr. Cindy-Lee Dennis, to discuss the situation as soon as possible.

Karen McQueen will inform the appropriate authorities when necessary (e.g., Children’s Aid Society, Public Health, the Police).

Immediate Safety Issue: If, however, a Data Collector suspects that a mother is harming or may harm her infant and feels that it is an emergency situation, remain on the (business) telephone line with the mother, and on a separate (business) telephone line, DIAL 9-1-1. Provide the mother’s home address to the operator when prompted. Wait on the telephone line with the mother until further support arrives.

Immediately after either one of the above described events (e.g., not an immediate safety issue vs. an immediate safety issue), please document the following information on the Infant Harm Documentation Form – Data Collectors (provided):

- your name
- the participant’s ID number
- the participant’s date of birth
- date of the assessment
- when you are collecting data from the participant (e.g., at baseline, 4 or 8 weeks postpartum
- the participant’s date of delivery
- the participant’s EPDS score
- date of when Karen McQueen and supervisor (Dr. Cindy-Lee Dennis) were contacted regarding the situation
- Karen’s recommendation (e.g., to note participant’s progress, to contact CAS, to dial 9-1-1, etc.)
- whether you, as the Data Collector, dialed 9-1-1
- other comments/notes

If you suspected infant harm and needed to dial 9-1-1, please notify the Principal Investigator, Karen McQueen, as soon as possible

Be sure to also provide a completed Infant Harm Documentation Form – Data Collectors following the event.
Infant Harm Documentation Form

INSTRUCTIONS: If you suspect infant harm, please follow the appropriate protocol and immediately complete the following form. Make sure to notify the Principal Investigator who will notify the PhD Supervisor as soon as possible either in person or on the telephone about the events and course of action taken.

Name of data collector:

Participant’s ID number: □□-□□□□

Participant’s date of birth: □□□□ (yyyy/mm/dd)

Therapy session number:

Date of telephone call: □□□□

Date of delivery: □□□□ (yyyy/mm/dd)

EPDS score:

Was the CAS contacted? □ Yes □ No

Was 9-1-1 called? □ Yes □ No

Other comments/notes: