Evaluating the Effectiveness of a Coparenting Breastfeeding Support Intervention (COSI) on Exclusive Breastfeeding Rates at Twelve Weeks Postpartum

by

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A thesis submitted in conformity with the requirements for the degree of PhD, Nursing Science

Lawrence S. Bloomberg Faculty of Nursing
University of Toronto

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Breastfeeding is the infant feeding method recommended by leading health authorities.
Breastfeeding rates in Canada are suboptimal. Fathers’ support for breastfeeding has been found to positively impact breastfeeding exclusivity and duration. Intervention studies have not been conducted to determine the best way to involve fathers and assist them in providing support to breastfeeding mothers. Therefore, a randomized controlled trial was conducted to evaluate the effects of a coparenting breastfeeding support intervention. Coparenting teaches parents to work in partnership towards meeting their jointly determined child health goals. The primary outcome was exclusive breastfeeding at 12 weeks postpartum. The secondary outcomes were breastfeeding duration, breastfeeding support, and coparenting at 6 and 12 weeks as well as paternal infant feeding attitude and breastfeeding self-efficacy at 6 weeks. First-time breastfeeding women (n=214) and the infants’ fathers were recruited on the postpartum unit. Parents were randomized to the usual care groups or the intervention group, which received standard postpartum care, plus a multifaceted support intervention. The intervention included an in-hospital discussion, take-home booklets, video, access to a secure study website, follow-up
emails, and a telephone call. All components of the intervention contained extensive information on breastfeeding and coparenting. The results of this study indicated that more mothers in the intervention group were exclusively breastfeeding at 6 ($n=75, 72.1\%$ compared to $n=62, 60.8\%$) and 12 weeks ($n=70, 67.3\%$ compared to $n=63, 60.0\%$) and practicing any breastfeeding at 6 weeks ($n=102, 98.1\%$ compared to $n=94, 92.2\%$); however, the differences were not significant. There were significantly more mothers in the intervention groups practicing any breastfeeding at 12 weeks ($n= 100, 96.2\%$ compared to $n= 92, 87.6\%$, RR $1.10$, 95% CI $[1.01, 1.19]$; $x^2=5.09$, $p=0.02$). No significant differences were found between the groups in relation to breastfeeding support, the coparenting relationship or paternal infant feeding attitude. However, the intervention group had a significantly greater increase in paternal breastfeeding self-efficacy over the first 6 weeks postpartum ($F=4.84, p=0.03$). This trial appeared to be feasible in the postpartum period and provides preliminary evidence suggesting this intervention may increase breastfeeding outcomes; however, more research is warranted.
Acknowledgments

I would like to thank my family, who made this possible and without whom I could not have achieved this degree. My husband provided me with daily support, assistance, and encouragement. My children were an inspiration to me and were very patient and understanding when I worked night after night at my computer. Thank you to my parents for reading my dissertation numerous times, Richard Dick for his support, and Andrew Dick who helped me create the intervention video and website. As well, thank you to all my family and friends who supported me along the way.

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CHAPTER ONE
INTRODUCTION

Leading health authorities such as the World Health Organization (WHO; 2001), Health Canada (2008, 2012), the Canadian Paediatric Society (2009), and the American Academy of Pediatrics (AAP; 2005, 2012) all recommend breastfeeding as the optimal feeding method for human infants. These recommendations suggest that infants be breastfed exclusively for the first 6 months of life and, once other foods have been introduced, continue to be breastfed until two years and beyond. These recommendations are based on a body of literature which provides compelling evidence that breastfeeding offers many health benefits for both mother and child (AAP, 2012; Horta, Bahl, Martines & Victoria, 2007; Ip et al., 2007)

Breastfeeding has a dose response effect, with increased benefits to breastfeeding women and their infants being proportionate to the extent of exclusive breastfeeding and the duration of breastfeeding. Research suggests that the longer and more exclusive the breastfeeding, the greater the health benefits (Kramer et al., 2003; Kramer & Kakuma, 2002; Raisler, Alexander, & O’Campo, 1999). Therefore, the recommendation has recently been changed to increase exclusive breastfeeding from 4 to 6 months of age (Health Canada, 2008).

Although the percentage of Canadian women initiating breastfeeding is high (90%), there is a sudden decline in exclusive breastfeeding in the early postpartum period: by 12 weeks, only 51.7% of Canadian mothers are exclusively breastfeeding (Public Health Agency of Canada, 2009), and this drops considerably, to less than 25% at 24 weeks (Statistics Canada, 2011, Health Canada, 2011). According to the Organization for Economic Co-operation and Development (OECD) this is consistent with other developed countries, in which the proportions of women exclusively breastfeeding are low. In the 18 countries for which the proportion of women exclusive breastfeeding at 12 and 24 weeks was reported: 7 countries had percentages lower than Canada, while 10 countries were higher (OECD, 2009). The suboptimal number of women exclusively breastfeeding indicates that breastfeeding mothers and their infants are not receiving the maximum benefits breastfeeding provides.

Risk factors related to premature cessation or supplementation of breastfeeding have been examined, and the causes have been found to be multifaceted (Dennis, 2002; Meedya, Fahy &
Kable, 2010; Thulier & Mercer, 2009). Maternal characteristics, which negatively impact breastfeeding include younger age, a lower education level, lower social status, and full-time employment. Other factors are related to physical difficulties with breastfeeding and lactation, including insufficient milk supply, sore nipples, engorgement, mastitis, and plugged ducts. Women who have positive prenatal intentions, positive attitudes, and high breastfeeding self-efficacy have better breastfeeding outcomes; support from professionals, partners, family, and friends can also positively impact breastfeeding (Dennis, 2002; Kehler, Chaput, & Tough, 2009; Meedya et al., 2010; Thulier & Mercer, 2009). The research indicates that most women are not meeting their breastfeeding goals due to difficulties encountered rather than maternal choice (Dennis, 2002).

Although there is a large body of research on support interventions designed to increase breastfeeding outcomes, due to the heterogeneity of the studies there is no conclusive evidence as to which interventions are most effective (Renfrew, McCormick, Wade, Quinn & Dowswell, 2012). When viewed collectively, support interventions, in general, positively impact breastfeeding outcomes. Additional research is needed to determine which components of support interventions are most effective in significantly influencing breastfeeding outcomes (Britton, McCormick, Renfrew, Wade & King, 2007; Chung, Raman, Trikolina, Lau & Ip, 2008; Renfrew et al., 2012).

One factor that is amenable to intervention and may influence breastfeeding outcomes and assist mothers in overcoming breastfeeding difficulties is paternal support. Paternal support is crucial to women’s breastfeeding experiences: many women report the father as the number one factor related to their breastfeeding success (Arora, McJunkin, Wehrer & Kuhn, 2000; Kong & Lee, 2004; Swanson & Power, 2005). Further, a lack of paternal support has been found to negatively impact both breastfeeding initiation and duration (Arora et al., 2000; Bar-Yam & Darby, 1997; 2001; Giugliani, Cai, Vogelhut, Witter & Perman, 1994; Litman, Medendorp & Goldfarb, 1994; Rempel & Rempel, 2004; Scott, Landers, Hughes & Binn, 2001; Shaker, Scott & Reid, 2004; Swanson et al., 2004).

Based on growing research, it has been recommended that fathers be included in breastfeeding interventions (AAP, 2005; Health Canada, 2007; RNAO, 2007). Including fathers in
interventions that are currently geared solely towards mothers would account for father-mediated effects on their infants’ health (Gearing, McNeill & Lozier, 2005).

However, breastfeeding intervention studies that have involved fathers have been limited. The strongest evidence comes from two studies that have evaluated support interventions delivered to fathers in the postpartum period (Pisacane, Continisio, Aldinucci, D’Amora & Coninisio, 2005; Susin & Giugliani, 2008). The limited evidence that these two studies provide does indicate that involving fathers in breastfeeding education may be an important factor to improve breastfeeding outcomes. These studies had methodological limitations suggesting further research is warranted to determine which type of interventions involving fathers will improve breastfeeding outcomes.

**Problem Statement**

Despite the recommendations for breastfeeding, only about 50% of Canadian mothers are exclusively breastfeeding at 12 weeks (Chalmers et al., 2009). The discontinuation of breastfeeding or supplementation with breast milk substitutes often takes place in the first few weeks postpartum as a result of breastfeeding difficulties (Chalmers et al., 2009; Sheenan, Krueger, Watt, Sword & Bridle, 2001; Sheehan, Watt, Krueger & Sword, 2006). The reasons for premature discontinuation and supplementation are multifaceted (Dennis, 2002; Thulier & Mercer, 2009). Although interventions aimed at increasing breastfeeding success have been implemented, the rates of exclusive breastfeeding remain suboptimal. Many of these interventions designed to increase breastfeeding outcomes have targeted solely breastfeeding women and their infants (Britton et al., 2007; Dennis, 2002; Kramer et al., 2001, Renfrew et al., 2012). Thus, these interventions have not examined the modifiable variable of paternal support. Fathers’ support is critical to women’s breastfeeding experiences and assists them in overcoming breastfeeding challenges, as the couple work together as a team to overcome difficulties. No randomized controlled trial has been conducted to assess the effectiveness of a coparenting breastfeeding support intervention delivered to both breastfeeding mothers and fathers.

Including fathers in breastfeeding interventions has been recommended by the American Academy of Pediatrics (2005), Health Canada (2007), and the Registered Nurses Association of Ontario (2007). The precise manner in which to best prepare fathers to support and assist breastfeeding mothers in overcoming breastfeeding difficulties has not yet been determined. The
purpose of this study was to evaluate the effect of the Coparenting Breastfeeding Support Intervention (COSI) on exclusive breastfeeding at 12 weeks postpartum. Secondary outcomes included breastfeeding duration, perceived breastfeeding support, and coparenting at 6 and 12 weeks postpartum, as well as, paternal breastfeeding self-efficacy and infant feeding attitude at 6 weeks.
CHAPTER TWO
LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

This chapter will review paternal support for breastfeeding women and the coparenting model, which will be used as the conceptual framework for the study. The literature review will include the evidence that supports the inclusion of fathers in breastfeeding interventions. The chapter will start with breastfeeding recommendations, rates, and risk factors to breastfeeding success. Literature regarding breastfeeding interventions will be reviewed and recommendations for future interventions will be examined. Information on fathers’ involvement with breastfeeding will then be presented. Past interventions that have focused on fathers and breastfeeding outcomes will be critically analyzed. Coparenting models, intervention, and measure will be reviewed. The coparenting framework and the manner in which it relates to breastfeeding will be illustrated. The chapter will conclude with the study’s purpose and research questions.

Breastfeeding Recommendations and Rates

Breastfeeding is the infant feeding method recommended by leading health authorities. The American Academy of Pediatrics (2005, 2012), Canadian Paediatric Society (2009), Health Canada (2008, 2012), and the World Health Organization (2001), all recommend that infants be exclusively breastfed to 6 months of age, with the continuation of breastfeeding up to 2 years and beyond, once other foods have been introduced.

In recent years there has been an increase in breastfeeding initiation rates in Canada from 25% in the mid 1960’s to 85% in 2003; this rate has currently increased to 90.3% of Canadian mothers (Chalmers et al., 2009; Public Health Agency of Canada, 2009). Nevertheless, Canadian exclusive breastfeeding rates decrease to 75% at 1 week, to 51.7% by 12 weeks postpartum, and 24.4% by 24 weeks postpartum (Chalmers et al., 2009; Public Health Agency of Canada, 2009; Statistics Canada, 2011). By 12 weeks almost half of Canadian mothers have introduced breast milk substitutes. (Al-Sahad, Lanes, Feldman & Tamim, 2010; Chalmers et al., 2009; Public Health Agency of Canada, 2009). This indicates that most breastfeeding women and their infants are not receiving the full health benefits that exclusive breastfeeding provides. In spite of the recent increases in breastfeeding initiation rates, the percentage of women who are
exclusively breastfeeding is problematic as there is a substantial gap between the recommendations and those adhering to this practice.

In the majority of cases in Canada, exclusive breastfeeding is discontinued early, with 21% of breastfed infants supplemented in the first week and 25.5% of infants supplemented in the second week (Chalmers et al., 2009; Public Health Agency of Canada, 2009). Additionally, discontinuation of any breastfeeding often occurs within the first weeks. Sheenan et al. (2001; 2006) conducted a two-phase study in which postpartum women in Ontario were surveyed at 4 weeks post-discharge to assess the effectiveness of a Universal Hospital Stay and Postpartum Home Visiting Program. They found many women had discontinued breastfeeding early in the postpartum period. The switch to formula had occurred by 4 weeks post-discharge in 18.5% (13.4%-24.3% range over 5 study sites) of their sample and in the first phase of their study and 16.4% (4.3%-18.6% range over 5 study cites) in the second phase of the study. Within the group of women in both studies who had discontinued by 4 weeks, 41% had discontinued by 1 week and 69% had done so by two weeks postpartum. This is consistent with other studies, which have found that a large percentage of early discontinuation occurs in the first two weeks of postpartum (Cooke, Sheehan & Schmied, 2003; Ertem, Votto & Leventhal, 2001; Hall et al., 2002; Matthews, Webber, McKim, Banoub-Baddour & Laryea, 1998). Thus, support for mothers in the early weeks of breastfeeding is necessary as this is the time in which most of the difficulties which lead to the cessation of exclusive breastfeeding occur.

**Benefits of Breastfeeding/Risks of Not Breastfeeding**

Breast milk is the ideal food for human infants, as it provides all essential nutrients for growth and development (Riordan, 2005). Breast milk compensates for the developmental delays in the immune system of the infant by providing protective agents, which are antimicrobial, anti-inflammatory and immunomodulatory (Labbok, Clark & Goldman, 2004).

Horta et al. (2007) conducted a systematic review and meta-synthesis to determine the long-term effects of breastfeeding and found protective effects on: (1) systolic blood pressure (mean difference -0.49; 95% CI [-0.87, -0.11]; estimates from 30 studies); (2) mean lower blood cholesterol levels among adults (-0.18 mmol/L (95% CI [0.06, 0.03] mmol/L; estimates from 9); (3) obesity (OR; 0.78; 95% CI [0.72, 0.84]; 39 estimates from 33 studies); (4) type 2 diabetes
(OR= 0.63 95% CI [0.45, 0.89]; estimates from 5 studies); and (5) intelligence levels (mean difference of 4.9 on the performance of intelligence tests (CI 95% [2.97, 6.92]; estimates from 8 studies). Kramer et al. (2008) had similar findings in relation to intelligence: formula feeding and lower rates of breastfeeding exclusivity and duration resulted in lower cognitive scores and academic rating at 6.5 years.

A large randomized trial (PROBIT), which was conducted with 17,046 mother-infant pairs in 31 sites in Belarus and found the intervention group had increased breastfeeding rates and decreased episodes of gastrointestinal tract infection (9.1% vs. 13.2%; adjusted OR, 0.06; 95% CI [0.40,0.91]; Kramer et al., 2001) as well there was a significant reduction in incidence of gastrointestinal disease in infants who breastfed for 24 weeks compared to those who breastfed for 12 weeks (adjusted incidence density ratio: 0.35 [0.13- 0.96] ; Kramer et al., 2003).

The Agency for Healthcare Research and Quality in the United States conducted a literature review to identify the benefits of breastfeeding for mothers and infants (Ip et al., 2007). They included 43 primary studies and 29 systematic reviews or meta-analysis, which incorporated approximately 400 studies. They found breastfeeding protects the infant against many illnesses and diseases. Bartick and Reinhold (2010) conducted a pediatric cost analysis for suboptimal breastfeeding in the U.S. using findings from Ip et al. (2007). They illustrated the difference in incidences of disease based on infant feeding method with the odds ratio in favour of breastfeeding between non-breastfed subjects and breastfed subjects. Their findings are presented in Table 1. Additionally Bartick and Reinhold (2010) used this data to conduct a cost analysis of these 10 diseases. The study concluded that if 90% of mothers exclusively breastfeed to 6 months, the U.S. would save 13 billion dollars a year in medical costs and prevent an excess of 911 deaths.
Table 1

*Decreased Odds of Specific Diseases Related to Breastfeeding*

<table>
<thead>
<tr>
<th>Illness</th>
<th>Breastfeeding duration</th>
<th>OR in favour of breastfeeding</th>
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<tr>
<td>Otitis Media</td>
<td>Exclusive Breastfeeding (EBF) and any breastfeeding versus exclusive formula feeding</td>
<td>0.77 for any breastfeeding</td>
</tr>
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<td></td>
<td></td>
<td>0.5 for EBF</td>
</tr>
<tr>
<td>Gastroenteritis</td>
<td>EBF 24 weeks</td>
<td>0.36</td>
</tr>
<tr>
<td>NEC</td>
<td>Exclusive breast milk for 12 weeks</td>
<td>Risk Ratio 0.42</td>
</tr>
<tr>
<td>Lower Resp tract infection</td>
<td>EBF 16 weeks</td>
<td>0.28</td>
</tr>
<tr>
<td>SIDS</td>
<td>Any breastfeeding for 24 weeks</td>
<td>0.64</td>
</tr>
<tr>
<td>Childhood Asthma</td>
<td>Any breastfeeding for 12 weeks</td>
<td>0.73</td>
</tr>
<tr>
<td>Childhood Lukemia</td>
<td>Any breastfeeding for 24 weeks</td>
<td>0.81 for ALL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.85 for AML</td>
</tr>
<tr>
<td>Type one diabetes</td>
<td>Any breastfeeding for 12 weeks</td>
<td>0.77</td>
</tr>
<tr>
<td>Childhood obesity</td>
<td>Any breastfeeding for 12 weeks</td>
<td>0.93</td>
</tr>
</tbody>
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EBF= Exclusive Breastfeeding  
ALL= Acute lymphocytic leukemia  
AML= Acute myelogenous leukemia  
(Bartick & Reinhold, 2010, p. e1051)

Breastfeeding is important to women’s health. Some reasons for this include (1) delayed menses (Kramer & Kahuma, 2002), (2) promotion of maternal weight loss (Health Canada, 2008; Kramer & Kakuma, 2002), and (3) reduced risk of type 2 diabetes and breast and ovarian cancers (Ip et al., 2007).
Contraindications to Breastfeeding

The breastfeeding recommendations are universal, except for a few exceptional circumstances. Contraindications to breastfeeding include (1) Human Immunodeficiency Virus (HIV) seropositivity (provided safe alternative is available), (2) Human T- Lymphotropic virus (HTLV) seropositivity, (3) substance abuse, (4) chemotherapy, (5) radio isotope therapy (until isotope has been eliminated from the mother’s body), (6) active TB (expressed milk can be given), (7) active varicella (expressed milk can be given), (8) active herpes lesion on breast, (9) Galactosemia, (10) Chagas’ disease (while in the active phase; AAP, 1995; Overfield, Ryan, Spangler & Tully, 2005), and (11) maple syrup urine disease (Huner, Baykal, Demir & Demirkol, 2005).

Factors Influencing Breastfeeding Outcomes

Many reasons have been identified as to why women do not initiate breastfeeding or discontinue early in the postpartum period. Some of these factors are related to non-modifiable risk factors such as, demographic variables, while some of these factors are modifiable and amenable to support interventions designed to increase breastfeeding duration and exclusivity.

Demographic variables related to women not choosing to initiate breastfeeding or prematurely discontinuing breastfeeding include being young, having less than 12 years of education, and having a lower income level (Callen & Pinelli, 2004; Dennis, 2002; Thulier & Mercier, 2009). Additional factors that decrease breastfeeding initiation, duration and exclusivity include returning to work or school, being obese, cigarette smoking, using medication, having had breast-alteration surgeries, having multiple infants, infant hospitalization, and unintended pregnancy (Ahuwalia, Morrow & Hsia, 2005; Dennis, 2002; Kirkland & Fein, 2003; Meedya et al., 2010; Thulier & Mercier, 2009).

Some of the modifiable risk factors related to women not choosing to initiate breastfeeding or premature discontinuation of breastfeeding include women having negative attitudes towards breastfeeding, low confidence in their ability to breastfeed (Dennis, 2002; Thulier & Mercer, 2009), and low breastfeeding intention (Meedya et al. 2009). The most common reasons for premature discontinuation of breastfeeding include perceived insufficient milk supply and physical complications which include sore nipples, mastitis, thrush, engorgement, clogged ducts,
latching problems, breastfeeding frequency, sleep disruption, and fatigue (Ahluwalia, Marrow, & Hsia, 2005; Dennis, 2002; Sheenan et al., 2001; Sheenan et al., 2006; Thulier & Mercer, 2009; Kirkland & Fein, 2003; Wright, Parkinson & Scott, 2006).

Primiparous mothers are particularly in need of interventions which support breastfeeding. Primiparity has been found to be a risk factor for decreased breastfeeding initiation and duration (Dennis 2002; Lathouer, Lionet, Body & Perrotin, 2004; Thulier & Mercer, 2009). First time mothers have more anxiety, which leads to decreased breastfeeding duration (Zanardo et al., 2009). Additionally, first time mothers are more likely to give complementary feeds in the first four weeks (Baxter & Cooklin, 2009).

Other factors identified by women as deterrents to breastfeeding success are disruptive maternity care practices. Breastfeeding practices such as late breastfeeding initiation, taking infants to a nursery, offering supplemental feeds, and providing hospital discharge gift packs that include free formula are known to decrease breastfeeding duration and exclusivity (WHO, 1998). Pacifier use has previously been thought to negatively impact breastfeeding outcomes; however, a recently published Cochrane Review found that among highly motivated mothers pacifier use does not negatively impact exclusive breastfeeding at three 12 weeks (RR 1.00; 95% CI [0.95, 1.06]) or 16 weeks of age (RR 0.99; 95% CI [0.92, 1.06]) or partial breastfeeding at 12 weeks (RR 1.00; 95% CI [0.97, 1.02]) or 16 weeks (RR 1.1; 95% CI [0.98, 1.03]; Jaafar, Jahanfar, Agolkar, & Ho, 2011). A limitation of this review is that it consisted of only two studies (n=1302) and one the studies consisted of only highly motivated mothers (n=1021) whose infants had regained their birth weight in 15 days (Jenik, Vain, Gorestein & Jacobi, 2009). The second study consisted of women who intended to breastfeed to 12 weeks (Kramer et al., 2001). Due to the fact that these mothers were highly motivated to breastfeed this may not be generalizable to the general population. While this review offers new knowledge and insight into this area, additional research is needed with a variety of breastfeeding mothers, including those who are not highly motivated.

The Baby Friendly Hospital Initiative, which is an evidenced-based movement to change hospital practices, has tried to address these issues. This initiative was started by the World Health Organization and UNICEF. The “Ten Steps to Successful Breastfeeding” is the gold standard of hospital care for breastfeeding mothers. These steps address hospital practices that
negatively impact breastfeeding (WHO, 1998). Although the “Baby Friendly” designation has been shown to be effective in increasing breastfeeding exclusivity and duration by eliminating the hospital practices known to be detrimental to breastfeeding (Kramer et al., 2001), barriers to its implementation remain in many hospital settings (Baby-Friendly USA, 2004; Batrick, Stuebe, Shealy, Walker & Grummer-Strawn, 2009). As of 2012, only 15 Canadian facilities outside of Quebec (Breastfeeding Committee for Canada, 2012a) and 20 facilities in Quebec (Breastfeeding Committee for Canada, 2012b) have the “Baby Friendly” designation.

One modifiable factor that has been identified as critical in influencing breastfeeding is support, the aid or assistance that mothers receive around breastfeeding. Lack of family and societal support negatively impacts breastfeeding initiation, exclusivity and duration (Dennis, 2002; Chung et al., 2008; Thulier & Mercer, 2009). Women who have more support from family and friends have better breastfeeding outcomes. Arora et al. (2000) surveyed 123 women in the U.S. and found that 90.9% of formula feeding mothers reported they may have breastfed with more support from family members. Sources of social support for breastfeeding women include their partners, the infants’ maternal grandmother, other female family members, friends, and peers with breastfeeding experience (Nelson, 2006). There are four types of support breastfeeding women receive: emotional (empathy and understanding), appraisal (validating the commitment to breastfeed), informational (assistance with information seeking and problem solving), and instrumental (tangible assistance with household and childcare tasks). These social support relationships are valuable, as the attitudes and beliefs about breastfeeding in women’s social network have been found to influence women’s breastfeeding experiences (Dennis, 2002; Thulier & Mercer, 2009). Research on social support and breastfeeding has indentified that paternal support is of particular importance to the mothers’ breastfeeding experience.

**Paternal Support Influences Breastfeeding**

Bar-Yam and Darby (1997) conducted a literature review on fathers and breastfeeding. They found that paternal support for breastfeeding is consistently identified as an important source of support for breastfeeding initiation and duration. They included 23 studies conducted from 1980-1995 in the United States, Canada, and Great Britain. The main findings from this review were that fathers play an important role in the decision to breastfeed, provide assistance at the first feed, and impact the duration of breastfeeding; moreover, their lack of support is a risk
Support from the infant’s father has been identified as the most important source of support for breastfeeding women (Arora et al., 2000; Bar Yam & Darby, 1997; Kong & Lee, 2004; Moore & Coty, 2006; Nelson, 2006; Swanson & Power, 2005; Tohotoa et al., 2010). Arora et al. (2000) surveyed 123 mothers in the U.S: of the mothers who breastfed, women indicated that the baby’s fathers’ feelings contributed to their breastfeeding (32.8%) more than any other factor. This factor was reported more often than nurses’ advice or opinion (29.9%) or than grandmothers’ or other family members’ feelings (23.5%). Swanson and Powers (2005) had consistent findings from their study of 203 mothers in Scotland. These women were followed up for 6 weeks postpartum. When asked how important views of different social referents were to them, both breastfeeding and bottle-feeding mothers rated fathers’ views the highest. Their views were rated higher than those of nurses, of their own mothers, or friends.

Qualitative studies with breastfeeding mothers reveal consistent findings. Tohotoa et al. (2010) found in their study with 76 Australian women that a main theme to emerge was “Dads do make a difference.” Mothers in this study stated “I could not have done it without him.” Moore and Coty (2006) interviewed 9 women in the United States and found that the participants often identified their husbands as the persons who were most supportive of their breastfeeding decisions. Nelson (2006) conducted a meta-synthesis of qualitative breastfeeding studies, representing a total of 15 studies and 247 participants. They found that by far, partners and mothers were listed as the most important source of both emotional and instrumental support during the first weeks of breastfeeding.

### Interventions to Improve Breastfeeding Outcomes

Renfrew et al. (2012) published a Cochrane review on support interventions designed to increase breastfeeding rates. They examined 52 trials, which included 56,000 mother-infant pairs from 21 countries. They found interventions in which health care professionals and/or lay individuals provided extra breastfeeding support (interventions provided in addition to routine care) to mothers increased the breastfeeding duration and exclusivity rates. When all studies, which included all forms of support, were analyzed collectively, the likelihood of stopping breastfeeding before 24 weeks was decreased (RR 0.91, 95% CI [0.88, 0.96]). The effect the
support interventions had on exclusive breastfeeding was even greater as women who received support were less likely to give up exclusive breastfeeding at 24 weeks (RR 0.86, 95% CI [0.82, 0.91]) and 4 to 6 weeks (RR 0.74, 95% CI [0.61, 0.89]; Renfrew et al., 2012).

When looked at separately, both professional and lay support interventions were effective in increasing breastfeeding. Support interventions provided by professionals were found to reduce the likelihood of the cessation of any breastfeeding up to 24 weeks, when compared to usual care (RR 0.93, 95% CI [0.88, 0.98]). When both lay and professional support were provided together in an intervention, this was effective in reducing cessation of any breastfeeding (RR 0.84, 95% CI [0.77, 0.92]) and exclusive breastfeeding (RR 0.76, 95% CI [0.44, 1.32]; Renfrew et al., 2012).

Renfrew et al. (2012) found that face-to-face support was more effective than telephone or mixed telephone and face-to-face support. Women were almost 20% less likely to have given up exclusive breastfeeding when they received face-to-face support (RR 0.81, 95% CI [0.75, 0.88]). However, no effect was found for the trials with predominantly telephone support (RR 1.00, 95% CI [0.99, 1.10]) or the studies with balanced telephone and face-to-face support (RR 0.98, 95% CI [0.94, 1.02]).

Britton et al. (2007) had previously conducted a similar Cochrane review and found the eight studies with interventions containing an antenatal element were not effective (RR 0.92, 95% CI [0.83, 1.02]), whereas twenty studies offering postnatal support alone were effective (RR 0.89, 95% CI [0.84, 0.96]). Renfrew et al. (2012) found there to be no differences between the studies that offered antenatal and postnatal support compared to postnatal support alone. Limitations of this review include (1) lack of methodological detail for several trials, (2) very diverse support interventions, and (3) different timing of study end-points. This may have impacted the analysis of pooled data (Renfrew et al., 2012).

The U.S. Preventive Services Task Force (Chung et al., 2008) conducted a systematic review of interventions to promote breastfeeding. They reviewed 36 trials conducted in developed countries. The interventions in this review included formal breastfeeding education, professional support and lay support, motivational interviews, delayed or discouraged pacifier use, and skin-to-skin contact. They concluded that these interventions increased rates of short-term (4-12 weeks) exclusive breastfeeding (rate ratio 1.28 95% CI [1.11, 1.48]) and long-term (24-48
weeks) exclusive breastfeeding (rate ratio 1.44 [CI 1.13, 1.84]) when compared to usual care, for trials conducted in developed countries (Chung et al., 2008). Although no conclusions could be made as to the most effective interventions, the authors did conclude that a multi-component intervention may be beneficial in increasing breastfeeding duration or exclusivity.

Although these systematic reviews have been conducted to evaluate the effectiveness of support interventions on breastfeeding outcomes, there is substantial heterogeneity across these intervention studies, which make it difficult to draw conclusions as to the most effective support interventions to increase breastfeeding duration and exclusivity. The interventions in these studies varied in a number of ways:

1. the time when delivered: prenatally, in the hospital in the immediately postpartum period, after discharged from hospital in the postpartum period, or a combination of these
2. delivered once or offered over an extended period, days, weeks, or months
3. delivered by a variety of trained personnel, including nurses or peers
4. used one or a combination of methods of support: individual education and counseling, group counseling, group education, medical clinic visits, breastfeeding clinic visits, home visits, telephone support, and hospital practices

Although there is heterogeneity in these studies, the fact that interventions are effective in increasing breastfeeding duration and exclusivity is clear. Renfrew et al. (2012) concluded that the varied international locations these studies were conducted in and heterogeneity of the interventions indicate that support interventions are robust across settings and populations and increase breastfeeding. Because these interventions included only breastfeeding women, there still remains a need to continue to identify new and innovative interventions to increase breastfeeding exclusivity and duration which include the infants’ fathers (Meedya et al., 2010).

In planning an intervention which includes fathers, additional factors need to be addressed. Two commonly identified issues found to negatively impact interventions including fathers are compliance and attrition (Laantera, Polkki, Ekstrom & Pietila, 2010; Salonen, Kaunonen, Astedt-Kuki, Jarvenpaa & Tarkka, 2008; Wolfberg et al., 2004). Delivering web-based interventions to fathers may increase their compliance and decrease attrition, as this method of delivery allows fathers to access information at their convenience.
Pate (2009) conducted a systematic review of the effectiveness of different breastfeeding intervention delivery methods. The review included 15 randomized controlled trials, and six quasi-experimental studies of which three interventions were web-based and 18 were provider based. In the analysis it was determined that the web-based interventions had a moderate effect on breastfeeding \((OR \ 2.2 \ 95\% \ CI \ [1.9, \ 2.7], \ d=0.5)\) and the provider-based interventions had little or no effect \((OR \ 1.1 \ 95\% \ CI \ [1.0, \ 1.2], \ d=0.03)\).

While all of the studies in this review did not include fathers, two studies which provided web-based interventions to fathers have been conducted. Fletcher, Vimpani, Russell and Keatinge (2008) conducted a study solely with fathers. They provided fathers with web-based information tailored to the role of partners and found that participants rated the information as satisfactory and 78% indicated it changed their approach to fathering. Additionally, Salonen et al. (2008) conducted a quasi-experimental study with parents of infants \((n=1300)\) in Finland. They provided mothers and fathers prenatally with access to a password protected website that consisted of information on parenting, breastfeeding, and infant care. These parents were compared with a group of parents who delivered at a different hospital and had not received the information. More mothers in the intervention group were exclusively breastfeeding in the hospital and their partners were more satisfied with the social support they received than those in the control group. However, the extent to which fathers used the website is unknown as only 40% of the fathers completed the follow-up questionnaires. Tohotoa et al. (2010) designed a breastfeeding intervention for fathers. The fathers in their study provided feedback that suggested adding web-based information would improve the intervention. Although to date there is little research with fathers, these studies provide preliminary evidence to suggest that web-based interventions may be effective in increasing fathers breastfeeding knowledge as well as decreasing attrition and increasing compliance; however, more rigorously conducted research is needed.

**Designing a Breastfeeding Intervention**

Dyson et al. (2009) conducted a review to develop policy and public health recommendations for breastfeeding promotion in developed countries. Their review consisted of a formal evaluation of the research evidence, as well as consultation with both professional and service users related to breastfeeding support. Based on this review they recommend interventions be designed and
packaged to meet the needs of the local population to which they will be delivered. Components of this package should include education and/or support programs, complementary telephone peer support, education and support from one professional (to increase consistency in the delivery of care), and education and support should be available throughout the first year.

Two qualitative meta-syntheses have been conducted, one exploring women’s experience with breastfeeding support interventions (Schmied, Beake, Sheehan, McCourt & Dykes, 2009) and another examining when a mother’s confidence in breastfeeding is undermined (Schilling Larsen, Hall, Aagaard, 2008). These studies provide additional information related to effective support interventions. Schmied et al. (2009) identified that authentic presence, which includes building a trusting relationship, demonstrating empathy, listening, and being responsive to the mother’s needs, is more effective when providing support than disconnected encounters, which are often discouraging, ineffective and counter-productive. Additional findings indicate continuity of care is important as it assists the supporter in building a relationship and rapport with the mother. A facilitative approach (enabling people to draw on a range of information or experiences to learn for themselves) was much more helpful than the reductionist approach (the analysis of something into smaller parts; oversimplifying something complex). Additionally, individualized care is preferred to standard care pathways. Mothers found when information is provided in a leaner-centered, realistic, detailed, and encouraging manner it is more effective. Further, information should be presented in a manner consistent with adult-learning principles and the educator should use person-centered communication skills. Finally, the relationships between the supporter and mother were found to be of importance. Mothers benefited from forming a trusting relationship with the supporter and this was best achieved when the same supporter was consistently available to the mother (Schmeid et al., 2009).

Schilling Larsen et al. (2008) identified that women’s breastfeeding confidence is affected by women’s expectations, their social network, and breastfeeding experts. Three discourses emerged in their analysis, breastfeeding is natural, the female body is a machine, and mothers are being cautioned about breastfeeding not working. Mothers were made to feel individually responsible for breastfeeding success and blamed for breastfeeding failure.

In summary, these reviews suggest an intervention which includes the following characteristics could be effective in increasing breastfeeding exclusivity and duration:
A postnatal intervention, which spans over the intrapartum and postpartum period; this may begin in the hospital and continue post discharge by way of telephone contacts or visits (Britton et al., 2007; Dyson et al., 2009)

A combination of methods for reviewing the information such as, discussion, video, and written material, as this is consistent with adult-learning principles (Chung et al., 2008; Schmeid et al., 2009)

A web-based component that allows parents access to valuable information and is available to parents over an extended period of time (Fletcher et al., 2008; Pate 2009; Tohotoa et al., 2010)

Information should be delivered in a way that does not make mothers feel solely responsible for breastfeeding success or failure, or that her body is a machine-like structure that can malfunction, fail, or breakdown (Schilling Larsen et al., 2008)

The same professional should deliver the intervention in order to provide consistent care and form a trusting relationship with the mother and father (Dyson et al., 2009; Schmeid et al., 2009)

When designing a breastfeeding support intervention it is also necessary to consider the feasibility of the intervention. Interventions that are easily implemented are needed to facilitate practice change in primary care settings. Many previously studied support interventions may not be feasible to implement, as they span over a long period of time, days to months, and require one or more trained personnel to deliver the intervention. Funds for such intensive interventions may not be available in many practice settings.

**Fathers Influence Breastfeeding Outcomes**

The recommendations that fathers should be included in supportive interventions for breastfeeding are based on research findings indicating two main themes related to fathers and how they impact breastfeeding outcomes: (1) paternal attitudes and knowledge, and (2) paternal provision of support. The body of literature that illustrates the impact that paternal attitude and support has on breastfeeding comes from a number of countries, including Canada, (Rempel & Rempel, 2004) United States (Arora et al., 2000; Chezem, 2012; Giugliani et al., 1994; Kessler, Gielen, Diener -West & Paige, 1995; Littman et al., 1994; Sullivan, Leathers & Kelley, 2004),
Australia (Scott, Bin & Aroni, 1997; Scott et al., 2001), Hong Kong (Kong & Lee, 2004), Scotland (Shaker et al., 2004; Swanson et al., 2004), and Turkey, (Taspinar, Coban, Kucul, & Sirin, 2012). Many of these observational studies have been conducted with mothers in the prenatal period (Shaker et al., 2004; Kessler et al., 1995; Rempel & Rempel, 2004; Sullivan et al., 2004) or early in the postnatal period, while still in the hospital (Giugliani et al., 1994; Littman et al., 1994; Kong & Lee, 2004; Scott et al., 1997; Scott et al., 2001). One study contacted mothers when their child was 6 months to 3 years. (Arora et al., 2000). Two studies collected information from fathers of newborns (Taspinar et al., 2012; Voss et al., 2004), while others collected information from both mothers and fathers or fathers only in pregnancy (Freed, Fraley & Schanler, 1992; Chezem, 2012; Kessler et al., 1995; Shaker et al., 2004; Sullivan et al., 2004; Rempel & Rempel, 2004). All these studies examined factors that promoted breastfeeding (Arora et al., 2000; Kong & Lee, 2004; Scott et al., 2001) or parental attitudes and infant feeding decisions (Giugliani et al., 1994; Kessler et al., 1995; Littman et al., 1994; Shaker et al., 2004; Swanson et al., 2004; Chezem, 2012; Taspinar et al., 2012). Although the majority of these studies were cross-sectional surveys, some of them prospectively followed the mothers into the postpartum period (Kessler et al., 1995; Scott et al., 2001; Sullivan et al., 2004; Swanson et al., 2004; Rempel & Rempel, 2004). Additionally, qualitative studies with both breastfeeding women and their partners have provided additional information on the importance of fathers to the breastfeeding experience (Goodman, 2004; Moore & Coty, 2006; Nelson, 2006; Nickerson, Sykes & Fung, 2012; Sherriff & Hall, 2011; Tohotoa et al., 2010). Due to their observational and qualitative designs, these studies do not provide sufficient evidence that paternal support significantly increases breastfeeding initiation and duration rates. However, the consistent positive findings are important and additional research is warranted.

**Paternal Attitudes and Breastfeeding Intentions**

Women’s breastfeeding intentions have been found to be positively influenced by the supportive attitude of the father towards breastfeeding (Kessler et al., 1995; Kong & Lee, 2004; Rempel & Rempel, 2004; Scott et al., 1997). Kessler et al. (1995) conducted a study with 133 women and their significant others (71% were fathers) in the U.S. They found that the maternal intention to breastfeed was associated with the significant others’ preference for breastfeeding vs. bottle-feeding ($OR= 58.82$, 95% CI [47.82, 69.82]). Rempel and Rempel (2004) conducted a study in
Canada with 317 first time mothers. They found that women’s prenatal perception of their partners’ approval significantly predicted their prenatal breastfeeding intentions ($B=0.20$, $R^2=0.04$, $p<0.05$). Kong and Lee (2004) conducted a study in Hong Kong with 230 first time mothers 24-48 hours after delivery. They found that mothers indicated fathers’ advice for breastfeeding was ranked the second most important factor to influence feeding intention, second to mothers’ own decisions. Scott et al. (1997) also found in their sample of Australian women ($n=556$) that the most important factor influencing mothers’ decision to breastfeed was the maternal perception that their partners preferred breastfeeding.

**Paternal Attitudes and Breastfeeding Initiation**

Paternal attitudes influence breastfeeding initiation. A study conducted in the prenatal period in Scotland found fathers ($n=108$) of breastfed infants had significantly higher attitude scores towards breastfeeding than those of formula fed infants (62.7±7.6% vs. 55.1±8.8, $p<0.001$; Shaker et al., 2004). Guigliani et al. (1994) conducted a study with breastfeeding ($n=100$) and formula feeding ($n=100$) mothers in the U.S. and found 98% of the breastfeeding group reported the fathers had a favourable attitude towards breastfeeding and this was the most important factor related to breastfeeding ($OR$ 32.8). Scott et al. (1997) found in their sample of Australian women ($n=556$), that the women who perceived that their partners had a preference for breastfeeding were 10 times more likely to initiate breastfeeding than women who stated their partners either preferred bottle-feeding or were ambivalent ($OR = 10.18, 95 \% CI [4.42, 23.42]$). Littman et al. (1994) found that in their sample of 115 U.S. mothers, one of the only factors that significantly contributed to their breastfeeding initiation was the fathers’ approval of breastfeeding; when there was a strong approval of breastfeeding 75% of mothers were totally breastfeeding and 98.1% were at least partially breastfeeding and if the father was indifferent towards the feeding method only 26.9% of mothers breastfed ($p<0.001$). Kong and Lee (2004) found that mothers’ perception of fathers’ infant feeding perception had a major influence on the mothers. Of the fathers who wanted their babies to be breastfed, 57% had fully breastfed infants, while 14.4% were mixed-feeding. Kappa statistical analysis (0.4, $p<0.001$) demonstrated that there was significant agreement between fathers’ preference and actual feeding method.

Additional studies that followed mothers into the first week had consistent findings. Scott et al. (2001) conducted a study in Australia ($n=1059$), to determine the determinants of initiation and
duration of breastfeeding. They found that at discharge, breastfeeding was most strongly associated with paternal support (adjusted OR 9.13, 95% CI [4.83, 17.26]). Additionally, Swanson and Powers (2005) found that mothers who breastfed perceived their partners to be more pro-breastfeeding in the early postpartum period than partners of bottle-feeding mothers, as indicated by scores on a breastfeeding belief scale (M 6.0, SD 1.2 vs. M 3.4, SD 1.4, 95% CI [-3.0, -2.3], p<0.001). Kessler et al. (1995) found that mothers were more likely to be breastfeeding at one week if their significant other preferred this method of feeding (adj OR 66.70, 95% CI [64.1, 69.3]).

**Paternal Attitude and Breastfeeding Duration**

Paternal positive breastfeeding attitudes impact breastfeeding duration (Rempel & Rempel, 2004; Scott et al., 2001; Sullivan et al., 2004; Swanson & Powers, 2005). Scott et al. (2001) found that women who perceived their partner to prefer breastfeeding were less likely to stop breastfeeding at any time (RR= 0.58, 95% CI [0.45-0.75]). Swanson and Powers (2005) found that the mothers who were breastfeeding at the 6 week follow-up rated their partners normative breastfeeding beliefs scores higher than those who were not breastfeeding (M 5.7 SD 1.5 vs. M 3.5 SD 1.5, 95% CI [-2.9, -1.5]; p<0.001). Rempel and Rempel (2004) found men’s approval of breastfeeding predicted women’s 36 weeks breastfeeding behaviours (B=0.52 R² = 0.27, p<.001). Sullivan, Leathers and Kelly (2004) found that in their sample of 115 primiparous women in the U.S. that fathers who had prenatal breastfeeding plans to have their infant exclusively breastfed (n=53) were more likely to have their child breastfeed longer. The hazard of early breastfeeding cessation was 46% greater for the women whose partner did not have exclusive breastfeeding plans; they had more than double the odds of early cessation (1/0.46, or 2.2 times). For more details on these studies on paternal attitude and breastfeeding see Appendix A.

**Paternal Attitude and Bottle-feeding**

When women know or perceive the fathers’ attitudes are unsupportive of breastfeeding, they are more likely to bottle feed (Arora et al., 2000; Kong & Lee, 2004; Swanson et al., 2004). Arora et al. (2000) found that 35% of mothers indicated that the most significant factor for initiating bottle-feeding was the mother’s perception of the father’s attitude, and this was the most frequently chosen factor. Of the bottle-feeding women, 80.0% reported that support from the
father would have encouraged them to breastfeed. Kong and Lee (2004) found that of the fathers who wanted their infants to be bottle-fed ($n=33$), 63.6% of mothers chose this method of feeding ($\chi^2=22.847$, $d.f.=4$, $p<0.001$). Swanson and Power (2005) found that fathers who had scores on an infant feeding beliefs scale that favoured bottle-feeding as the normative behaviour were more likely to have babies who were bottle-fed at baseline ($M=2.7$, $SD=1.4$ vs. $M=4.5$, $SD=1.6$; 95% CI [1.3, 2.1], $p<0.001$) and at the 6 week follow-up ($M=3.1$, $SD=1.8$ vs. $M=4.7$, $SD=1.2$; 95% CI [0.83, 2.3], $p<0.001$).

**Paternal Breastfeeding Knowledge**

Father’s breastfeeding knowledge impacts their attitude. Although many fathers report breastfeeding is the more natural choice (Chezem, 2012; Sherriff and Hall, 2011; Mitchell-Box & Braun, 2012), they often lack information about the benefits of breastfeeding. Laantera, Pietila and Pokki, (2010) surveyed 123 mothers and 49 fathers prenatally in Finland and found fathers had significantly less breastfeeding knowledge than mothers in the following areas: how to increase lactation, sufficiency of breast milk in hot weather, sufficiency of breast milk for 16 weeks after birth, and breastfeeding and alcohol consumption. Chezem (2012) found fathers had less information than mothers regarding the disease protection breastfeeding provides. Pollock, Bustamanet-Forest, and Giarratano (2002) surveyed a culturally diverse sample of 100 men in the U.S. who had accompanied a woman to an obstetric/gynaecological clinic appointment and found half of the men were not aware of immunological properties and had misconceptions about breastfeeding. Fathers who do not favour breastfeeding often have misconceptions about breastfeeding, which include beliefs that breastfeeding should not occur in public (Avery & Magnus, 2011; Freed et al., 1992; Henderson, McMillian, Green, & Renfrew, 2011; Sharma & Petosa, 1997; Mitchell-Box & Braun, 2012), breastfeeding is bad for breasts, breastfeeding will negatively impact the couple’s sex life (Freed et al., 1992; Henderson et al., 2011; Sharma & Petosa, 1997), and breastfeeding is difficult and risky, while formula feeding is safe and easy (Henderson et al., 2011).

**Paternal Breastfeeding Confidence**

Fathers frequently report being insufficiently prepared to assist with breastfeeding (Deave, Johnson, & Ingram, 2008; Goodman, 2004; Pontes, Alexandrino & Osorio, 2008; Sherriff &
Hall, 2011; Tohotoa et al., 2009). Additionally, fathers reported feeling inadequate, as they are unable to calm their breastfed infant (Goodman, 2004; Mitchell-Box and Braun, 2012). Mitchell-Box and Braun (2012) found fathers felt like the “third wheel” in the mother infant dyad. They were particularly troubled when breastfeeding difficulties were experienced and they did not know how to help or support their partner. Paternal feelings of guilt and being frustrated when unable to provide breastfeeding assistance has been associated with breastfeeding discontinuation, as switching to formula was perceived to be an easier option (Sherriff & Hall, 2011; Mitchell-Box & Braun, 2012). Furthermore, this lack of confidence in breastfeeding may negatively impact parenting self-efficacy (Goodman, 2004). This has not been previously studied; however, de Montigny, Lacharite and Devault (2012) conducted a study with fathers (n=164) in Quebec to determine if breastfeeding was related to paternal self-efficacy. They found paternal self-efficacy was not related to paternal positive perception of the breastfeeding experience, yet, it was related to father involvement (B=0.21, p<0.01). The fathers who were more involved had more confidence.

**Paternal Provision of Support**

Breastfeeding mothers rely heavily on fathers’ encouragement and support (Kong & Lee, 2004). Numerous studies have identified paternal support as a significant factor in breastfeeding success; if the father is supportive of breastfeeding, mothers are more likely to continue (Bar-Yam & Darby, 1997; Thuiler & Mercer, 2009; Dennis, 2002; Giugliani et al., 1994; Shaker et al., 2004; Tohotoa et al., 2009). Kong and Lee (2004) analyzed qualitative data from Chinese mothers (n=26) and found that the majority of mothers agreed that encouragement and support from their husbands was important to breastfeeding. Fathers can provide different types of support, which have been linked to improved breastfeeding outcomes. This is also the case in situations where mothers are pumping their breast milk, such as with very-low-birth weight preterm babies; in these situations, paternal support is also critical to lactation success (Sweet & Darbyshire, 2009).

Fathers appear to work in partnership with mothers toward achieving breastfeeding success. The concept of couples working together in relation to breastfeeding was illustrated in the study conducted by Rempel and Rempel (2010). This qualitative study explored what it is like to be the father of a breastfed baby and the role that fathers play in breastfeeding families. The core
theme determined in this study was ‘the breastfeeding team’. The fathers saw breastfeeding as a team endeavor and themselves as having a supporting cast member role, while the mother had the starring role. They worked in tandem with the mother to provide the best for their child and made an important contribution to breastfeeding in their own right. The types of support fathers provide include informational, instrumental, emotional and appraisal.

**Informational Support**

Informational support refers to fathers providing assistance with breastfeeding and lactation management. This support can be provided by the father in many ways, which include (1) providing assistance around attachment and positioning, which can be valuable to the mother who may not remember advice previously given by health care professionals (Rempel & Rempel, 2010; Nickerson et al., 2012; Tohotoa et al., 2009); (2) researching for information on the internet in order to assist with problem solving around breastfeeding challenges (Tohotoa et al., 2009); (3) giving advice, suggestions, and feedback to the breastfeeding mother; (4) monitoring the infant’s output, as well as the mother’s comfort level, during feeds; and (5) assisting with identifying and seeking help from available resources for breastfeeding difficulties and challenges. Research shows educating fathers in breastfeeding and lactation management increases their breastfeeding knowledge as well as their ability to provide informational support to breastfeeding women and assists with problem solving around breastfeeding challenges (Pisacane et al., 2005; Susin, Giugliani, Kummer, Marciel, Simon, da Silveira, 1999). Pisacane et al. (2005) conducted a randomized controlled trial in Italy and found that fathers who had received a breastfeeding intervention, which included information on ways fathers can assist with breastfeeding problems, were able to provide mothers with relevant help with breastfeeding and assisted them in overcoming breastfeeding difficulties. Susin and Giugliani (2008) found 93.3% of mothers said they would like help from their husband/partner with breastfeeding and 99.2% of the fathers said they wished to help mothers during this period; however, 21.5% indicated they did not know how to help. It is, therefore, important to educate fathers so that they can provide informational support to mothers.
Instrumental Support

Instrumental support is tangible assistance with tasks and physical help with chores. When fathers share in or take on additional domestic responsibilities, they are providing instrumental support, and this has been noted as an important factor in achieving breastfeeding success (Nickerson et al., 2012; Pontes, Osorio & Alexandrino, 2009; Smith, Jamerson, Bernaix, Schmidt & Seiter, 2006; Voss, Finnis & Manners, 1993). Voss et al. (1993) surveyed fathers ($n=113$) in the United Kingdom. The fathers reported the ways they helped with infant feeding were to keep other children occupied (43%) or complete housework in order to give mothers more time to feed (21%). Pontes et al. (2009) conducted a qualitative study with women ($n=9$) and men ($n=11$) in Brazil. The participants indicated that some of the ways fathers can be included in the breastfeeding process is by providing a favourable environment for the mother and baby, helping with domestic chores, and being present during breastfeeding. Smith et al. (2006) conducted a qualitative study with fathers ($n=16$) who had hospitalized premature infants. These fathers indicated that the supportive behaviours included: cleaning house, cooking meals, ensuring mothers drank fluids and ate, assuming other daily chores, caring for/playing with other children, providing mothers with words of encouragement, praising mothers for their lactation efforts, and reinforcing instructions. Rempel and Rempel (2010) found some of the fathers in their qualitative study saw taking on the task of cooking as a way of ‘refueling’ the mother while she gives nutritionally to their baby. Taspinar et al. (2012) included 203 Turkish fathers in their study and found 88.7% of the fathers were happy to help with the housework so that their wives could breastfeed. Nickerson et al. (2012) found fathers attended to household tasks so that the mothers could breastfeed without being worried about housework. Susin and Giugliani (2008) found that 64.9% of mothers in their study indicated they would like their partners to help with household chores and childcare, yet only 37.2% of these fathers cited these tasks as a way to support breastfeeding.

Lack of instrumental support has been found to be related to decreased breastfeeding exclusivity and duration. A study by Sullivan et al. (2004) found that women who are responsible for the majority of the household tasks were more likely to discontinue breastfeeding prematurely (12-18 weeks postpartum) than those who received assistance with these tasks. In a qualitative study conducted with women in the UK ($n=19$), having fathers take part in childcare was reported as
one of the reasons some women choose not to breastfeed, as these women indicated bottle-
feeding would allow the father to share in the childcare workload (Earle, 2000). This desire to
have fathers involved and part of the childcare experience confirms the need to teach fathers how
to be involved with their breastfed infant in ways other than feeding the baby a bottle, as giving
the baby a bottle may negatively impact breastfeeding (WHO, 1998).

When the childcare and household tasks are not shared to the degree expected by either parent,
this can lead to a strain in the relationship. Of particular concern is when mothers perceive
inequality in relation to task performance by the father (assistance with childcare tasks is less
than the mother perceives as fair). This has been found to result in decreased marital quality
(Feinberg, 2003). Hildingsson, Tihgvalll and Rubertsson (2008) found nearly half (45%,
\( n=1060 \)) of the Swedish new mothers in their study (\( N=2340 \)) were not satisfied with their
partners’ participation in childcare and household chores one year after the birth.

**Marital Relationships and Breastfeeding**

Marital relations and satisfaction may also be important to breastfeeding success, as Sullivan et
al. (2004) found in their study of mothers and fathers in the US (\( n=115 \)) that decreased marital
satisfaction and increased marital distress are related to early breastfeeding cessation. They
found that higher relationship distress was predictive of early breastfeeding cessation. Although
this was not significant individually (\( p=.07 \)), when the four variables were added into a nested
model with (1) inadequate support, (2) number of household tasks and (4) number of childcare
tasks the mother always does, this block of variables was highly significant (Change in -2 log
likelihood= 24.13, 4 df, \( p<.001 \)). Garcia Falceto, Giugliani and Fernandes (2004) found that in
their sample of 118 Brazilian couples with 16 weeks old infants that fathers who were in good
relationships or relationships with minor problems showed more support for breastfeeding (\( OR =
3.2, 95\% CI [1.3, 8.0], p=.01 \)) and were more actively involved with their infants’ care (\( OR= 4.8,
95\% CI [2.0, 11.7], p=<.001 \)) than those in relationships with moderate or severe problems.

Quinlan and Quinlan (2008) examined couples relationships and cross-cultural trends in
breastfeeding, using data from 74 countries, and found children tended to wean about 5 months
earlier in societies where divorce was common. The authors argue that fathers’ provision of
instrumental support is important to breastfeeding success, as it allows mothers the time and
energy needed to breastfeed. This is consistent with findings from Callen and Pinelli (2004),
who conducted a review of 22 studies to analyze the factors related to breastfeeding incidence and duration of term infants in Canada, United States, Europe, and Australia and found being married to be one of the demographic characteristics consistently reported among women with increased breastfeeding initiation and duration rates.

**Appraisal Support**

Appraisal support is provided when fathers validate the mothers’ experience and decision to breastfeed, as well as give encouragement and praise for breastfeeding (Kingston, Dennis & Sword, 2007). When fathers have a positive attitude towards breastfeeding (Guigliani et al., 1994; Shaker et al., 2004; Swanson et al., 2004), are part of the infant feeding decision making (Kong, & Lee, 2004, Littman et al., 1994; Sharma & Petosa, 1997; Swanson & Powers, 2004), value and accept the mothers’ commitment to breastfeed, and trust that the mother is doing the best thing for their baby by breastfeeding, (Rempel & Rempel, 2010; Tohotoa et al., 2009; Nickerson et al., 2012) they are providing appraisal support. Other ways in which fathers provide appraisal support are by advocating for breastfeeding, and defending the mothers’ breastfeeding in situations where health care professionals, friends, or family suggest formula, as well as encouraging and supporting mothers’ breastfeeding in public (Rempel & Rempel, 2010; Tohotoa et al., 2009; Nickerson et al., 2012). In a study of 400 mothers conducted in Lao People’s Democratic Republic, fathers’ encouragement of breastfeeding (OR 9.03, 95% CI [1.21, 67.57]) and inter-spousal communication (OR 5.20. 95% CI [2.34,11.56]) were found to be factors influencing exclusive breastfeeding to 24 weeks (Putthakeo, Ali, Ito, Vilayhong & Kuroiwa, 2009). Additionally, Ingram, Johnson, and Greenwood (2002), found that social encouragement from partners increased breastfeeding at 6 weeks OR 3.25 (95% CI, [1.95, 5.42], p<0.0001).

**Emotional Support**

Emotional support involves communicating information that is valuable to the mothers’ self-evaluation; it provides affirmation of emotions, cognitions, and behaviours and fosters feelings of acceptance, being cared for, admired, listened to, shown affection, empathized, respected, and valued (Dennis & Ross, 2006). Emotional support is provided through empathic listening and caring interactions (Kingston et al., 2007). Qualitative studies of fathers supporting mothers with breastfeeding have found that acts of affection and kindness given to mothers by fathers during
times of breastfeeding difficulty to be very helpful (Rempel & Rempel, 2010; Tohotoa et al., 2009; Nickerson et al, 2012). Rempel and Rempel (2010) found in their qualitative study with Canadian fathers of breastfed infants (n=21) that being understanding of the difficulties and demands of breastfeeding for the mother, as well as letting her vent and express her frustrations during difficult times, is a way fathers provide emotional support for breastfeeding. This support has been identified as an important factor in overcoming breastfeeding difficulties (Moore & Coty, 2006; Rempel & Rempel, 2010; Nickerson et al., 2012). Moore and Coty (2006) found that women indicated that the emotional support they received from their husbands helped them to stick with breastfeeding and not give up easily when faced with difficulties. Nickerson et al. (2012) conducted a qualitative analysis in the U.S. and found women (n=19) identified their partners providing emotional support and encouragement as a major factor in achieving breastfeeding success. They reported needing their husbands to be “cheerleaders” to help support and encourage them with breastfeeding.

**Paternal Desire to be Involved with Breastfeeding**

Most men want to be involved in making the infant feeding decision. A study conducted by Pollock et al. (2002) found 68% of the men agreed that the decision to breastfeed should be made by both parents, 81% indicated they wanted their child to be breastfed, and 96% of the men would support their partner if she wanted to breastfeed. This is consistent with Laantera et al. (2010) who surveyed 123 Finnish mothers and 49 fathers about breastfeeding attitudes. They found parents felt it was important for fathers to participate and play an active role in infant feeding and fathers wanted to be involved in choosing the feeding method. Other studies have found that although fathers may encourage breastfeeding, they often feel the final decision should be the mothers’ and if their partners did not choose to breastfeed they would work to support their partners’ preferences (Avery & Magnus, 2011; Mitchell-Box & Braun, 2012). Rempel and Rempel (2010) found most of the couples in their qualitative study made a mutual agreement to breastfeed; however, all fathers thought the mother had the final say.

Paternal perceptions of the breastfeeding experience and their involvement with breastfeeding has been assessed in several qualitative studies (Avery & Magnus, 2011, Deave et al., 2008; Epstein-Gilboa, 2009; Ingram & Johnson, 2004; Pontes et al., 2008; Rempel & Rempel, 2010; Sherriff & Hall, 2011; Tohotoa et al., 2009; Mitchell-Box & Braun, 2012, de Montigny et al.,
2012) and a metha-synthesis of qualitative studies (Goodman, 2005). These studies were conducted in the UK (Deaves et al., 2008), the US (Avery & Magnus, 2011; Goodman, 2005; Mitchell-Box et al., 2012); Canada (Epstein-Gilboa, 2009; Goodman, 2005; Rempel & Rempel, 2010; de Montigny et al., 2012), Brazil (Pontes et al., 2008), Australia (Goodman, 2005; Tohotoa et al., 2009) and Denmark (Goodman, 2005). This research has suggested, for some fathers, breastfeeding causes them to have a perceived delay in relationship development with their infants compared to the mothers. Some fathers want to bond with their infant but find that breastfeeding inhibits the development of their fathering relationship (Goodman, 2004; Bar-Yam & Darby, 1997). Involving fathers in the breastfeeding process may help address these negative breastfeeding perceptions. Some fathers overcome this by becoming involved by recognizing signs of hunger and encouraging breastfeeding to soothe the baby, being present during feeding sessions, burping the baby, and/or holding them immediately after the feed (Rempel & Rempel, 2010; Nickerson et al., 2012).

Equally shared parenting has been studied by Deutsch (2001). Equally shared parenting occurs when both parents nurture and care for infants and children in an equal manner, and unequal parenting occurs in families in which traditional gender roles are upheld, where the mother does the majority of infant and child care and the father helps the mother when needed. Qualitative research with families has found that unequal parenting fathers reported that breastfeeding interfered with involvement with their infant, whereas equally sharing fathers did not find this, as they found other ways to participate while their wives breastfed. This included diapering and rocking the baby to sleep (Deutsch, 2001).

Although some fathers feel breastfeeding interferes with bonding with their infants, others fathers are able to work around breastfeeding and establish opportunities for bonding to occur. Thus, infant-feeding methods do not necessarily interfere with infant-father attachment. A study conducted in the U.S. by Pavill (2001) identified that there is no difference in infant attachment between fathers regardless of whether the infant was breastfed or bottle-fed. The fathers of breastfed infants \((n=95)\) and fathers of bottle-fed infants \((n=92)\) were assessed when their infants were 12 to 16 weeks of age. The two groups of fathers did not differ in attachment scores; the fathers of the bottle feeding infants had a mean of 23 \((SD 2.0)\) and the fathers of the breastfeeding infants has a mean of 23 \((SD 1.8)\).
Goodman (2004) conducted a meta-synthesis of qualitative studies that described the experience of fatherhood in the early months after the birth of an infant. The meta-synthesis included seven studies published between 1990-1999, including 134 participants in total, from Australia, Canada, Denmark, and the United States. These were mainly first time fathers who were married or living with the mother of the child. The interview times ranged; however, the majority were conducted between 8 to 24 weeks. The author identified four phases reflecting the experiences of fathers. These included (1) entering with expectations and intentions, (2) confronting reality, (3) working to create one’s role as an involved father, and (4) reaping rewards. Furthermore, this meta-synthesis identified the need for health care professionals to improve guidance and support for fathers as well as include them in breastfeeding education and promotion (Goodman, 2004).

Tohotoa et al. (2009) conducted a qualitative study in Australia with parents to identify parents’ perceptions of what constitutes support for breastfeeding. They interviewed 76 participants (48 women and 28 men). Themes that emerged were anticipating needs and getting the job done, encouragement to do your best, paternal determination and commitment. The father’s data identified the theme of “wanting to be involved” with three sub-themes (1) wanting more information, (2) learning the role, and (3) being an advocate.

Qualitative data with fathers has indicated that currently, fathers are not targeted by health care professionals in relation to breastfeeding support and care. Ingram and Johnson (2004) found fathers were not given any information in pregnancy or included in a discussion about breastfeeding in the postpartum period. This causes some fathers to feel left out and insufficiently prepared to assist with breastfeeding (Deave et al., 2008; Goodman, 2004; Pontes et al., 2008; Sherriff & Hall, 2011; Tohotoa et al., 2009). This may also negatively impact their parenting self-esteem (Goodman, 2004). Although men may be reluctant to ask for help, or not know where to get assistance, research has indicated that they need ready access to supports specific to father’s needs and reassurance of their role (Tohotoa et al., 2009). During interactions with health care providers, fathers did not feel recognized as a parent in their own right or as having responsibility for their child’s needs, but were treated as having a secondary role, to assist the mother (Goodman, 2004). Fathers need to be included in the breastfeeding experience to prevent them from feeling excluded and incompetent. Fathers want to be part of the parenting and breastfeeding experience; however, they need to learn their role, as well as ways to be involved with breastfeeding (Rempel & Rempel, 2010; Tohotoa et al., 2009).
Although many fathers want to be part of the breastfeeding experience and provide breastfeeding support, currently many fathers lack the information and skills necessary to do this. A study conducted by Carvalhaes, Parada and Costa (2007) of 380 Brazilian mothers found that 55% \((n=211)\) of mothers experienced breastfeeding difficulties and of them 5.2% \((n=11)\) reported their husbands played a significant role in helping them overcome their problems. This is a small percentage, which may suggest that fathers are not adequately prepared to assist mothers with breastfeeding. Fathers want to know the best way to help their partners, including information on ways to overcome breastfeeding difficulties (Sherriff & Hall, 2011; Mitchell-Box & Braun, 2012). Qualitative studies with fathers have found that men want breastfeeding literature designed for both parents, with information specifically for fathers (Deave et al., 2008; Goodman, 2004; Ingram & Johnson, 2004; Sherriff & Hall, 2011). This information should include positive imagery of fathers with their children, it should focus on the practical issues involved, as well as include some information on the emotional aspects of breastfeeding (Sherriff & Hall, 2011).

**Breastfeeding Mothers Supporting and Including Fathers**

Fathers report their role in breastfeeding is to support their partner; however, many fathers do not feel they receive support in return (Goodman, 2004). Thus, mutual support in some relationships may not occur, which may cause relationship strain (Goodman, 2004). It has been suggested that it is important to include fathers in childcare activities to assist them in developing a relationship with their infants (Bar-Yam & Darby, 1997; Goodman, 2004), as the sooner fathers get involved in childcare and increase their childcare skills, the earlier they will bond with their infants (Epstein-Gilboa, 2009; Goodman, 2004). Mothers supporting fathers with breastfeeding may increase fathers’ involvement and assist the couple in achieving their breastfeeding goals.

Breastfeeding women can encourage the involvement of their partners by providing opportunities, emotional support, and information about the infants’ daily events and developments. Fathers report this strengthens their partner-infant relationship (Goodman, 2004). Epstein-Gilboa (2009) conducted a qualitative study with breastfeeding families and found mothers supported fathers’ learning process by tutoring, introducing them to novel parenting concepts and guiding them on care-giving interactions. However, in some situations it has been found that gate-keeping behaviours of the mother do not support, but instead restricts partner
involvement (Goodman, 2004; Hoffman, 2011). The role of the mother in involving the father and encouraging his childcare activities is explained by the ‘gender congruence theory.’ This theory suggests that men are more likely to take on care giving roles, which are still predominately defined as woman’s work, if they receive “reflected-appraisals”. “Reflected-appraisal” is defined as positive feedback for their behaviour and this is most effective when it comes from the mother (Maurer & Pleck, 2006). This reflected-appraisal from the mother is, therefore, of importance to parenting as it encourages a balanced relationship between the child and both parents.

**Breastfeeding Interventions that Include Fathers**

A limited number of studies have examined breastfeeding interventions with fathers. These include (1) two randomized controlled trials that evaluated the effect of an antenatal intervention to increase paternal knowledge (Wolfberg et al., 2004; Sciacca, Phipp, Dude and Ratliff, 1995) and two feasibility studies have been conducted in the antenatal period to evaluate the effects of an intervention designed to increase paternal breastfeeding knowledge (Ingram & Johnson 2004, 2009), (2) two quasi-experimental studies and one randomized controlled trial evaluated the effects interventions delivered to fathers to increase paternal knowledge and support for breastfeeding (Pisacane et al., 2005; Susin et al., 1999; Susin & Giugliani, 2008; Tohotoa et al., 2010), and (3) four studies that describe programs specifically designed to include fathers in breastfeeding (Cohen, Lang & Slusser, 2002; Lovera, Sanderson, Bogle & Vela, 2010; Stremler & Lovera, 2004).

**Antenatal Interventions to Increase Paternal Breastfeeding Knowledge**

Two randomized controlled trials and two feasibility studies have been conducted in the antenatal period to increase paternal breastfeeding knowledge. Wolfberg et al. (2004) conducted a randomized controlled trial in the U.S. evaluating a breastfeeding education intervention with fathers to determine the effect on breastfeeding initiation. The intervention group \((n=27)\), received a 2-hour prenatal breastfeeding education session and the control group \((n=32)\) were educated on infant care. The breastfeeding group showed greater rates of initiation \((74\% \text{ compared to } 41\%; \(p=.02\))\). However, there was no effect on breastfeeding duration at 8 weeks. A major limitation of this study is that of the pregnant women approached by the researchers, only
10% of their partners participated. Sciacca et al. (1995) conducted a randomized controlled trial in the U.S. to evaluate the effects of a partner-supported, incentive-based breastfeeding education program on breastfeeding exclusivity and duration rates \((n=55)\). They found that the intervention group reported significantly higher percentages of exclusive breastfeeding at hospital discharge (55.2% vs. 88.5%, \(p<0.01\)), 2 (34.5% vs. 80.8%, \(p<0.001\)), 6 (24.1% vs. 50.0%, \(p=0.02\)), and 12 (17.2% vs. 42.3%, \(p=0.02\)) weeks postpartum compared to the control group. The control group had significantly higher percentages of exclusive formula feeding at hospital discharge (20.7% vs. 0%, \(p=0.01\)), 2 (44.8% vs. 3.8%, \(p<0.001\)), 6 (69.0% vs. 19.2%, \(p<0.001\)), and 12 (75.9% vs. 38.5%, \(p=0.01\)) weeks postpartum. Although both of these studies found significant breastfeeding outcomes, their findings were limited due to the small sample sizes.

Ingram and Johnson (2004, 2009) conducted two feasibility studies evaluating an intervention in Bristol, UK, which included fathers in an antenatal breastfeeding education session. The first study consisted of focus groups that were held with grandmothers and home interviews with fathers to identify salient issues to be included in an antenatal breastfeeding intervention (Ingram & Johnson, 2004). The intervention was then designed and piloted with 29 mothers and their social supporters that included 9 grandmothers and 20 fathers. The intervention was delivered in the home by a research midwife. It was a 30 minute session delivered at 36 weeks gestation. A leaflet specifically designed for grandmothers and fathers provided the basis for discussion. The content was the same for both grandmother and fathers. Additionally, the session included a demonstration of breastfeeding positioning using a doll and a discussion of the health benefits and mechanics of breastfeeding. Follow-up visits were conducted when the baby was eight weeks old. The grandmothers and fathers liked the leaflets and information explained to them during the session. When mothers were asked about the support they received from the father or grandmother, the majority of the mothers ranked the practical support they received as good or very good (25/29, 86.2%) and the emotional support as good or very good (25/28, 89.2%). The intervention was found to be acceptable, useful, and enjoyable by all participants.

Ingram and Johnson (2009) evaluated the feasibility and acceptability of the same intervention (Ingram & Johnson, 2004) delivered by maternity care assistants. Maternity care assistants provide support for community midwives in the UK. The intervention was evaluated with fathers from economically deprived communities. This study included 11 couples who received an in-home session around 36 weeks of pregnancy. Follow-up interviews were done around 10
weeks. The mothers commented that their partners had been very supportive and kept them breastfeeding. Both the couples and staff delivering the intervention found this to be a positive experience (Ingram & Johnson, 2009).

Interventions with Fathers and Breastfeeding Outcomes

Two quasi-experimental trials with non-random group allocation have been conducted. These trials evaluated postnatal educational interventions with fathers on breastfeeding knowledge (Susin et al., 1999) and breastfeeding outcomes, such as exclusivity and duration (Pisacane et al., 2005; Susin & Giuglani, 2008; See Appendix B for more details).

Pisacane et al. (2005) conducted a clinical trial in Naples, Italy, in which the participants were allocated in 2-month blocks to an intervention group (n=140) or control group (n= 140). A midwife delivered an educational session with 280 mothers and their partners who were considering breastfeeding. Support and advice were delivered to all mothers. The fathers in the intervention group received a training session on breastfeeding management. This included detailed breastfeeding information on how to cope with breastfeeding difficulties and how partners can support breastfeeding women. The control group received information on baby care with little detail provided on breastfeeding. Follow-up was done by telephone interview at 6 and 12 months. They found the prevalence of exclusive breastfeeding at 6 months (25% vs. 15%; p<.05) and any breastfeeding at 12 months (19% vs. 11% NS) was higher in the intervention group than the control group. Exclusive breastfeeding at 6 months was significantly higher in the intervention group (24%) than the control group (4.5%; p<.001) when the mother had experienced breastfeeding difficulties. The authors concluded that the intervention group was able to overcome breastfeeding difficulties with the assistance of the father, as significantly more women in the intervention group reported they received support and relevant help with infant feeding from their partners (91% vs. 34%).

Susin et al. (1999) conducted a clinical trial in Brazil, to assess the breastfeeding knowledge of mothers and fathers before and after receiving postpartum advice. They also assessed the relationship between breastfeeding knowledge and breastfeeding exclusivity and duration. Three study groups were allocated by blocks of time: (1) the first 208 couples comprised the control group; (2) the next 197 couples were in the experimental group 1, in which only the mothers
received the intervention; and (3) the remaining 196 couples were the experimental group 2, in which both the mother and father received the intervention. An educational intervention was delivered on the postpartum unit. This intervention included a video discussing the basic topics of breastfeeding, an explanatory leaflet, and open discussion after viewing the video. Mothers and fathers in all three groups answered a test on breastfeeding knowledge immediately postpartum and at 4 weeks postpartum. Follow-up home visits were made at 4, 8, 16, and 24 weeks, or until breastfeeding ceased. Fathers in the experimental group 2 (58.3%) had a significant increase in breastfeeding knowledge scores between their initial and final score compared with fathers in the control group (19.4%) and the experimental group 1 (20.6%; \(^p<0.0001\)). The fathers had a greater increase in knowledge than the mothers (fathers’ increased 58.3%; mothers in experimental group 1, 27.9% and experimental group 2, 15.6%). Women whose partners had higher knowledge scores had greater likelihood to be exclusively breastfeeding at 4 weeks (\(OR\ 1.76, 95\% \ CI [1.18-2.64]\)) and breastfeeding at 24 weeks (\(OR\ 1.64, 95\% \ CI [1.11-2.40]\)).

An additional analysis (Susin & Giugliani, 2008) was conducted to evaluate the effectiveness of including the father in a breastfeeding support intervention on breastfeeding exclusivity and duration. The inclusion of fathers in the intervention significantly increased exclusive breastfeeding rates but did not increase breastfeeding duration. The couples group had higher exclusive breastfeeding rates at the 16 week period (16.4% vs. 11.1% in mother only and 5.7% in the control group, \(p=0.003\)) and a significantly decreased risk of discontinuing exclusive breastfeeding before 24 weeks (\(HR\ 0.80; 95\% \ CI [0.65, 0.98]\)). The inclusion of fathers did not increase the breastfeeding duration rate at 24 weeks (\(HR\ 0.86; 95\% \ CI [0.65, 1.14]\)). Including fathers with less than eight years of schooling in the intervention resulted in a decreased rate of breastfeeding when compared to the mothers only intervention group (\(p=0.01\)). This is consistent with previous research that found fathers with lower levels of education (Littman et al., 1994) and lower-income (Henderson et al., 2011) have more negative perceptions of breastfeeding.

Both of these quasi-experimental studies had adequate sample sizes, used block allocation, and appropriate data collection and analysis strategies. The limitations to these studies are that non-random allocation was used, increasing the risk of history bias and contamination. One study had a pediatrician conduct the intervention, which may have had a co-intervention effect, as not
only the intervention, but also the advice of the pediatrician may have impacted the outcome (Susin & Giuglani, 2008). Pediatricians’ advice has been found to be more effective than that of other health care professionals in influencing breastfeeding initiation (Kong & Lee, 2004; Littman et al., 1994). The generalizability of these findings is limited, as the interventions and comparisons varied between studies. Additionally, both studies were conducted outside of North America. To date no trials have been conducted in Canada, which include breastfeeding mothers and fathers.

Tohotoa et al. (2010) conducted a randomized controlled trial to evaluate a perinatal education support program in Perth, Western Australia. The program consisted of (1) an antenatal session for fathers, (2) telephone contact at birth, and (3) weekly information for five weeks on different postpartum and parenting issues. Randomization was done within each hospital without blinding (Tohotoa et al., 2012). More women in the intervention group reported enjoying breastfeeding compared to the control group (77% compared to 68%, respectively). Fathers were reported as the person who gave the most breastfeeding support in both groups. The fathers found the program helpful in reducing anxiety and increasing problem solving abilities. Unfortunately, breastfeeding outcomes were not rigorously evaluated as minimal details were provided as to how the intervention impacted breastfeeding exclusivity and duration.

**Breastfeeding Programs**

Breastfeeding programs with fathers have been conducted. Stremler and Lovera, (2004) and Lovera et al. (2010) evaluated a father-to-father breastfeeding support pilot program, and Cohen et al. (2002) evaluated at a male-focused breastfeeding program.

Cohen et al. (2002) described a program in the U.S. This was a corporate lactation program offered to employees at the Los Angeles Department of Water and Power. It was an expansion to a breastfeeding support program offered to female employees. This voluntary program included breastfeeding education classes for fathers and their partners, full individual lactation counseling by a nurse consultant and lactation educator, and breast pumps for the mother’s use at home or at her worksite. The participation rates for this program rose over time. As well, the program was successful in increasing breastfeeding. Many of the mothers who had the fathers participate in the program breastfed until 24 weeks (69%), which is well above the national
average of 21.7% (1996 average). The average length of breastfeeding for the infants whose fathers were in the program was 8 months.

Stremler and Lovera (2004) evaluated a pilot program in Texas with the WIC (Women, Infants and Children Program) fathers. In this pilot program peer dads were trained to give breastfeeding and parenting information to other WIC fathers. This pilot program was followed by a larger study by Lovera et al. (2010). They conducted a cohort study in Texas to evaluate the duration of breastfeeding among Hispanic WIC program participants who had enrolled in a Peer Dad Program (n=101). The comparison group consisted of those who did not enroll in the Peer Dad Program (n=99). In both groups mothers were enrolled in a peer support program. The intervention group breastfed longer than the control group at only two of the four time points (25.3% vs. 17.8% breastfed <12 weeks; 18.8% vs. 20.2% breastfed 12 to 24 weeks; 32.6 vs. 24.2% breastfed 24 to 52 weeks; and 30.7% vs. 30.3% breastfed >52 weeks); however these differences were not significant. The intervention group were no more likely (OR 1.44, 95% CI [0.82, 2.54]) to have their baby continue to be breastfed past 24 weeks than the control group.

**Historical Changes in Parental Roles**

In Canada, the majority of mothers return to work by the time their child is one year old (Zhang, 2007). These changes have significantly altered family life and parental roles, with parents experiencing increased equality in childcare roles and joint parenting responsibilities (Falceto, Fernandes, Baratojo & Giugliani, 2008). Factors that have contributed to these changes include the feminist movement, increased life expectancies, increased female education, contraceptive availability, and women entering the work force (Falceto et al., 2008).

Traditional gender roles, which were historically assigned to women, such as childrearing, are now being shared with fathers. This has followed a trend in which women have both childrearing and employment responsibilities. With a high percentage of mothers in Canada returning to paid employment within one year of their infant’s birth some families are practicing shared parenting. The term shared parenting has emerged to describe situations in which couples have increased equality in the division of labour in childcare and household responsibilities (Koivunen, Rothaupt & Wolfgram, 2009). Recent Canadian statistics have found that the percentage of stay at home fathers has risen from 1% in 1967 to 10% in 2008. Paternity leave
has also increased from 15% in 2005 to 28% in 2008 (Statistics Canada, 2009). The 2010 Survey of Young Canadians (n=10,810) provided information on parents’ employment and reported leaves during pregnancy and the postpartum period. The parents had children 1 to 9 years old and lived in the ten provinces. They found that 26% of fathers outside Quebec and 76% of fathers in Quebec took some type of paternity leave (Statistics Canada, 2012). These policies have increased gender equality, by providing both parents the opportunity to take time off from employment to tend to childcare responsibilities; these leaves are designed to increase fathers’ share in childrearing activities (Marshall, 2008).

The historically defined role of the father to “procreate, protect and provide” (McNeill, 2007, p. 409) has changed since the 1960’s. A qualitative study by McNeill (2007) supports the increase in paternal involvement and provides insights into the close emotional relationships fathers are developing with their children. In this study, fathers reported they did not have this type of relationship with their own fathers. Currently, fathers are more involved in childcare activities than they have been in the past. A study by Falceto et al. (2008) of Brazilian couples with children 0 to 5 years (n=118) found that 67% of the fathers in their study, all of which lived with the infant, were actively involved in the childcare of their infants. This included daily contact between father and child and participation in activities such as comforting, playing, feeding, and bathing, whether spontaneously or at the mother’s request.

**Coparenting Definition**

Preliminary evidence suggests that educating fathers about breastfeeding increases fathers’ ability to help mothers to overcome breastfeeding difficulties (Pisacane et al., 2005). Rempel and Rempel (2010) found in their qualitative study that some couples who are able to meet their breastfeeding goals work as a team to achieve their breastfeeding success. However, ways in which to assist parents in working together as a team to overcome breastfeeding difficulties have not been identified. One way that may be effective in increasing parents’ ability to achieve child health outcomes, such as increased breastfeeding duration and exclusivity, is to promote having mothers and fathers work as coparents.

Coparenting is a term that emerged in the 1970’s out of the work of family system theorists. Coparenting was used to describe the manner in which parents worked in an executive subsystem
with roles as co-managers of family members’ behaviours and relationships and to regulate family interactions and outcomes (Feinberg, 2003). McHale, Kuersten-Hogan and Roa (2004) defined coparenting as “an enterprise… involving the coordination among adults responsible for the care and upbringing of children” (p.222). Additionally, McHale indicated “coparenting refers to the extent to which partners share leadership and support one another in their mutual roles as architects and heads of the family… accommodating their individual styles and preferences…(through) mutual support and commitment to parenting the child” (McHale, 1995, p. 985). Two adults (or more) who are jointly responsible for a child are in a coparental relationship and work as a coparental team (Feinberg, 2003; Feinberg, 2002; McHale, 2007; Van Egeren & Hawkins, 2004). The typical goals of a coparental team are the child’s health and wellbeing. These goals are best met in a partnership, which encompasses cohesiveness and solidarity. Coparenting “specifically addresses the extent to which spouses function as partners or adversaries in their parenting roles” (Gable, Crnic & Belsky, 1994, p. 382).

The differing styles of coparenting can impact child development either positively or negatively (Gable et al., 1994). Characteristics of effective coparenting include (1) capability to problem solve, (2) conflict management, (3) productive communication, and (4) support for the other’s parenting role (Feinberg & Kan, 2008; Van Egern, & Hawkins, 2004). Coparenting works to increase communication, cohesion, and flexibility within the parental relationship in order to meet parenting goals (Feinberg, 2003). Research has found that coparenting relationships, which were positive and demonstrated respect, acknowledged the other’s parenting, and supported one another when stressed, increase parenting self-esteem (Gable et al., 1994; Feinberg, 2003).

The benefits of coparenting are associated with positive child outcomes for young children and adolescents (Feinberg et al., 2010; Gable et al., 1994). Feinberg, Kan and Hetherington (2007) conducted a study with 516 two-parent, two-sibling families. The families were followed longitudinally for three years. Multiple regression analysis found coparenting conflict predicted mother and father negativity and adolescent antisocial behaviour. Block, Block and Morrison (1981) in their study of 83 American parental dyads found that parental adjustment was significantly related to the quality of psychological functioning in boys and girls over 4 years of age (3 to 7 years). Their findings indicated that for boys, parental agreement was positively related to ego control and to ego resiliency. This was reflected in resourcefulness, verbal facility, and acceptance of responsibility for one’s action and feelings to task orientation, and intellectual
functioning. Shooke, Jones, Forehead, Dorsey and Gene (2010) studied 268 African American youth from single mother homes and found that mother-coparent support was associated with child competence, whereas mother-coparent conflict was associated with child maladjustment.

Coparenting has also been found to positively impact couples’ relationships. Cowan, Cowan, and Knox (2010) conducted a literature review of marriage (which include coparenting programs) and fatherhood programs. When looked at collectively these programs were effective in increasing couples’ relationships quality, communication skills, as well as children’s behaviours such as internalizing behaviours, externalizing problems, and academic achievement. Thus, including both parents in such programs and encouraging them to work as coparents is necessary, as the relationship between the mother and father is the most salient predictor of fathers’ involvement (Cowan et al., 2010).

**Models of Coparenting**

Originally, the four core features of the coparental alliance included (1) childcare labour, (2) the degree of solidarity and support between parents, (3) the extent of dissonance and antagonism present in the parenting, and (4) the degree to which each parent participated actively in engaging with and directing the child (McHale et al., 2004). These core features have remained central to coparenting research and have been expanded on in the development of coparenting models (Feinberg, 2003; Van Egeren & Hawkins, 2004).

**Van Egeren and Hawkins Model**

Van Egeren and Hawkins (2004) provide characterization of coparenting in a framework they used in a study of coparenting that clarifies the external structure of coparenting- the who, what, and where of coparenting. Coparents are at least two individuals who are expected by mutual agreement or societal norms to have conjoint responsibility for a particular child’s well-being. Coparenting occurs only after the birth of a child; thus pre-birth discussions and mental representations are predictors of subsequent coparenting. Coparenting does not take place only within the presence of the child, but includes any actions and feelings that may promote or undermine the partner’s effectiveness as a coparent.
In this model the internal structure of coparenting is defined, so it does not get confused with other family subsystems. Coparenting requires a child, a partner, a dyadic process, and a bidirectional process. This coparenting framework includes four dimensions: (1) coparenting solidarity, the affective, enduring quality of growing together as parents and forming a unified executive subsystem; (2) coparenting support, the strategies and actions that support and extend the partner’s efforts to accomplish parenting goals, or the parent’s perceptions of support in his/her efforts to accomplish parenting goals; (3) undermining coparenting, strategies and actions that thwart the partner’s attempts to accomplish parenting goals or reports of criticism and lack of respect for parenting decisions by or toward the partner; and (4) shared parenting, the degree to which parents are responsible for limit setting and each partner’s sense of fairness about the way responsibilities are divided (Van Egeren & Hawkins, 2004).

With this framework the authors provide suggestions for how to measure each component of coparenting. The authors measured coparenting with the use of a number of subscales of coparenting that were embedded within six different instruments. Each of these instruments were described and the reliability measure provided for some of the instruments. This model was utilized by the authors in a longitudinal study in which 62 couples were followed from when the child was 6 months to 3 years old, to assess the linkages among multiple indicators of each of the coparenting dimensions with an emphasis on parent’s experiences of coparenting resulting from perceived or observed actions by the partner. The mothers and fathers correlations among the proposed coparenting dimensions were analyzed. Mothers’ and fathers’ ratings were significantly and positively associated for all four coparenting dimensions. Nevertheless, the authors were not able to rigorously evaluate the framework due to the small sample size of this study (Van Egeren & Hawkins, 2004).
Feinberg Model

Feinberg (2003) designed a multi-component model of the structure of the coparenting relationship, in order to inform further research and interventions. He defines coparenting as a “conceptual term that refers to the ways that parents/or parental figures relate to each other in the role of parent. Coparenting occurs when individuals have overlapping or shared responsibility for rearing particular children, and consists of the support and coordination (or lack of it) that parental figures exhibit in childrearing” (Feinberg, 2003, p. 96). Feinberg (2003) states that the coparenting relationship does not include other aspects of the adult relationship, which do not pertain to childrearing. The coparents’ roles do not have to be equal in authority or responsibility, as both cultural and economic factors may impact how the roles are distributed.

Coparenting involves meeting the needs of the child for physical and emotional sustenance, protection, and development, and thus, this is inclusive of parents other than biological mothers and fathers. Coparenting has been found to be important to health-promoting parenting and child adjustment (Feinberg, 2002; Fienberg, 2003; Feinberg & Kan, 2008; Feinberg, Kan, & Hetherington, 2007)

There are four components in the model of coparenting described by Feinberg (2003). The components are (1) agreement or disagreement in childrearing issues, (2) division of (child-related) labor, (3) support-undermining of the coparental role, and (4) joint family management of family interactions (Table 2). These four elements are associated yet distinct.

Figure 1:
Model of Coparenting Components
(Feinberg, 2003, p. 101)
**Childrearing Agreement**

Childrearing agreement refers to the agreement between parents on a variety of child-related topics, which include moral values, behaviours and discipline, children’s emotional needs, educational standards, safety, and peer associations. Agreement and disagreement are at opposite ends of the scale. Some parents may agree to disagree or compromise (Feinbreg, 2003).

**Division of Labour**

Division of labour relates to the splitting up of duties, tasks, and responsibilities pertaining to daily routines in childcare and household tasks as well as child related legal, financial, and medical issues. The perception of fairness and satisfaction of the parents in the division of labour is more important than equality of task division for parent adjustment and well-being. Some families may be rigid in the roles and division of labour whereas others may be flexible with this division of tasks changing as circumstances change over time (Feinbreg, 2003).

**Support/Undermining**

Support or undermining refers to the supportiveness parents provide to one another. This support includes affirmation of the others competency, acknowledgment and respect of their contributions, and upholding their parenting decisions and authority. In contrast, the undermining refers to criticism, discrediting, and blame (Feinbreg, 2003).

**Joint Family Management**

Joint family management refers to the executive subsystem in the family formed by the coparents. Aspects of family management related to this concept are (1) exposure of children to interparental conflict compared to conflict resolution, (2) coalitions- leaving children out of interparental conflict compared to triangulation and forming a parent-child coalition, (3) maintaining the generational boundaries to executive subsystem, (4) balance - both parents engage in balanced interactions with the child, and (5) encouraging and supporting the other coparents’ efforts to develop a secure and intimate relationship between each parent and the child (Feinberg, 2003).
Table 2  
*Four Components in the Coparenting Model and Parenting Outcomes*

<table>
<thead>
<tr>
<th>Component</th>
<th>Positive Parenting Outcomes</th>
<th>Negative Parenting Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Childrearing Agreement</td>
<td>Parents agree on childrearing topics.</td>
<td>Childrearing disagreement (acute or chronic)</td>
</tr>
<tr>
<td></td>
<td>It is okay to ‘agree to disagree’ and negotiate a compromise.</td>
<td>May lead to uncoordinated parenting strategies, undermining, criticism &amp;/or hostile conflict</td>
</tr>
<tr>
<td>Division of Labour</td>
<td>Fair process through which distribution of daily routines of childcare &amp; household tasks are decided between coparents.</td>
<td>When parents expectations of roles and responsibility division do not align with reality</td>
</tr>
<tr>
<td>Support-Undermining</td>
<td>Supportiveness provided toward parenting goals</td>
<td>Undermining through criticism, disparagement, and blame</td>
</tr>
<tr>
<td></td>
<td>Includes affirmation, acknowledgment and respect of others contributions, upholding childrearing decisions &amp; authority</td>
<td>Competitiveness for child’s affection</td>
</tr>
<tr>
<td></td>
<td>Coparental support leads to parenting self-efficacy</td>
<td>Low level of partner support and coparental support may lead to parental depression</td>
</tr>
<tr>
<td>Joint Family Management</td>
<td>Family Interaction: controlled behaviour and communication with appropriate conflict resolution</td>
<td>Intraparental conflict- break down in ability to provide physical/emotional security</td>
</tr>
<tr>
<td></td>
<td>Coalition of the executive subsystem with generational boundaries</td>
<td>Parent-child coalition, triangulation in an overt or covert parent-child coalition</td>
</tr>
<tr>
<td></td>
<td>Balanced: Triadic &amp; Parent-child interactions, parents encouraging of security and intimacy with child</td>
<td>Unbalanced triadic interactions due to parental withdrawal resulting from marital distress</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Feinberg, 2003)</td>
</tr>
</tbody>
</table>
Although these two models of coparenting are very similar in the coparenting constructs identified, they differ in that the Feinberg model has been developed for use in intervention studies, it includes more elements of coparenting, and it provides a more detailed description of each element. Hence, Feinberg’s model is more thoroughly described in the literature. As well, the Feinberg model has been used in the design and evaluation of a coparenting intervention (Feinberg & Kan 2008; Feinberg, Kan & Goslin, 2009). Additionally, Feinberg, Brown, and Kan (2010) have developed and psychometrically tested a measure of coparenting, which aligns with the model.

**Coparenting Skills**

In order for coparents to work as a team toward meeting their jointly determined child health outcomes, they need to know how to communicate with each other and problem solve. There are two main coparenting skills that include (1) effective communication, and (2) conflict management and resolution (Feinberg, 2008). These skills can be taught to couples in a coparenting intervention (Feinberg & Kan, 2008). The opportune time for parents to learn these skills is around the childbirth time period. Ideally, education and support at this time would help families early in the formative years before small problems become inflexible or poor communication habits are formed (Cowan, Cowan, Pruett, Pruett, & Wong, 2009). It has also been suggested that “the primary adaptations set in motion during the earliest weeks and months after a baby is born ‘set the stage’ in some fundamental way for subsequent coparental adaptations throughout the family’s child-rearing years” (McHale et al., 2004, p. 221). Additionally, at the transition to parenthood parents are increasingly open to learning new information and changing their behaviours (Feinberg & Kan, 2008).

The skills taught to coparents are effective communication and conflict management and resolution. The “speaker-listener technique” and “problem solution process” are specific tools that can be used to teach such skills. These tools were developed by Markman, Stanley and Blumberg (1994) to assist couples in working together to keep their marriage strong and work as a team. These skills are part of an extensively researched program, the ‘Prevention and Relationship Enhancement Program’ (PREP; Markman et al., 1994). The program and approach taken by the authors was built on the foundations of behavioural marital therapy and psychoeducational approaches to marriage, family relationships, and personal relationships.
(Markman et al. 1994). Moreover, these skills have been tested in previously conducted coparenting intervention research (Feinberg, 2008) and have been found to be effective in increasing coparenting behaviours (Feinberg & Kan, 2008).

**Effective Communication**

Communication is not only the delivery of information, it is also an activity that has the potential to change how a person feels and responds to another person. It is therefore important to communicate effectively and safely so as to elicit a positive response in your coparent. When communicating as coparents, it is important to feel cared for, in control, recognized, accepted, and secure in the parenting commitment (Markman et al., 1994). The communication between partners can become strained in early parenthood, as there is less time to communicate, and the needs of the child cause parents to be overtired and overwhelmed. Shapiro, Gottman & Carrere (2000) studied couples through the transition to parenthood and found that relationships are stronger when couples convey fondness and affection, show expansiveness, and express we-ness or unity. The fondness and admiration work like glue to keep the relationship strong, while expansiveness is the level of awareness each spouse has of their relationship, their spouse, and their spouse’s life; we-ness is the couple’s ability to view themselves as a unit. The authors concluded that the quality of the marital friendship is particularly important during the transition to parenthood, which is a time of change and stress (Shapiro et al., 2000). This friendship can be supported and protected with the use of positive communication.

Positive communication is a skill that can be taught. Normally there are many filters, which can be barriers of effective communication. These include inattention, emotional states, beliefs, values, expectations, and differences in style. These filters can interfere with communication and then get in the way of accurately remembering what was said (Markman et al., 1994). One valuable tool for effective communication, which can be used during times of conflict or communication breakdown, is the “Speaker-Listener Technique” (Markman et al., 1994). This is a tool that allows the problem to be discussed without moving onto problem solving. It provides an opportunity for a coparent to state his/her thoughts, issues, and concerns and have them heard and understood. The speaker does the talking and the listener paraphrases to illustrate understanding and elicit clarification when needed. The role of the speaker and listener alternate throughout the discussion so that both coparents have an opportunity to speak and to be heard.
Conflict Management and Resolution

Conflict management and resolution are additional skills that can be taught. Conflict management skills include understanding the thoughts and feelings present during conflict (Feinberg, 2008) and knowing the stages of conflict resolution and problem solving (Markman et al., 1994). Teaching parents to positively resolve conflict is important for both their relationship and their children. Couples who experience marital conflict, which is negatively dealt with by use of criticism, defensiveness, contempt, and stonewalling, can have an increased risk of their marriage ending in divorce (Gottman & Notarius, 2000). Couples increasingly experience conflict during the transition to parenthood. The stress of this transition led to 40-70% of couples indicating there is a drop in marital quality at this time, and marital conflict increased by a factor of 9 (Gottman & Notarius, 2000). Some of the reasons for this are people revert to stereotypical gender roles, they are overwhelmed by the amount of housework and child care, fathers withdraw into their work, and marital conversations and sex decrease enormously (Gottman & Notarius, 2000). Thus, research on the transition to parenthood has found that as couples become parents there is a dramatic decrease in positive marital interchanges, a dramatic increase in marital conflict, and a precipitous decline in marital satisfaction, and this for some couples begins the cascade toward divorce (Shapiro et al., 2000).

Marital conflict is also related to child outcomes, as it is linked to depression, withdrawal, poor social competence, deleterious health outcomes, lower academic achievement, and conduct related incidence (Gottman & Notarius, 2000). It is critical that children see an emotionally harmonious ending to conflict in order for them to feel emotionally secure, regardless of whether the conflict was about adult or child issues (Gottman & Notarius, 2000).

In order to effectively resolve conflict, a problem solving technique can be taught to parents. There are two stages to problem solving, which are problem discussion and problem solution. With the thorough understanding of the problem the couple gains during the problem discussion, they can then move onto problem solving. Many times the problem discussion identifies that no further solution is needed. In these situations communicating the issue and ensuring both coparents have an understanding of the issue will resolve the problem. If problem solving is needed, “problem solution” is a process that includes four stages: agenda setting (scheduling a time to discuss the issue); brainstorming (all of the possible solutions are noted and the pros and
cons of each discussed); agreement or compromise; and follow-up (reassess plan in one week
time; Markman et al., 1994). Two additional tips related to problem solution are (1) keep issues
small, so that they are more manageable to deal with and easier to find solutions to; and (2) think
positively about your coparent’s strengths and work to help each other achieve his/her full
parenting potential (Feinberg, 2008).

A Coparenting Intervention

Parenting programs and interventions have been designed to teach effective parenting and
increase positive youth outcomes (Sandler, Schoenfelder, Wolchick, & MacKinnon, 2011). These
programs have focused on helping parents deal with their children’s emotional and
behavioural development and are based on a range of theoretical approaches which include (1)
behaviour modification programs that are designed to use positive reinforcements to encourage
desirable behaviour, (2) relationship focused programs that help parents to understand children
and the motives for their behaviours, and (3) family systems theory programs that are designed to
increase understanding of family members behaviours and to locate the problem behaviour
within the context of relationships (Barlow, Parson, & Stewart-Brown, 2005). These programs
have been found to be effective in increasing family functioning and parenting self-efficacy
(Sandler et al., 2011). Many of these programs have targeted high risk groups; however,
preventive programs targeting all families are needed (Feinberg, Jones & Kan, 2010).
Additionally, interventions need to be designed to target both parenting and the couple’s
relationship, as this relationship is strongly associated with parenting and child outcomes
(Feinberg, 2002). Coparenting refers to the ways that parents work together in their roles as
parents and is a potentially modifiable target for parenting interventions. The transition to
parenthood is an ideal time to deliver such an intervention as (1) new parents are particularly
open to change at that point (Feinberg, 2002); (2) they are entering into a difficult adjustment
period (Shapiro et al., 2000); and (3) the guidance, support, and skills provided in such an
intervention may assist them in coping with these transformations and stresses they will
encounter (Feinberg, 2003). A coparenting intervention should include topics such as
communication, joint problem solving skills, and learning to identify and resolve conflict.

Previous research has evaluated interventions delivered to parents during the transition to
parenthood. Some of these studies have evaluated the impact interventions have on fathers’
involvement (Doherty, Erickson, & LaRossa, 2006; Hawkin, Lovejoy, Homes, Blanchard & Fawcett, 2008), couples’ relationships, and marital quality (Shipiro & Gottman, 2005). Although these studies do provide some evidence of the effectiveness of interventions delivered to parents at the transition to parenthood, they do not measure coparenting, or the parents’ ability to work together towards child outcomes.

To date only one coparenting intervention has been evaluated (Feinberg & Kan, 2008). This coparenting intervention has been adapted for this current trial. Although this intervention was conducted once, there are three follow-up data collection points, 6 months (Feinberg & Kan, 2008), 1 year (Feinberg, Kan & Goslin, 2009), and 3.5 years (Feinberg, Jones, & Kan, 2010), and the measures utilized varied at each time-point.

Feinberg and Kan (2008) conducted a randomized controlled trial with 169 heterosexual adult couples who were expecting their first child in the U.S. The purpose of the study was to evaluate the effect of the intervention on a variety of different outcomes over a 3.5 year period. The control group received a mailed brochure on selecting quality childcare. The intervention group received the ‘The Family Foundations Program’ which consisted of eight classes which spanned over the prenatal and postnatal period. Topics covered included (1) how to manage disagreements, (2) productive communication, (3) problem solving, (4) conflict management techniques, and (5) mutual support strategies that foster positive joint parenting of an infant (Feinberg & Kan, 2008). The program was standardized with the use of a manual and included all four elements of coparenting (Feinberg, 2008).

The 6 months outcome data were collected via self-report questionnaires, which measured key dimensions of coparenting (coparental support, parent-based closeness and coparental undermining). Cronbach’s alpha ranged from .80 to .83 for mothers and .66 to .80 for fathers. Additional questionnaires measured parental depression and anxiety, distress in the parent-child relationship, and infant regulation.

One hundred and forty-nine couples (88%) were followed up at 6 months. The program was found to have significant effects for mothers on coparental support (effect size 0.35; p<.05), maternal depression (effect size 0.56; p<.01), and anxiety (effect size 0.38; p< .05). Significant effects on fathers included coparental support (effect size 0.54; p<.05), parenting based closeness
(effect size 0.44; \( p<0.05 \)), distress in the parent-child relationship (effect size 0.70; \( p<0.05 \)) and infant soothability (effect size 0.35; \( p<0.05 \); Feinberg & Kan, 2008).

At one year, couples (\( n=146 \)) were observed and videotaped during home visits from research staff (Feinberg et al., 2009). Codes were developed for coparenting, parenting, child behaviour, and dyadic couple behaviours. The codes used to measure coparenting were competition, triangulation, warmth, inclusion, and active cooperation. The coders were blinded to the experimental condition.

Findings at one year indicate significant effects (\( p<0.05 \)) for mothers on coparenting (competition [effect size 0.51], triangulation [effect size 0.33] and inclusion [effect size 0.45]); dyadic couple behaviours (negative communication [effect size 0.48] and warmth to partner [effect size 0.89]); parenting behaviours (positivity [effect size 0.34]); and child-behaviours (self-soothing [effect size 0.46]). Findings for the father indicate significant effects on coparenting (competition [effect size 0.36; \( p<0.01 \)], triangulation [effect size 0.28; \( p<0.05 \)]); dyadic couple behaviours (warmth to partner [effect size 1.01; \( p<0.05 \)]); parenting behaviours (positivity [effect size 0.45; \( p<0.05 \)] and negativity [effect size 0.60; \( p<0.05 \)]; Feinberg et al., 2009).

The authors developed and psychometrically tested a measure of coparenting, the Coparenting Relationship Scale (CRS; Feinberg, Brown & Kan, 2010). A version of this scale was used to measure coparenting at the 3.5 year follow-up period. This measure of coparenting is based on Feinberg’s conceptual model. This tool was found to be both valid and reliable.

At 3.5 years, the outcome data were collected from 84.6% of families (\( n=137 \)). Parental adjustment was assessed using a 16-item Parenting Sense of Competence Scale. Coparenting was assessed using the 31-item Coparenting Scale. The couple’s relationship was assessed using the Quality of Marriage Index. Parenting was assessed using a parenting scale. The child outcomes were assessed using the child behaviour checklist, which is a 100 item questionnaire (Feinberg et al., 2010). The findings indicate that significant differences were found on average overall differences across all three data collection time points between the control and intervention groups (Feinberg et al., 2010). These differences included positive intervention effects for parental stress (\( b=-.11, p=0.31, \) from 6 months to 3.5 years) and efficacy (\( b=2.77, p=.024 \)). The intervention group had increased coparenting (\( b=.12, p=.011 \)) and lower levels of behavioural problems (main effects model: \( b=-3.23, p=.022 \)). Data from 3.5 years indicated
positive intervention effects for relationship satisfaction ($b=.711, p=.007$, among parents of boys only), lower levels of over-reactivity ($b=-3.23, p=.022$), laxness ($b=-.22, p=0.49$), and physical punishment ($b=-1.16, p=0.14$).

The strengths of these studies (Feinberg & Kan, 2008; Feinberg et al., 2009; Feinberg et al., 2010) include (1) random allocation of participants into groups, (2) the intervention was monitored and found to be delivered consistently, (3) intention-to-treat principles were followed, (4) the one year data was collected by a blinded assessor with self-report used at other time periods, (5) sessions were well attended by the couples, and (6) the attrition rate was low at all time points. Limitations of the study include no mention of sample size calculation; no explanation as to how the randomization was carried out; 23% of eligible couples agreed to participate; and homogeneous sample with the majority being married, white, high economic status, and educated. Additionally, it is also not known if being in a group or if the content of the intervention were responsible for the outcomes, therefore, assessing coparenting information delivered in another format, such as one-to-one session, in a booklet, or video, is warranted. Overall, these studies provide preliminary evidence of the effectiveness of a coparenting intervention in increasing couples coparenting behaviour.
Breastfeeding is the recommended infant feeding method. The recommendations from leading health authorities indicate that infants should be exclusively breastfed for the first six months of life, with the continuation of breastfeeding once other foods have been introduced to two years and beyond. These breastfeeding recommendations are based on extensive research, which highlights the importance of breastfeeding for infant and maternal health. The current breastfeeding rates in Canada are not meeting these guidelines. The exclusive breastfeeding rate is less than 25% at 24 weeks. Many variables have been identified that lead to the supplementation or cessation of breastfeeding; these include demographic, biological, psychosocial, and social variables. Additionally, breastfeeding challenges, such as perceived insufficient milk supply or breastfeeding discomforts in the first weeks have been indicated as the most common reasons for early cessation of breastfeeding.

Interventions that have been designed to increase breastfeeding duration and exclusivity have been conducted. However, systematic reviews have been inconclusive as to the most effective interventions to increase breastfeeding duration and exclusivity. The intervention studies have been heterogeneous in intervention components. Many of these studies have evaluated interventions that are delivered by trained professionals or lay individuals over an extended period of time in a variety of settings. The feasibility and implementation of such interventions may be restricted due to cost in practice settings, therefore additional research is needed to design and evaluate feasible interventions to increase breastfeeding duration and exclusivity.

Mothers have been targeted in breastfeeding promotion campaigns and intervention studies. The literature suggests that fathers should be included in breastfeeding interventions as fathers are involved and greatly influence infant feeding decisions. Additionally, their support of breastfeeding impacts breastfeeding duration and exclusivity. Identifying an effective intervention, which prepares and assists fathers in providing support to breastfeeding women is needed. Fathers are in an ideal position to provide such support and research suggests that they want to be part of the breastfeeding experience. Leading health authorities have recommended fathers inclusion in breastfeeding promotion and education.
Breastfeeding interventions that have included fathers have provided preliminary evidence that fathers’ involvement can positively impact breastfeeding duration and exclusivity. None of these studies to date have used the randomized control trial design, with an adequately powered sample size. More research is needed to determine the type of interventions with fathers that are most effective in increasing breastfeeding duration and exclusivity. The trials that have included fathers have not previously been conducted in Canada.

Involving fathers as coparents will increase the involvement and responsibility that fathers have with breastfeeding. Coparenting is designed to assist couples in joint problem solving around breastfeeding issues and mutually supporting one another as they work to achieve child health outcomes. Coparenting would provide a structured framework on which to design an intervention. The Feinberg model of coparenting is well described in the literature and it aligns with breastfeeding. It has been previously evaluated in an intervention study and has been shown to positively impact coparenting behaviours. Thus, there is evidence to suggest that a coparenting breastfeeding support intervention delivered to first time parents in the postpartum unit, in which couples are given a face-to-face discussion with a professional, booklets, a video, access to a website, follow-up emails and a telephone call could increase breastfeeding duration and exclusivity.
Coparenting Framework Applied to a Breastfeeding Intervention

Based on the preceding literature review, the Feinberg (2003) coparenting framework will be used as the trial conceptual model (See Figure 1). This model consists of four main components (1) childrearing agreement, (2) division of labour, (3) support/undermining, and (4) joint family management. Each of the four elements have the potential to positively or negatively impact parenting outcomes, depending on the extent to which they are achieved in a collaborative, goal directed manner (Feinberg, 2003; See Table 2) The model has been adapted to the breastfeeding context.

Childrearing Agreement

In the coparenting relationship, the child’s health goals should be mutually agreed upon (Feinberg, 2003; McHale et al., 2004). Setting breastfeeding goals has been associated with achieving breastfeeding outcomes (Dennis, 2002). For example, mothers who indicate they plan to breastfeed for 1 year are more likely to do so than those without a breastfeeding plan (Meedya et al., 2010). Couples should develop together their short- and long-term breastfeeding goals related to exclusivity and duration. The short-term goals should include refraining from the use of supplements that are known to negatively impact breastfeeding outcomes (WHO, 1998).

Division of Labour

The division of labour does not define the actual percentage of tasks completed by each coparent, but the emphasis is on the process through which the negotiation of responsibilities takes place and the fairness perceived by the parents in the division that results (Feinberg, 2003). With breastfeeding being a task that only the mother can perform, the division of labour is an important issue for coparents to discuss. Couples should develop a plan that will allow mothers the time and energy they need to breastfeed. This tangible help is important to breastfeeding success. Partners sharing in domestic responsibilities are an important part of breastfeeding support and success (Smith et al., 2006; Pontes et al., 2009; Voss et al., 1993). Couples can also ask friends and family for assistance with tasks.
Support/Undermining

The domain of coparental support highlights the importance of a mutually supportive relationship in which both parents assist one another in meeting jointly determined goals (Feinberg, 2003). Informational, instrumental, emotional, and appraisal support are what couples can provide to one another while working to achieve their breastfeeding goals. Breastfeeding women have indicated these supports are important to their breastfeeding experience and achieving breastfeeding success. Fathers who have negative breastfeeding attitudes or lack breastfeeding education may undermine mothers’ breastfeeding efforts.

Joint Family Management

Prevention of intraparental conflict, positive communication with conflict resolution, and balanced interactions between coparent and child are essential (Feinberg, 2003). Involving fathers in breastfeeding and childcare may decrease feelings of envy, reported by some fathers, of the close relationship developing between the mother and infant (Epstein-Gilboa, 2009).
Study Purpose

The purpose of this study is to examine the effect of a coparenting support intervention on breastfeeding exclusivity among primiparous breastfeeding couples.

Research Questions

Primary Outcome Question

What is the effect of a coparenting support intervention on exclusive breastfeeding at 12 weeks postpartum among primiparous breastfeeding mothers?

Secondary Outcome Questions

Among primiparous mothers and fathers, what is the effect of coparenting breastfeeding support intervention on:

1. breastfeeding duration at 6 and 12 weeks postpartum
2. maternal perceived breastfeeding support at 6 and 12 weeks postpartum
3. maternal perception of the coparenting at 6 and 12 weeks postpartum
4. paternal infant feeding attitude at 6 weeks postpartum
5. paternal breastfeeding self-efficacy at 6 weeks postpartum

Exploratory Research Questions

6. Among primiparous mothers and fathers, what is the effect of coparenting breastfeeding support intervention on their satisfaction with coparenting behaviours and breastfeeding information received?
7. What factors are associated to exclusive breastfeeding at 12 weeks?
8. What factors are predictive of exclusive breastfeeding at 12 weeks?
Process Research Questions

9. What is maternal satisfaction with the coparenting breastfeeding intervention at 6 and 12 weeks post-intervention?

10. What is paternal satisfaction with the coparenting breastfeeding intervention at 6 weeks post-intervention?

11. What is maternal satisfaction with participation in the trial at 12 weeks postpartum?
CHAPTER THREE
METHODS

Study Design

Overview
A randomized controlled trial was conducted. Eligible, consenting breastfeeding mothers and fathers (male partner jointly responsible for the infant) were randomly allocated to a control group or an intervention group. Participants in the control group received standard postpartum care, while those in the intervention group received standard care plus a multifaceted coparenting breastfeeding intervention. Follow-up data was collected from the mothers at 6 and 12 weeks and fathers at 6 weeks postpartum via a web-based questionnaire or telephone interview conducted by a research assistant blinded to group allocation.

Sample
A non-probability sample from an acute care hospital in the Toronto area was recruited. Participants were randomly allocated into study groups. All eligible couples were approached and their participation in the study was requested. Information was collected regarding the number of eligible women, those who consented, were randomized, and from whom outcome data were collected.

Inclusion Criteria
The target population for the study included all primiparous breastfeeding women on the postpartum unit who met the following inclusion criteria: (1) singleton birth (vaginal and cesarean births), (2) term infant (37-42 weeks gestation), (3) able to speak and read English, (4) 18 years of age or older, and (5) couple living in the same home.

Exclusion Criteria
The exclusion criteria included: (1) shared a hospital room with a study participant, (2) infants or maternal medical problem that could interfere with breastfeeding (e.g. infant with cleft palate or maternal previous breast surgery), (3) midwifery patient, (4) infant not discharged home with
mother, (5) mother was pumping milk but not planning to breastfeed, (6) mother did not have access to the internet, (7) mother did not have a telephone, (8) mother was planning to breastfeed less than 12 weeks, and (9) father was not available.

**Setting**

This trial took place in Toronto at the North York General Hospital (NYGH) which had 6,024 births in 2007 (NYGH, 2008), making it one of the largest birthing centres in Ontario (NYGH, 2004). The hospital services an economically and cultural diverse population, with most families in the higher income ranges and a large percentage of new immigrants from Eastern Asia, Southern Asia, West Central Asia and Middle East (City of Toronto, 2006). NYGH had the third highest breastfeeding initiation rate (96.8%) of ten surveyed Toronto hospitals (Toronto Public Health, 2010). Their exclusive breastfeeding rate at discharge was 64.7% and the exclusive breastfeeding rate was 55.6% at 2 weeks postpartum (ranked sixth and fifth highest respectively; Toronto Public Health, 2010).

**Sample Size**

The current Canadian exclusive breastfeeding rate at 12 weeks is 52% (Public Health Agency of Canada, 2009). A sample size calculation was completed to find a 15% increase in breastfeeding exclusivity to 67% among those in the intervention group. With an 80% power an \( \alpha \), of 0.05 to detect a 15% increase in breastfeeding exclusivity at 12 weeks postpartum- 170 couples (85 per group) were required. A 15% increase was chosen as it is a reasonable improvement for clinicians to consider implementing this intervention in practice settings. A 25% attrition rate was added after the sample calculation to account for potential attrition resulting in a final sample size of 214 couples (107 per group).

**Recruitment**

Recruitment took place 5 to 7 days a week, between March 26, 2012 and July 15, 2012. The floor nurses informed the eligible couples about the study and if the couples agreed to hear a detailed explanation (Appendix L1) the research coordinator approached them. Eligibility was confirmed (Appendix O) and if the couples were willing to participate they were given the consent form to sign (Appendix M). Consent and baseline data were collected from each
participant before randomization. Couples were informed that upon completion of the 12 week survey they would be sent a $10.00 gift card and the control group would be sent intervention booklets.

**Randomization**

Random allocation was used to determine group assignment. The random sequence was generated on www.random.org. To ensure the information was protected and each participant had an equal chance of being allocated to either group, sequentially numbered, sealed, opaque envelopes were used. The random sequence and envelopes were made by a research assistant who was not part of this study. As well, cardboard and aluminum foil were placed inside the envelope to prevent potential detection of assignment group by placing the envelope up to a light source (Higgins & Green, 2006; Schutz & Grimes, 2002). The researcher coordinator recruited participants, obtained consent, collected baseline data, randomized participants into study groups, and then provided the intervention to those in the intervention group. This method of randomization was chosen as it allowed the interaction between the research coordinator and the couple to be uninterrupted and the study activities to be completed within a timely manner in order to decrease participant burden.

**Study Groups**

**Control Group**

Couples allocated to the control group received standard postpartum care in the hospital and the community. The hospital care consists of assistance and monitoring by hospital nurses, with referral to a lactation consultant as required. Women received this care until discharge from the hospital (24 to 36 hours post vaginal delivery and 2 to 3 days post-cesarean section). Based on individual needs, some women were scheduled a return visit at the Mother Baby Unit to see the lactation consultant post hospital discharge. The care in the community consisted of a telephone call from a public health nurse in which the mother may or may not have received support for breastfeeding. The mothers received follow-up postpartum care by an obstetrician or family doctor. The mother usually had one appointment in the doctor’s office at 6 weeks postpartum. The infant received care from a physician, either a pediatrician or a family doctor. The infant
may have been followed up regularly and usually visited their physician in the first week postpartum. At these postpartum appointments infant feeding may have been reviewed.

**Intervention Group**

The intervention group received standard care offered to breastfeeding women in the hospital and community with the addition of a multifaceted coparenting breastfeeding support intervention, which included (1) an in-hospital discussion, (2) video, (3) a workbook, (4) access to the intervention website, (5) two follow-up emails, and (6) one telephone call (Table 3). This intervention was designed with coparenting elements (joint goal setting, support, fair division of parental tasks, and joint parental involvement), as well as the two coparenting skills (effective communication and conflict resolution/problem solving) and contained extensive breastfeeding information.

Table 3

**Intervention Components**

<table>
<thead>
<tr>
<th>Component</th>
<th>Delivery Time-Point</th>
<th>Details of Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussion</td>
<td>In hospital in first two days postpartum</td>
<td>The research coordinator described coparenting to parents with use of a take home workbook and the video. The booklets were reviewed and used to discuss the mechanics of breastfeeding, how to tell baby is getting enough, and fathers’ involvement. A 2 minute video on the <a href="http://www.cosistudy.com">www.cosistudy.com</a> website was shown. The discussion took approximately 15 minutes.</td>
</tr>
<tr>
<td>Take-home Workbook</td>
<td>Discussed in hospital and to be completed at home over the first 12 weeks post-partum</td>
<td>This booklet contained information on coparenting and included activities for the couple to complete together.</td>
</tr>
<tr>
<td>Breastfeeding Booklet</td>
<td>Given in the hospital to be taken home</td>
<td>The Breastfeeding Matters booklet was given to parents to provide information on breastfeeding</td>
</tr>
<tr>
<td>Take-home Video</td>
<td>Offered to be shown in the hospital or to be viewed at home by the couple</td>
<td>The video contained information on the elements and skills of coparenting, as well as how to work together to solve breastfeeding problems</td>
</tr>
</tbody>
</table>
The website was available to the parents in the intervention group over the course of the study (12 weeks postpartum). The website was password protected. It contained information on coparenting and breastfeeding.

Follow-up emails

Emails were sent to mothers and fathers at 1 and 3 weeks postpartum. The intentions of the emails were to remind the couples of the resources they had been given and assisted them in navigating through the material to find the information they required.

Follow-up telephone call

Mothers received a telephone call at 2 weeks postpartum. The telephone call to the mother was intended to provide support. If the mother was not available, a message was left with a call back number.

Video

A specifically developed 12 minute coparenting video was offered to couples to watch in the hospital and a copy of this DVD was given to take home for future viewing, as necessary. Additionally, the video was posted on the intervention website.

Workbook

A specifically developed intervention booklet was provided (Appendix P) to teach elements and skills of coparenting. The workbook also included (1) a chart on breastfeeding (Supplemental Material B); (2) an information chart, which clearly indicated where information on certain breastfeeding topics could be found within the intervention materials; and (3) a page on how to access the website (Appendix Q). This additional information was designed to assist with navigating through the information provided and provide visuals for some of the breastfeeding information covered in the in-hospital discussion.

Breastfeeding Resource

*Breastfeeding Matters* is a 41-page breastfeeding information booklet developed by Best Start: Ontario’s Maternal, Newborn and Early Child Development Resource Centre with assistance
from the Public Health Units of Ontario and funded by the Government of Ontario (Supplemental Material A; Best Start Ontario, 2011). This booklet provided a wide variety of breastfeeding information regarding the importance of breastfeeding, common problems, pumping and storing milk, and getting help. It includes diagrams and visual images. The content was approved by the Ontario Breastfeeding Committee and it meets the Baby-Friendly Initiative standards.

Website
Couples had access to a secure website (www.cosistudy.com) specifically designed for this study (Appendix Q), which contained text and video information on coparenting as well as information on breastfeeding management, common problems and solutions, resources, and links to extensive breastfeeding information on the internet. Google Analytics were used to track the frequency with which each webpage was visited.

Follow-up Emails and Telephone Calls
Couples received an email at 1 and 3 weeks postpartum to remind them of the resources they had been given. The mothers were given a follow-up telephone call from the research coordinator at 2 weeks postpartum. This call allowed mothers the opportunity to ask any questions.

Piloting the Intervention
The intervention was piloted with 10 couples in the first phase of the study. At the 1 and 4 week telephone calls were made to both mothers and fathers. During the call the couples were asked to provide feedback on the intervention (Appendix J). This feedback was used to make modification deemed necessary.

Instruments Used for Data Collection

Baseline Data
The baseline data were collected following consent procedures and before randomization. Demographic data were collected from both mothers and fathers. At baseline mothers breastfeeding self-efficacy was assessed. Assessment of three of the secondary outcome
variables were administered to assess for changes in paternal breastfeeding self-efficacy, paternal infant feeding attitude, and maternal perception of the coparenting relationship.

**Demographic Characteristics**

Baseline data were collected on maternal (Appendix C 1) and paternal (Appendix C 2) demographic information known to be related to breastfeeding duration and exclusivity. The data collected included (1) personal characteristics, such as maternal and paternal age, socioeconomic status, and ethnicity; (2) interpersonal characteristics, such as breastfeeding intentions, attitude, confidence; and (3) hospital policies and intrapartum experiences, such as early breastfeeding initiation, rooming–in, supplementary feeding, intrapartum experience (Dennis, 2002).

**Primary Outcome Variable**

**Exclusive Breastfeeding**

The primary outcome for this study was the rate of exclusive breastfeeding at 12 weeks postpartum. This is defined as no food or liquid other than breast milk (not even water) given to the infant and includes feeding expressed breast milk. However, under this definition of exclusive breastfeeding, undiluted drops or syrups consisting of vitamins, minerals supplements or medicines are included (Breastfeeding Committee for Canada, 2006; WHO, 2010). Exclusive breastfeeding was determined by asking the mother what she has fed her baby in the last 24 hrs and what she usually feeds her baby. This is consistent with the indicators for assessing infant feeding practices published by the WHO (2010). In this trial exclusive breastfeeding will be consistent with full breastfeeding described by Labbok and Krasovec (1990). The information was collected using questions on the Infant Feeding Questionnaire at 6 weeks (Appendix F1) and 12 weeks (Appendix F2) postpartum. The follow up time point was chosen as most breastfeeding difficulties that result in the premature discontinuation of breastfeeding occur in this time-period (Chalmers et al., 2009; Cooke et al., 2003; Ertem et al., 2001; Hall et al., 2002; Matthews et al., 1998; Sheenan et al., 2001; Sheenan et al., 2006).
Secondary Outcome Variables

**Breastfeeding Duration**

Breastfeeding duration is defined as the length of time in which the infant receives breast milk. The Infant Feeding Questionnaire was used to collect data on breastfeeding duration and infant feeding patterns (Appendix F1 & F2). Data were collected on infant feeding methods and patterns including (1) breastfeeding frequency (day and/or nights), (2) artificial nipples or devices used (yes/no), (3) expression of breast milk, (4) timing of breast milk substitute introduction, and (5) quantity of breast milk substitute fed to the infant (Labbok & Krasovec, 1990). Additionally, information on breastfeeding problems experienced, weaning and reasons for weaning, and where mothers received the most valuable breastfeeding supports was collected.

**Coparenting Relationship**

Coparenting is the degree to which parents work together to achieve parenting goals. This was measured using Feinberg, Brown and Kan (2010) Coparenting Relationship Scale (CRS: Appendix G3). There are 35 items in total in this tool. There is a 7-point response scale ranging from “not true of us” (0) to “very true of us” (6). The five items related to “Exposure to Conflict” range from “never” (0) to “very often” (6) (Feinberg, Brown & Kan, 2010). Negative scale items are reversed. Total scores range from 0-210, higher score indicate positive coparenting. The complete 35 items were determined with the use of exploratory and confirmatory factor analysis and the scale has been psychometrically tested. The tool was found to be psychometrically sound in testing coparenting with a Cronbach’s alpha of 0.91-0.94 across gender and data collection points and stable over time (regression coefficient 0.74 wave 2-3 and 0.71 wave 3-4; Feinberg, Brown & Kan, 2010). Criterion validity analysis was done using several constructs of concurrent correlations between the CRS and other dyadic couple relationship variables. For these measures the associations were found to be in the expected direction for love, conflict, sex/romance, ineffective arguing, and couple efficacy. The Brief Coparenting Relationship Scale (Bf-CRS; Appendix G1 & G2) which has 14 items with scores has good internal consistency (Cronbach’s alpha 0.81 to 0.89) and scores range from 0-84 (Feinberg, Brown & Kan, 2010).
Breastfeeding Support

Breastfeeding support is defined as the appraisal, emotional, informational and instrumental support provided to the breastfeeding woman. This component of coparenting was measured using the Postpartum Partner Support Scale (PPSS; Appendix H). The Postpartum Partner Support Scale (PPSS), a 25-item self-report instrument, was designed to assess partner postpartum-specific perceptions of support at 4-weeks postpartum. This scale was developed to assess functional elements of support: appraisal/emotional, informational, and instrumental. Two items were included to examine negative support from the partner. Items were rated on a 4-point scale to produce a summative score ranging from 25 to 100, with higher scores indicating higher levels of postpartum-specific partner support. Content validity of the PPSS was based on a literature review and expert judgment. Responses were subjected to principal components analysis with a varimax rotation. This measure utilized previously was found to have high internal consistency with a Cronbach alpha of 0.96 (Dennis & Letourneau, 2007).

Breastfeeding Self-Efficacy

Breastfeeding self-efficacy is defined as a mother’s confidence in her ability to breastfeed her infant (Dennis & Faux, 1999). To measure this variable the Breastfeeding Self-Efficacy Scale – Short Form (BSES-SF; Appendix D 1 & 2; Dennis, 2003) was used. This instrument has 14 items. The response format is on a Likert scale, ranging from ‘not at all confident’ (1) to ‘very confident’ (5) where items are summed to produce a total score, ranging from 14 to 70, with higher scores indicating greater breastfeeding self-efficacy. This instrument has been psychometrically tested and found to be a good measure of breastfeeding self-efficacy with a Cronbach’s alpha of 0.97 (Dennis, 2003). Additionally, construct validity was determined using principal component factor analysis, comparison contrast groups, and correlations with self-esteem were positive, while it negatively correlated with depression and stress. This scale had good predictive validity and has been translated into diverse languages.

Infant Feeding Attitude

Breastfeeding attitude is defined as parental attitude regarding infant feeding methods. Paternal breastfeeding attitudes were assessed using the Iowa Infant Feeding Attitude Scale (IIFAS;
Appendix E), which measures attitude towards infant feeding methods. This scale consists of 17 items that cover various dimensions of infant feeding. The respondent indicated if he agreed or disagreed with each statement, on a five point Likert scale that ranges from strongly agree (5) to strongly disagree (1). The items were worded so that about half are favourable of each feeding method. Items that favour formula feeding were then reverse scored. The items total score range from 17-85 and the lower scores reflect a preference for formula feeding whereas the higher scores reflect a preference for breastfeeding. The tool has been found to be reliable, with a Cronbach’s alpha ranging from 0.85-0.86. The tool’s construct validity was illustrated by its ability to predict choice of feeding method. It was able to differentiate between women who planned to breastfeed versus those who planned to formula-feed their infant, as well as actual feeding behaviour and duration of breastfeeding (de la Mora, Russell, Dungy, Losch & Dusdieker, 1999).

Maternal and Paternal Satisfaction

Satisfaction refers to how content the participants were with the study experience. Information on satisfaction with intervention materials and with study participation was collected to assist the researcher in determining strengths and weaknesses of the study and help plan future studies. The Participant Satisfaction Questionnaire (PSQ) was used to collect this information from intervention group mothers at 6 weeks postpartum (Appendix I1) and all mothers at 12 weeks postpartum (Appendix I2) via web-based questionnaire or telephone survey. Paternal satisfaction with the intervention was collected using a version of the Participant Satisfaction Questionnaire at 6 weeks postpartum (Appendix I3, questions 1-7) and the control groups were administered selected questions only (Appendix I3, question 7-9).

Methods of Data Collection

Data was collected from both the mother and the father. The mothers had three data collection time points (Table 4) and the fathers had two (Table 5). The first data collection point was in the hospital upon entry to the study. Data were collected using self-report, as the participants completed the questionnaires. Six weeks and 12 week data were collected via web-based questionnaires on Survey Monkey (Survey Monkey, 2011) or telephone interview, whichever the participant preferred. If telephone interviews were chosen, the research assistant conducting the
interviews remained blinded to group allocation. The mothers and fathers whom requested web-based surveys were sent emails with the link to the questionnaires. These emails were sent one week before the data collection time period and telephone reminders were also provided to ensure the participants received the emails.

Table 4
*Data Collection Instruments and Time Points for the Mother*

<table>
<thead>
<tr>
<th>Concept</th>
<th>Data Collection Tool</th>
<th>Baseline</th>
<th>6 week data collection</th>
<th>12 week data collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic</td>
<td>Demographic questionnaire</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Breastfeeding Exclusivity and Duration</td>
<td>Infant Feeding Questionnaire</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Breastfeeding Support</td>
<td>PPSS</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Coparenting Relationship</td>
<td>Bf-CRS</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CRS</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>Patient Satisfaction Questionnaire</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

BSES-SF= Breastfeeding Self-Efficacy Scale- Short Form
PPSS= Postpartum Support Scale
Bf-CRS= Brief Coparenting Relationship Scale used a baseline and 6 weeks
CRS= Coparenting Relationship Scale -Full Scale used at 12 weeks

Table 5
*Data Collection Instruments and Time Points for the Father*

<table>
<thead>
<tr>
<th>Concept</th>
<th>Data Collection Tool</th>
<th>Baseline</th>
<th>6 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic</td>
<td>Demographic Questionnaire</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Paternal Breastfeeding Self-Efficacy</td>
<td>BSES-SF</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Paternal Infant Feeding Attitude</td>
<td>IIFAS</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Satisfaction with Intervention</td>
<td>Patient Satisfaction Questionnaire</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

BSES-SF= Breastfeeding Self-Efficacy Scale- Short Form
IIFAS= Iowa Infant Feeding Attitude Scale
Data Management Plan

Storage of Confidential Information

To ensure confidentiality of all participants’ information, all paper information with participants’ identifying and personal information, such as consent forms and contact information, were kept in a locked filing cabinet. This information was kept separately from the participants’ personal data collected on questionnaires. Identifying information was removed and names were replaced with a unique participant identifier with a secondary identifier (McFadden, LoPresti, Bailey, Clarke & Wilkins, 1995). The participants’ birth date was collected as the secondary identifier. All paper and electronic documents will be kept securely for seven years. At the end of the allotted retention period, the destruction of the documents (both paper and electronic) will be done in a secure manner, which ensures the data is not recoverable (TAHSN Research Committee, 2008).

Storage of Electronic Information

All information was entered into a SPSS © database for data storage and analysis. All electronic data was stored weekly on a backup hard drive and main computer. Two locations were used in order to protect from loss due to theft, fire, or flood (McFadden et al., 1995).

Assessing Data Accuracy

Once data collection started, data checking was done on an ongoing basis and before entry into the database in order to detect any problematic questions. Participants were contacted by email for clarification when necessary. To increase accuracy of the data, logic checks and range checks were built into the web-based questionnaire and questionnaires on which the research assistant was entering the data from the telephone interviews. The majority of data were entered into a web-based questionnaire, which were designed through Survey Monkey. Survey Monkey is a secure, private, and accessible web-based survey collector with encrypted responses for confidentiality (Survey Monkey, 2011). The online surveys were monitored for completion and email reminders were sent to ensure the questionnaires were completed within the data collection time period.
Tracking Data Completion and Compliance

In order to track data completion and ensure that data were collected at the correct time points, a form was created to track participants. As the outcome data were collected, the data tracking form was updated on a biweekly basis. Furthermore, reminders were sent weekly to the participants when the questionnaires were outstanding. Up to 4 emails and 3 telephone calls were given to remind participants of outstanding questionnaires and increase compliance. Telephone calls were needed as emails were not always received. Additionally, the research coordinator delivered all components of the intervention to the participants and kept record of all intervention components on a compliance checklist (Appendix N).

Data Analysis

Data was analyzed with SPSS. Intention-to-treat principals were followed.

Primary Outcomes

The frequencies and percentages were calculated for the primary outcome variable, exclusive breastfeeding at 6 and 12 weeks. The association between exclusive breastfeeding and group allocation at 6 and 12 weeks were tested using the chi-square statistic as the data were dichotomous outcomes. The Relative Risk (RR) and corresponding 95% confidence intervals were calculated for exclusive breastfeeding at 6 and 12 weeks.

Secondary Outcomes

The association between breastfeeding duration and group allocation at 6 and 12 weeks postpartum were tested using the chi-square statistic as well the Relative Risk (RR) and 95% confidence intervals were calculated. Means (M) and standard deviations (SD) were calculated for scores on the scales measuring breastfeeding support, the coparenting relationship, paternal breastfeeding self-efficacy and infant feeding attitude. The mean scores between groups were analyzed using the two independent sample t-tests. Man Whitney U Test was used for skewed data. The repeat measures multivariate ANOVA test was used to determine the changes in scores in each group over time at 6 and 12 weeks. Logistic Regression was used to determine the
impact of baseline coparenting, maternal and paternal breastfeeding self-efficacy, and paternal infant feeding attitude on breastfeeding exclusivity at 12 weeks postpartum.

Additional Outcomes

Content analysis was completed using information obtained from open ended questions. These types of questions were used to collect data on participants’ satisfaction with the intervention and participation in the study. Demographic data were analyzed using descriptive statistics (mean and standard deviations for continuous variables and frequencies and percentages for categorical data).

Contamination

To control for contamination the research coordinator did not recruit participants in the same hospital room, the intervention group was instructed not to discuss or share elements of the intervention (educational session, website, and written material) with other patients or staff (Appendix L2), and the staff were blinded to the intervention components. The staff members were also blinded to the group the couples were allocated to in order to decrease co-intervention.

In order to identify contamination, the control group was asked about their exposure to the intervention components. This information was collected at 12 weeks as part of the Participant Satisfaction Questionnaire (Appendix I 2, Question # 12; Sackett, 2007).

Controlling for Attrition

Attrition bias was controlled for in three main ways: (1) frequent email reminders and telephone calls were provided throughout the study period, (2) to decrease the chance of losing contact with participants mothers’ and fathers’ telephone numbers and email addresses were collected at baseline, (3) participants were told upon enrollment that they would receive a $10.00 gift card once the 12 week survey was completed.
Ethical Issues

Ethics approval for the study was received from both the University of Toronto and the North York General Hospital ethics boards before the study commenced.

Risks

There were no known risks to participating in this trial. All participants received standard postpartum care in the hospital and community, no care was withheld. However, since some mothers find breastfeeding to be an emotional issue, particularly if they do not succeed in meeting their goals, sensitivity toward mothers’ experiences were taken into consideration. Every effort was made in the design of the intervention and in the interaction with participants to be supportive of all mothers regardless of their feeding experience and method. Additionally, some couples may not be comfortable with the information provided in the intervention regarding the division of labour. Therefore, it was communicated that this was not referring to the manner in which the tasks were divided, the goal was that both parents’ perceived the division as fair. Lastly, to ensure participant safety, the couples were informed that the information on the website should not be used in place of seeking medical advice when needed and was not intended to promote any products (Appendix L2).

Benefits

There are no known benefits to this intervention. However, studies that have evaluated breastfeeding interventions, coparenting interventions, and programs that have involved fathers in breastfeeding, all have reported positive experiences for participants. It was hoped that this study would prove to be a positive experience for participants. The intervention workbook, video, and website were all designed to enhance the couples’ breastfeeding experience and assist the couples in having a safe, positive, and successful breastfeeding experience.
CHAPTER FOUR
RESULTS

Chapter Summary

This chapter will review the trial results. First, the pilot study data and result will be presented. The sample demographics and the flow of participants will be reviewed. The participant dosage of the intervention will be presented. The results of the primary outcome, exclusive breastfeeding at 12 weeks as well as exclusive breastfeeding at 6 weeks and any breastfeeding at 6 and 12 weeks will be analyzed using a Chi square test and the relative risks will be indicated. Study group mean differences will be compared for scales used to measure the secondary outcomes, breastfeeding support, coparenting, paternal breastfeeding self-efficacy, and paternal infant feeding attitude. Participant satisfaction will be discussed and the chapter will conclude with logistic regression analysis to determine variables associated and predictive of exclusive breastfeeding at 12 weeks.

Pilot Study

Pilot Sample

Enrollment for the pilot study took place on the postpartum unit of a large urban hospital in Toronto, Canada. Ten couples were enrolled between February 2 and 9, 2012. Some of the mothers in the pilot study planned to breastfeed exclusively \((n=6, 60\%)\) while others planned to give mixed feeds and supplement with formula \((n=4, 40\%)\). While in the hospital, the mothers reported breastfeeding was going very well \((n=3, 30\%)\), good \((n=5, 50\%)\) or satisfactory \((n=2, 20\%)\). Half of the participants had an annual household income of over $80,000 \((n=5, 50)\). The majority of mothers had university educations with 40% \((n=4)\) having undergraduate degrees and 50% \((n=5)\) having completed graduate degrees. All of the fathers had completed a university degree. Sixty percent \((n=6)\) of mothers and 40% \((n=4)\) of the fathers were born outside of Canada. Eighty percent \((n=8)\) of the fathers worked full time and 20% \((n=2)\) worked part time.
**Intervention**

Baseline data were collected from both parents and the in-hospital discussion was provided. These discussions explained the elements of the intervention to couples and reviewed how breastfeeding works. All couples were given the intervention material and both mothers and fathers were followed up by way of a telephone call at 1 and 4 weeks postpartum. At that time they were asked about their use of the study information and their perception of its usefulness.

**One Week Postpartum**

At 1 week, 90% \((n=9)\) of the mothers and 80% \((n=8)\) of the fathers were contacted by telephone. Of these mothers, only 22.2% \((n=2)\) of mothers and 37.5% \((n=3)\) of fathers had reviewed the coparenting workbook (Table 6). The *Breastfeeding Matters* booklets was reviewed by 66.7% \((n=6)\) of mothers and 75% \((n=6)\) of fathers and all of the participants that reviewed the book reported finding it helpful. Sixty percent \((n=6)\) of couples viewed the DVD in the hospital and 11.1% \((n=1)\) of mothers and 25% \((n=2)\) of fathers viewed the DVD at home. Only two fathers accessed the website. One of these fathers reported that he found the website helpful in the first week but wanted more detailed information, as well as more information specifically targeting fathers. Eight mothers and five fathers reported the reason they had not completed the activities in the workbook was that they did not have time. Sixty-six percent \((n=6)\) of mothers and 62.5% \((n=5)\) of fathers reported finding the telephone calls helpful.

<table>
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<tr>
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<th>1 Week Postpartum</th>
<th>4 Weeks Postpartum</th>
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<tr>
<td><strong>Intervention Component</strong></td>
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<td><strong>Father ((N=8))</strong></td>
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<td>Coparenting Workbook</td>
<td>2 (22.2%)</td>
<td>3 (37.5%)</td>
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<tr>
<td><em>Breastfeeding Matters</em></td>
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<td>6 (75%)</td>
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<tr>
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<td>2 (25%)</td>
</tr>
<tr>
<td>DVD watched</td>
<td>7 (77.8%)</td>
<td>7 (87.5%)</td>
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</table>
Four Weeks Postpartum

At four weeks, 60% (n=6) of mothers and 50% (n=5) of fathers were contacted (Table 6). Of these couples, 83.3% (n=5) of mothers and 100% (n=5) of these fathers had reviewed the coparenting workbook, four of these mothers reviewed the book with their partner and one did it on her own. The *Breastfeeding Matters* booklet was reviewed by 100% (n=6) of these mothers and 80% (n=4) of these fathers and they all reported that they found it helpful. Sixty-six percent of mothers (n=4) and 60% (n=3) of fathers had accessed the website. One hundred percent (n=6) of the mothers and fathers (n=5) reported finding the one week follow-up telephone call helpful.

Comments from Mothers and Fathers Regarding the Information

One mother commented “It has been great having the resources at our fingertips. It is good to have and I really like how everything is put together.” Another stated, “It helped get me thinking about how Dad can be involved” and yet another stated “Although we did not formally fill out the book, the workbook provided good discussion topics that couples may not explicitly talk about. It makes you talk and think about issues you may not necessarily realize and provides potential strategies to deal with them.” One mother’s commented about the video, “I thought it was great, good length and I enjoyed watching the couples.” One father commented, “The simpler the better, the exercises are good. It is hard because I have no time.” Another father noted, “Good information, everything is there, step by step.”

Modifications to Trial Protocol

The majority of mothers (n=9, 90%) and fathers (n=8, 80%) were contacted at 1 week. At 4 weeks there was greater attrition, with only 60% (n=6) of mothers and 50% (n=5) of fathers contacted. The number of couples lost to follow-up in the pilot was concerning, as such, the sample size of the trial was increased to allow for a 25% attrition rate. Further an incentive was introduced, where all participants who completed the 12 week questionnaire received a $10.00 gift card and those in the control group were also provided with the coparenting workbook and *Breastfeeding Matter* booklet.
The sessions in the hospital were shortened due to participant burden. The length of time it was taking the participants to complete the questionnaires, listen to the discussion and watch the video was approximately 30-45 minutes. Couples appeared tired and the sessions were often interrupted by the infants’ needs or other health care professionals or visitors. Some of the baseline questions deemed to be unrelated to the primary or secondary outcomes were removed.

Making contact with couples by telephone proved to be difficult with many attempts often required. Additionally, the conversations were often cut short due to infants’ needs. To address this, follow-up telephone calls were replaced with emails for both parents at 1 and 3 weeks, with one telephone call being made to the mother at 2 weeks. If the mother was not contacted on the telephone, a message was left and the mother was given the contact information for the research coordinator.
Full Trial Results

Sample

Recruitment

In total, 1536 postpartum mothers were assessed for eligibility during the study period of March 26, 2012 to July 15, 2012 (Figure 2). Of these mothers, 1138 (74.5%), did not meet the inclusion criteria. The majority of these mothers were excluded as they were not primiparous (n=823, 73.7%). Of the 713 primiparous mothers assessed for study inclusion, 315 (44.2%) primiparous mothers were not eligible. The most common reasons for exclusion were (1) inability to speak English (n=63, 20.0%), (2) formula feeding (n=39, 12.4%), (3) infant was not term (n=34, 10.8%), baby was in the Intensive Care Unit (n=31, 9.8%), sharing a hospital room with a participant (n=29, 9.2%), midwife patient (n=27, 8.6%), and mothers were single (n=23, 7.3%). Twenty-three couples were not able to participate as their partner was unavailable (7.3%).

Of the 456 mothers who were approached by the hospital nurse and informed about the study, 130 (28.5%) declined to hear the study detailed explanation from the research coordinator. Of the 326 who heard the study details, 58 (17.8%) were not eligible and 54 women (16.5%) declined study participation. The most common reasons for exclusion were (1) the father was unavailable (n=23, 39.7%), (2) insufficient ability to speak English (n=19, 32.8%). The primary reason for declining was that the mother and/or father were not interested (n=43, 79.6%).
Postpartum breastfeeding women and their partners in hospital (day 1-2 postpartum) 
(n=1536)

Eligible Women (n=398)

Randomized to Group Allocation 
(n=214)

Allocated to usual care (n=107) 
Received usual care (n=107)

Loss to follow up 6 weeks
Mother  n= 16 (complete) 
         n= 5 (primary) 
Father   n= 12

Loss to follow up 12 weeks
Mother  n= 11 (complete) 
         n= 2 (primary)

Outcome data 6 weeks
Mother  n= 91 (complete) 
         n= 102 (primary) 
Father   n= 95

Outcome data 12 weeks
Mother  n= 96 (complete) 
         n= 105 (primary)

Allocated to Intervention (n=107) 
Received Intervention (n=107)

Loss to follow up 6 weeks
Mother  n= 9 (complete) 
         n= 3 (primary) 
Father   n= 14

Loss to follow up 12 weeks
Mother  n= 7 (complete) 
         n= 3 (primary)

Outcome data 6 weeks
Mother  n= 98 (complete) 
         n= 104 (primary) 
Father   n= 93

Outcome data 12 weeks
Mother  n= 100 (complete) 
         n= 104 (primary)

Not meeting Inclusion criteria 
(n=1138)

- n= 823 multiparous
- n= 63 not speaking English
- n= 39 formula feeding
- n= 34 premature
- n= 31 NICU
- n= 29 sharing room
- n= 27 midwife
- n= 23 father not available
- n= 23 single
- n= 19 pumping not bf
- n= 11 twins
- n= 9 maternal illness
- n= 5 not bf to 3 mo
- n= 2 under 18
- n= 1 same sex
- n= 1 no internet

Refused to participate 
(n=184)

- n=130 refused RN
- n=54 refused RC
- n=43 not interested

Loss to follow up 12 weeks
Mother  n= 7 (complete) 
         n= 3 (primary) 
Father   n= 14

Outcome data 12 weeks
Mother  n= 100 (complete) 
         n= 104 (primary)
**Attrition**

Complete data were collected at 6 weeks postpartum for 189 (88.3%) mothers, 188 (87.9 %) fathers, and at 12 weeks postpartum for 196 (91.6%) mothers. Information on the primary outcome (exclusive breastfeeding) was obtained from 206 (96.3%) women at 6 weeks and 209 (97.7%) at 12 weeks. A higher follow-up rate was achieved with the primary outcome due to (1) mothers or fathers were contacted by telephone and agreed to provide the primary outcome data but declined to complete the rest of the survey, or (2) the mother began the web-based survey but did not complete it. The majority of questionnaires were completed by web-based survey for both the mothers at 6 (n=185, 97.9%) and 12 weeks (and n=196, 99%) and fathers at 6 weeks (n=176, 93.6%). There were no significant differences between the fathers who completed the 6 week questionnaire and those who were lost to follow up (LTF) related to baseline characteristics collected at baseline: age, education level, income, work status, breastfeeding intentions, infant feeding attitude or breastfeeding self-efficacy. There were no significant differences found between those mothers who were LTF at 6 and 12 weeks postpartum and those who provided all follow-up data.

**Baseline Characteristics**

The mothers in this trial had a mean age of 30.6 (SD 3.8; range 18-41), the fathers mean age was 33.6 (SD 5.4; range 17-49; Table 7). Over half of the mothers (n=137, 64%) and fathers (n=142, 66.4%) were born outside of Canada. Of these participants, the majority came from Asia or the Middle East (mothers, n=108, 78.8%; fathers n=103, 72.5%). The mean length of time in Canada for mothers was 10.8 years (SD 8.1) and 11.8 (SD 16.1) years for fathers. The majority of participants acquired a university undergraduate or graduate degree (mothers n=156, 72.9%; fathers, n=148, 69.1%), had an annual household income over $60,000 (n=164, 76.1%), and were married (n=192, 89.7%). The majority of fathers were first time parents (n=207, 96.7%), of which only seven had a previous child.
Table 7
Demographic Baseline Characteristics

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<td>n (%)</td>
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**Time in Canada**

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### Paternal Place of Origin

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### Maternal Education

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### Paternal Education

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### Paternal Employment

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</table>
**Baseline Breastfeeding and Delivery Characteristics**

The majority of the mothers \((n=201, 93.9\%)\) and fathers \((n=173, 80.8\%)\) planned to have their infant breastfeed for 6 months or longer and to be doing so exclusively (mothers \(n=140, 65.5\%\); fathers \(n=118, 55.1\%\); Table 8). Most of the fathers had made the decision to breastfeed before pregnancy \((n=158, 73.8\%)\) or during early pregnancy \((n=35, 16.4\%)\). Most fathers were involved in the infant feeding plan, as 84.1\% \((n=180)\) of the couples reported that it was a joint decision. Most fathers also indicated the recommendation to exclusively breastfeed to 6 months was important or very important \((n=192, 89.7\%)\). The mothers also indicated the recommendation to exclusively breastfeed was important or very important \((n=194, 90.6\%)\).

The majority of the mothers had a vaginal delivery \((n=155, 72\%)\) with epidurals being the most common type of pain relief medication administered in labour \((n=197, 92.1\%)\). Very few mothers were separated from their infants after delivery \((n=6, 2.8\%)\). While most mothers were exclusively feeding in the hospital \((n=192, 89.7\%)\), breastfeeding was not progressing well for 21 \((9.8\%)\) mothers and 6 \((2.8\%)\) mothers indicated it was progressing terribly. Additionally, the majority of mothers reported the fathers were very supportive of breastfeeding \((n=200, 93.5\%)\).

**Table 8**  
*Baseline Breastfeeding and Delivery Characteristics*

<table>
<thead>
<tr>
<th></th>
<th>Intervention ((N=107))</th>
<th>Control ((N=107))</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maternal Planned Breastfeeding Level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan to exclusively breastfeed</td>
<td>95 (88.8)</td>
<td>95 (88.8)</td>
</tr>
<tr>
<td>Combination</td>
<td>11 (10.3)</td>
<td>11 (10.3)</td>
</tr>
<tr>
<td>Don’t know how will feed</td>
<td>1 (0.9)</td>
<td>1 (0.9)</td>
</tr>
<tr>
<td><strong>Paternal Planned Breastfeeding Level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan to exclusively breastfeed</td>
<td>75 (70.1)</td>
<td>76 (71)</td>
</tr>
<tr>
<td>Combination</td>
<td>25 (23.4)</td>
<td>27 (25.2)</td>
</tr>
<tr>
<td>Don’t know how will feed</td>
<td>7 (6.5)</td>
<td>4 (3.7)</td>
</tr>
<tr>
<td><strong>Decision to Breastfeed- Maternal Response</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother made decision solo</td>
<td>20 (18.7)</td>
<td>14 (13.1)</td>
</tr>
<tr>
<td>Both parents made decision</td>
<td>87 (81.3)</td>
<td>93 (86.9)</td>
</tr>
</tbody>
</table>
### Planned Breastfeeding Duration

<table>
<thead>
<tr>
<th>Duration</th>
<th>Maternal Plan</th>
<th>Paternal Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal plan to breastfeed over 6 months</td>
<td>101 (94.4)</td>
<td>100 (93.5)</td>
</tr>
<tr>
<td>Maternal plan to exclusively &gt;6 months</td>
<td>75 (70.1)</td>
<td>65 (60.7)</td>
</tr>
<tr>
<td>Paternal plans to breastfeed over 6 months</td>
<td>84 (78.5)</td>
<td>89 (83.1)</td>
</tr>
<tr>
<td>Paternal plan to exclusively &gt;6 months</td>
<td>57 (53.3)</td>
<td>61 (57)</td>
</tr>
</tbody>
</table>

### Infant Feeding Recommendations

<table>
<thead>
<tr>
<th>Type</th>
<th>Maternal –very important/important</th>
<th>Paternal – very important/important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusive breast milk</td>
<td>96 (89.7)</td>
<td>98 (91.6)</td>
</tr>
<tr>
<td>Combination</td>
<td>95 (88.8)</td>
<td>97 (90.7)</td>
</tr>
</tbody>
</table>

### Prenatal Education

<table>
<thead>
<tr>
<th>Attended</th>
<th>Mother</th>
<th>Father</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal –very important/important</td>
<td>78 (72.8)</td>
<td>63 (58.9)</td>
</tr>
<tr>
<td>Paternal – very important/important</td>
<td>74 (69.2)</td>
<td>57 (53.3)</td>
</tr>
</tbody>
</table>

### Pain Medications in Labour

<table>
<thead>
<tr>
<th>Type</th>
<th>Maternal</th>
<th>Paternal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidural</td>
<td>101 (94.4)</td>
<td>96 (89.7)</td>
</tr>
<tr>
<td>Gas (Nitrous Oxide)</td>
<td>1 (0.9)</td>
<td>2 (1.9)</td>
</tr>
<tr>
<td>Narcotic Injection</td>
<td>5 (4.7)</td>
<td>4 (3.7)</td>
</tr>
<tr>
<td>General</td>
<td>2 (1.9)</td>
<td>3 (2.8)</td>
</tr>
<tr>
<td>No pain medication</td>
<td>6 (5.6)</td>
<td>9 (8.4)</td>
</tr>
</tbody>
</table>

### Type of Birth

<table>
<thead>
<tr>
<th>Type</th>
<th>Maternal</th>
<th>Paternal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal birth</td>
<td>59 (55.1)</td>
<td>59 (55.1)</td>
</tr>
<tr>
<td>Vacuum extraction</td>
<td>5 (4.7)</td>
<td>9 (8.4)</td>
</tr>
<tr>
<td>Forceps</td>
<td>17 (15.9)</td>
<td>6 (5.6)</td>
</tr>
<tr>
<td>Caesarean with labour</td>
<td>21 (19.6)</td>
<td>24 (22.4)</td>
</tr>
<tr>
<td>Elective Caesarean</td>
<td>5 (4.7)</td>
<td>9 (8.4)</td>
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</tbody>
</table>

### Mother /Infant Separated

<table>
<thead>
<tr>
<th>Separated</th>
<th>Maternal</th>
<th>Paternal</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 (3.7)</td>
<td>2 (1.9)</td>
<td></td>
</tr>
</tbody>
</table>

### Infant Feeding in Hospital

<table>
<thead>
<tr>
<th>Feeding</th>
<th>Maternal</th>
<th>Paternal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusive breast milk</td>
<td>97 (90.7)</td>
<td>95 (88.8)</td>
</tr>
<tr>
<td>Combination</td>
<td>10 (9.3)</td>
<td>12 (11.2)</td>
</tr>
</tbody>
</table>

### Infant Feeding Progressing

<table>
<thead>
<tr>
<th>Progressing</th>
<th>Maternal</th>
<th>Paternal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very well</td>
<td>26 (24.3)</td>
<td>42 (39.3)</td>
</tr>
<tr>
<td>Good</td>
<td>39 (36.4)</td>
<td>32 (29.9)</td>
</tr>
<tr>
<td>Satisfactory</td>
<td>28 (26.2)</td>
<td>20 (18.7)</td>
</tr>
<tr>
<td>Not well</td>
<td>11 (10.3)</td>
<td>10 (9.3)</td>
</tr>
<tr>
<td>Terrible</td>
<td>3 (2.8)</td>
<td>3 (2.8)</td>
</tr>
</tbody>
</table>

### Maternal Perception of Partner Support

<table>
<thead>
<tr>
<th>Support</th>
<th>Maternal</th>
<th>Paternal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Supportive</td>
<td>100 (93.5)</td>
<td>100 (93.5)</td>
</tr>
</tbody>
</table>
Baseline Group Differences

More couples in the control group did not attend prenatal class ($n=44$, 41.1% compared to $n=29$, 27.1%; Table 8). The intervention group was higher in number of fathers who obtained a university degree ($n=48$, 44.9% compared to $n=38$, 35.5%; Table 7), however, the control group had more mothers with graduate degrees ($n=29$, 27.1% compared to $n=17$, 15.9%). More couples in the intervention had a higher annual household income of $80,000 per year ($n=67$, 62.5% compared to $n=53$, 49.5%). More mothers in the control group ($n=42$, 39.3%) indicated their breastfeeding was going very well in the hospital than in the intervention group ($n=26$, 24.3%).

Pretest Data

Maternal breastfeeding self-efficacy, paternal self-efficacy, paternal infant feeding attitude, and maternal perception of the coparenting relationship were all measured at baseline and no differences were noted between the groups (Table 9).

Table 9

<table>
<thead>
<tr>
<th></th>
<th>Intervention Group</th>
<th>Control Group</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$ (SD)</td>
<td>$M$ (SD)</td>
<td></td>
</tr>
<tr>
<td>Maternal BSES-SF</td>
<td>47 (9.2)</td>
<td>48.9 (9.5)</td>
<td>0.90</td>
</tr>
<tr>
<td>Paternal BSES-SF</td>
<td>48.5 (9.7)</td>
<td>49.5 (9.9)</td>
<td>0.91</td>
</tr>
<tr>
<td>Maternal Bf-CRS</td>
<td>75.1 (7.9)</td>
<td>75.5 (7.3)</td>
<td>0.73</td>
</tr>
<tr>
<td>Paternal IIFAS</td>
<td>61.4 (5.9)</td>
<td>61.1 (6.0)</td>
<td>0.55</td>
</tr>
</tbody>
</table>

BSES-SF= Breastfeeding Self-Efficacy Scale-Short Form (score range 14-70)

Bf-CRS= Brief Coparenting Relationship Scale (scores range 0-84)

IIFAS= Iowa Infant Feeding Attitude Scale (score range 17-85)
Intervention Dosage

The coparenting intervention was delivered to all of the 107 couples randomly assigned to the intervention group. In 96.3% (n=103) of the cases both parents were present for the in-hospital discussion, at which time the information package was explained. The in-hospital discussion took approximately 15 min (n=95, 88.7%). Five couples (4.7%) participated in an in-hospital discussion that lasted 20-30 minutes. However, seven (6.5%) couples received a discussion that lasted 10 minutes or less. For all couples, except for one, emails were sent to both mothers and fathers at 1 and 3 weeks postpartum.

Paternal Intervention Dosage

The majority of fathers (n=104, 97%) were present during the in-hospital discussion. At 6 weeks postpartum, data were collected from 93 (86.9%) fathers regarding their use of the intervention components. At 6 weeks postpartum 89.2% (n=83) of fathers reported using at least one of the components of the intervention (Table 10). Ten fathers (10.8%) did not review the material, however, nine (9.7%) of those fathers had received the in-hospital discussion. Three fathers were not present for the in-hospital discussion, of which one did not review any of the information at home, one was lost to follow-up and it is therefore not known if he reviewed the information and one did review the booklets, website and emails. It is therefore known that 98% (n=105) of the fathers received a portion of the intervention.
Table 10  
*Paternal Intervention Use at 6 Weeks Postpartum*

<table>
<thead>
<tr>
<th>Intervention Component</th>
<th>Usage (N=93)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
</tr>
<tr>
<td>Coparenting Workbook</td>
<td>63 (67.7)</td>
</tr>
<tr>
<td>Breastfeeding Matters Book</td>
<td>67 (72.0)</td>
</tr>
<tr>
<td>Coparenting DVD</td>
<td>44 (47.3)</td>
</tr>
<tr>
<td>Website</td>
<td>46 (49.5)</td>
</tr>
<tr>
<td>Emails and Calls</td>
<td>28 (30.1)</td>
</tr>
<tr>
<td>Used Nothing</td>
<td>10 (10.8)</td>
</tr>
</tbody>
</table>

**Maternal Intervention Dosage**

All mothers were present during the in-hospital discussion, at which time the information package was explained and the mechanics of breastfeeding reviewed. Telephone calls were made to all mothers (n=107) by the research coordinator at 2 weeks postpartum of which she was able to connect with 53 (49.5%) mothers. If the mother was not contacted in person, a message was left. Only one mother returned a call. One mother was not contacted by telephone as there was no answer and no answering machine on 4 attempts.

The majority of mothers reported using at least one of the components of the intervention at 6 and 12 weeks (Table 11). There were six mothers who reported they had not yet used the materials from birth to 6 weeks. Of these mothers, four did use the material between 6-12 weeks. Therefore, two mothers did not use the intervention following hospital discharge.

Table 11  
*Maternal Usage of Intervention Components to 12 Weeks Postpartum*

<table>
<thead>
<tr>
<th>Intervention Component</th>
<th>Birth to 6 Weeks (N=98)</th>
<th>7-12 Weeks (N=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Coparenting Workbook</td>
<td>74 (75.5)</td>
<td>88 (88)</td>
</tr>
<tr>
<td>Breastfeeding Matters Book</td>
<td>89 (90.8)</td>
<td>90 (90)</td>
</tr>
<tr>
<td>Coparenting DVD</td>
<td>49 (50)</td>
<td>64 (64)</td>
</tr>
<tr>
<td>Website</td>
<td>50 (51)</td>
<td>65 (65)</td>
</tr>
<tr>
<td>Emails and Calls</td>
<td>76 (77.6)</td>
<td>94 (94)</td>
</tr>
<tr>
<td>Used Nothing</td>
<td>6 (6.1)</td>
<td>4 (4)</td>
</tr>
</tbody>
</table>
Website Use

Google analytics indicated that 312 visits were made to the website between March 01, 2012 and November 01, 2012. Visits were made to each page and the majority of visits were to the homepage (n= 96, 30.8%). The additional pages were visited less frequently: Common Problems (n=29, 9.3%); How the Baby Makes Milk (n=27, 8.7%); How Milk is Made (n=25, 8.0%); Is Baby Ready to Feed (n=22, 7.1%); Breastfeeding Resources (n=19, 6.1%); Coparenting Page (n=14, 4.5%); and Protecting Breastfeeding (n=13, 4.2%).

Primary Outcome

At 6 weeks postpartum, there were more mothers exclusively breastfeeding in the intervention group (n=75, 72.1%) than in the control group (n=62, 60.8%). While mothers in the control group had an increased risk of not exclusively breastfeeding the increased risk was not significant (RR 1.19, 95% CI [0.98, 1.44]; x²=2.968, p=0.09). This trend remained at 12 weeks as more women in the intervention group (n=70, 67.3%) were exclusively breastfeeding than in the control group (n=63, 60.0%; RR 1.12, 95% CI [0.91, 1.38]; x²=1.21, p= 0.27). There was a 7% percent difference in the women exclusively breastfeeding at 12 weeks between study groups. Calculation of the number needed to treat indicates that if 14 couples were given this intervention one additional person would be exclusively breastfeeding at 12 weeks.

Secondary Outcomes

Breastfeeding Duration

While more women were practicing breastfeeding at 6 weeks in the intervention group (n=102, 98.1%) than those in the control group (n=94, 92.2%), the difference was not statistically significant (RR 1.06, 95% CI [1.00, 1.13]; Fisher Exact Test, p= 0.06). However, at 12 weeks significantly more women in the intervention group (n=100, 96.2%) were breastfeeding than those in the control group (n=92, 87.6%; RR 1.10, 95% CI [1.01, 1.19]; x²=5.09, p=0.02). This intervention increased breastfeeding at 12 weeks by 10% (95% CI [1%, 19%]). Calculation of the number needed to treat indicates that if 12 couples were to receive the intervention, one more mother would be practicing any breastfeeding at 12 weeks postpartum.
Breastfeeding Support

No difference in mean PPSS scores were found at 6 weeks \( t (187) = -1.59, p=0.12 \) or 12 weeks (Man Whitney U Test \( p= 0.21 \)) postpartum (Table 12). Additionally, there was no significant difference in the groups over time \( (F=0.44, p=0.51) \). The PPSS was a reliable instrument as the Cronbach’s alpha was 0.95 at 6 weeks and 0.97 at 12 weeks.

Table 12

<table>
<thead>
<tr>
<th>Measure</th>
<th>Time</th>
<th>Intervention Group ((N=107))</th>
<th>Control Group ((N=107))</th>
<th>Analysis to Compare Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPSS</td>
<td>6 weeks</td>
<td>88.0 (10.9)</td>
<td>85.6 (10.5)</td>
<td>( t (187)=-1.59, p=0.12 )</td>
</tr>
<tr>
<td>PPSS</td>
<td>12 weeks</td>
<td>86.6 (11.7)</td>
<td>83.6 (14.4)</td>
<td>Mann Whitney U test ( p=0.21 )</td>
</tr>
<tr>
<td>Bf-CRS</td>
<td>6 weeks</td>
<td>73.01 (9.8)</td>
<td>71.3 (10.6)</td>
<td>Mann-Whitney U test ( p=0.25 )</td>
</tr>
<tr>
<td>Bf-CRS</td>
<td>12 weeks</td>
<td>72.4. (11.2)</td>
<td>71.1 (12.2)</td>
<td>Mann-Whitney U test ( p=0.64 )</td>
</tr>
<tr>
<td>CRS</td>
<td>12 wks</td>
<td>179.9 (27.4)</td>
<td>174.93 (27.4)</td>
<td>Mann-Whitney U test ( p=0.29 )</td>
</tr>
<tr>
<td>Paternal BSES</td>
<td>6 weeks</td>
<td>55.9 (8.4)</td>
<td>53.1 (11.2)</td>
<td>( t (158)=-1.914, p=0.06 )</td>
</tr>
<tr>
<td>IIFAS</td>
<td>6 weeks</td>
<td>62.1 (8.1)</td>
<td>61.2 (6.7)</td>
<td>( t (186)= 0.788, p=0.43 )</td>
</tr>
</tbody>
</table>

PPSS= Postpartum Support Scale (scores range from 25-100)
Bf-CRS= Brief Coparenting Relationship Scale (scores range from 0-84)
CRS= Coparenting Relationship Scale -Full Scale (scores range from 0-210)
BSES-SF= Breastfeeding Self-Efficacy Scale- Short Form (scores range from 14-70)
IIFAS= Iowa Infant Feeding Attitude Scale (scores range from 17-85)
Note: Mann-Whitney U test used skewness

Coparenting Relationship

There were no differences found in mean CRS-Brief scale scores at 6 (Mann-Whitney U test \( p=0.25 \)) and 12 weeks (Mann-Whitney U test \( p=0.64 \); Table 12). Similarly, at 12 weeks there was no difference found in mean scores with complete CRS scale (Mann-Whitney U Test \( p=0.29 \)). There was no significant difference between the groups over the three time points (Greenhouse-Geisser, \( F= 1.81, p=0.16 \)). Similar findings were found in the subscale analysis (Table 13). The coparenting brief scale was found to have acceptable internal consistency at 6 weeks (Cronbach’s alpha 0.84) and 12 weeks (Cronbach’s alpha 0.88). The complete scale with 35 items at 12 weeks was found to have very good internal consistency (Cronbach’s alpha 0.94).
Table 13
Coparenting Relationship Subscales at 12 weeks

<table>
<thead>
<tr>
<th>Coparenting Subscale</th>
<th>Intervention Group (N =100) M (SD)</th>
<th>Control Group (N=96) M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coparenting Agreement</td>
<td>20.4 (4.1)</td>
<td>20.0 (4.6)</td>
</tr>
<tr>
<td>Coparenting Closeness</td>
<td>26.1 (4.4)</td>
<td>25.1 (5.2)</td>
</tr>
<tr>
<td>Exposure to Conflict</td>
<td>3.0 (3.9)</td>
<td>3.8 (4.0)</td>
</tr>
<tr>
<td>Coparenting Support</td>
<td>30.1 (6.6)</td>
<td>29.4 (7.5)</td>
</tr>
<tr>
<td>Coparenting Undermining</td>
<td>4.1 (6.2)</td>
<td>4.8 (6.5)</td>
</tr>
<tr>
<td>Endorse Partner Parenting</td>
<td>8.8 (3.1)</td>
<td>8.9 (3.1)</td>
</tr>
<tr>
<td>Division of Labour</td>
<td>8.8 (3.1)</td>
<td>8.9 (3.1)</td>
</tr>
</tbody>
</table>

**Paternal Breastfeeding Self-Efficacy**

The BSES-SF was administered at 6 weeks to only those fathers who had breastfeeding infants, which included 87 fathers in the intervention group and 86 fathers in the control group. At 6 weeks, there were no differences in mean Paternal BSES-SF scores between the intervention group (M 55.9, SD 8.4) and the control group (M 53, SD 11.2; t (158)= -1.91, p=0.06; Table 12). However, when the differences between the groups were examined over time there was a significant difference between the groups, with a greater increase in paternal breastfeeding self-efficacy in the intervention group than the control (F=4.84, p=0.03; Figure 3). The Paternal BSES-SF was found to have high internal consistency at 6 weeks (Cronbach’s alpha 0.92).
At 6 weeks, there were no differences in mean paternal IIFA scores between the intervention group ($M = 62.1$, $SD = 8.1$) and the control group ($M = 61.2$, $SD = 6.7$; $t(186) = -0.79$, $p=0.43$; Table 12). When the differences between the groups were examined over time there was no significant difference between the groups ($F=0.01$, $p=0.92$). The IIFAS was found to have acceptable internal consistency at 6 weeks (Cronbach’s alpha 0.72).
Exploratory Outcomes

Maternal Perceptions of Paternal Support

When asked who provided them with breastfeeding help (Appendix F1 #25), more women in the intervention group \((n=76, 71\%)\) reported receiving help from their partner with breastfeeding in the first 6 weeks then those in the control group \((n=56, 52\%); \chi^2=5.74, p=0.02\). Additionally, at 6 weeks more women in the intervention group \((n=52, 53.1\%)\) reported their partners helped them 5 or more times with breastfeeding than those in the control group \((n=34, 37.4\%; \chi^2=4.69, p=0.03\)). Similarly, at 12 weeks more women in the intervention group \((n=39, 36.4\%)\) reported receiving help from their partner than those in the control group \((n=29, 27.1\%)\), but this difference was not statistically significant \((\chi^2=1.67, p=0.20\); Appendix F2 #28\).

Maternal Use of Breastfeeding Resources

Both the control and intervention group received breastfeeding support from hospital nurses, family doctors, pediatricians, breastfeeding clinics and public health nurses (Table 14). More mothers in the intervention group received breastfeeding assistance from breastfeeding clinics or lactation consultants, whereas more assistance was received from public health nurses in the control group.

Table 14

<table>
<thead>
<tr>
<th>Resource</th>
<th>Control Group (n=96)</th>
<th>Intervention Group (n=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital nurse</td>
<td>81 (84.4)</td>
<td>87 (87.0)</td>
</tr>
<tr>
<td>Pediatrician</td>
<td>44 (45.8)</td>
<td>35 (35.0)</td>
</tr>
<tr>
<td>Family doctor</td>
<td>27 (28.1)</td>
<td>36 (36.0)</td>
</tr>
<tr>
<td>Breastfeeding clinic/lactation consultants</td>
<td>60 (62.5)</td>
<td>76 (76.0)</td>
</tr>
<tr>
<td>Public health nurse</td>
<td>27 (28.1)</td>
<td>18 (18.0)</td>
</tr>
</tbody>
</table>
Quantity of Formula Supplementation

Although there was no difference in exclusive breastfeeding rates at 6 weeks postpartum, more mothers in the control group ($n=16, 17.6\%$) than the intervention group ($n=9, 9.2\%$) group were giving greater amounts of formula to their infants (at least half of the feeds were formula) than the intervention group, but this was not statistically significant ($x^2=0.90; p=0.34$; Table 15). At 12 weeks this decreased and $7.5\%$ ($n=8$) of infants in the control group were being fed formula for half or more of their feeds; however, this increased to $14\%$ in the intervention group ($n=15$). Nevertheless, when infants being exclusively formula fed were included, the infants having over half to all of the feeds from formula in the control group was $19.6\%$ ($n=21$) and the intervention group was $17.8\%$ ($n=19$).

Table 15

**Differences in Quantity of Formula Feeds Between Groups at 6 and 12 Weeks**

<table>
<thead>
<tr>
<th></th>
<th>Control Group</th>
<th></th>
<th>Intervention Group</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6 Weeks</td>
<td>12 Weeks</td>
<td>6 Weeks</td>
<td>12 Weeks</td>
</tr>
<tr>
<td></td>
<td>($n=91$)</td>
<td>($n=97$)</td>
<td>($n=98$)</td>
<td>($n=101$)</td>
</tr>
<tr>
<td>Over half of the feeds</td>
<td>8 (7.5)</td>
<td>3 (2.8)</td>
<td>6 (5.6)</td>
<td>11 (10.3)</td>
</tr>
<tr>
<td>Half of the feeds</td>
<td>8 (7.5)</td>
<td>5 (4.7)</td>
<td>3 (2.8)</td>
<td>4 (3.7)</td>
</tr>
<tr>
<td>Under half of the feeds</td>
<td>8 (7.5)</td>
<td>10 (9.3)</td>
<td>8 (7.5)</td>
<td>4 (3.7)</td>
</tr>
<tr>
<td>One time per day</td>
<td>5 (4.7)</td>
<td>5 (4.7)</td>
<td>5 (4.7)</td>
<td>5 (4.7)</td>
</tr>
<tr>
<td>One of more times per week</td>
<td>4 (3.7)</td>
<td>3 (2.8)</td>
<td>3 (2.8)</td>
<td>4 (3.7)</td>
</tr>
<tr>
<td>Less than once per week</td>
<td>0</td>
<td>1 (0.9)</td>
<td>0</td>
<td>1 (0.9)</td>
</tr>
</tbody>
</table>

Satisfaction

Participants’ satisfaction with various elements of the trial were assessed: (1) maternal and paternal satisfaction with the intervention components, (2) maternal satisfaction with the coparenting and breastfeeding information they received, (3) maternal satisfaction with the coparenting behaviours occurring in their relationship, and (4) overall maternal satisfaction with trial participation.
Satisfaction with Intervention Components

Both mothers and fathers evaluated each intervention component. They strongly agreed or agreed that the following components were helpful: in-hospital discussion (mother, n=82, 82%; fathers, n=77, 82.8%), coparenting workbook (mothers, n=76, 76%; fathers, n=67, 71.2%), Breastfeeding Matters booklet (mothers n=79, 79%; fathers, n=69, 72.0%), coparenting video (mothers n= 46, 46%; fathers 52, 55.9%), intervention website (mothers, n=54, 54%; fathers n=53, 57.0%), and follow-up emails and telephone calls (mothers, n=67, 67%; fathers, n=42, 45.2%). When asked to select which components of the intervention the mothers and fathers found most helpful, there was a range of responses. The component selected most often from mothers was the Breastfeeding Matters booklet (n=66, 66%), whereas the component select most often by fathers was the in-hospital discussion (n=51, 54.8%).

Paternal Satisfaction with Coparenting and Breastfeeding Information

Of the 93 (86.9%) fathers who evaluated the helpfulness of the intervention, the majority indicated they found the information on breastfeeding helpful or very helpful, and this included: breastfeeding resources (n=64, 68.8%), information on how breastfeeding works (n=71, 76.3%), and helping with breastfeeding problems (n=60, 64.5%). The information on fathers’ involvement and support for breastfeeding was indicated to be helpful or very helpful by many fathers, this included: information on fathers support for breastfeeding (n=64, 68.8%) and information on father involvement (n=66, 71%). Lastly, the fathers found the coparenting information helpful or very helpful, which included: coparenting information (n=69, 74.2%), coparenting communication (n=56, 60.2%), and conflict resolution (n=50, 53.8%).

More fathers in the intervention group (n=66, 73.3%) felt the breastfeeding information received was directed towards both mothers and fathers than those in the control group (n=42, 45.7%; \( x^2=14.45, p=0.00 \)). Although not statistically significant, more fathers in the control group reported that they did not review any breastfeeding information (n=20, 21%) compared to those in the intervention group (n=11, 12.8%; \( x^2= 2.92, p=0.09 \)).
Maternal Satisfaction with Coparenting and Breastfeeding Information

The majority of mothers in the intervention group were very satisfied or satisfied with the information they received regarding breastfeeding information and support, partner involvement, ability to communicate with their partner, ability to problem solve and the division of labour (Table 16). Mothers in the intervention group responded more positively than those in the control group on every question. However, the only significant differences between the two groups were related to breastfeeding information received (n=81, 81% compared to n=60, 62.5%, $x^2=8.30$, $p<0.001$) and partners involvement with breastfeeding (n=89, 89% compared to n=75, 78.1%; $x^2=4.24$, $p=0.04$).

Table 16
Maternal Satisfaction with Coparenting and Breastfeeding Information

<table>
<thead>
<tr>
<th></th>
<th>Intervention Group (N=100)</th>
<th>Control Group (N=96)</th>
<th>$x^2$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breastfeeding information</td>
<td>81 (81)</td>
<td>60 (62.5)</td>
<td>8.30</td>
<td>0.00</td>
</tr>
<tr>
<td>Partners’ involvement with breastfeeding</td>
<td>89 (89)</td>
<td>75 (78.1)</td>
<td>4.24</td>
<td>0.04</td>
</tr>
<tr>
<td>Breastfeeding support from partner</td>
<td>90 (90)</td>
<td>82 (85.4)</td>
<td>0.96</td>
<td>0.33</td>
</tr>
<tr>
<td>Ability to communicate with partner</td>
<td>90 (90)</td>
<td>82 (85.4)</td>
<td>0.96</td>
<td>0.33</td>
</tr>
<tr>
<td>Ability to problem solve</td>
<td>87 (87)</td>
<td>77 (80.2)</td>
<td>1.65</td>
<td>0.20</td>
</tr>
<tr>
<td>Division of Labour</td>
<td>85 (85)</td>
<td>76 (79.2)</td>
<td>1.14</td>
<td>0.29</td>
</tr>
</tbody>
</table>

Paternal Satisfaction with Trial Participation

When fathers were asked via an open ended question what they like most about the trial the most common response provided was the large quantity of helpful information. Ten fathers indicated the information was informative, as it helped them know how to assist with breastfeeding, reinforced its importance, provided information on how they could be involved, and increased their confidence. Additionally, they mentioned liking the resources, specifically the links to helpful videos and resources in the community where additional information could be sought, if needed. One father commented on how the information was simple and easy to use.

Nevertheless, the lack of time to review all the information was noted by two fathers. Three
fathers stated they wanted more information on bottle feeding and formula, in case breastfeeding did not work out.

**Maternal Satisfaction with Trial Participation**

The majority of mothers ($n=187, 95.4\%$) reported that participating in the study was a positive experience. Eighty-four percent ($n=165$) of women said they would participate again. The mothers reported four main things they liked about the trial: (1) those in the intervention group liked the information provided to them, (2) mothers in both groups reported liking the questions in the surveys and reported the questions helped them think about their relationship, (3) the mothers were happy to be assisting in research and helping future couples, and (4) it was convenient to fill out the surveys online and there were not too many questionnaires to complete. It was also suggested by mothers that the information should be given to couples before the birth of the baby, as there is less time to review the materials once the baby was born. Twelve percent ($n=24$) of women indicated that they would not participate again because it took too much time. One mother indicated she did not like sharing personal information, and another mother stated she did not like recounting negative experiences she had with her partner.

**Variables Associated with Exclusive Breastfeeding at 12 Weeks**

Group allocation did not significantly impact exclusive breastfeeding at 12 weeks, exploratory analysis using univariate binary logistic regression was used to determine which variables were significantly associated with exclusive breastfeeding at 12 weeks (Table 17, $p$ values $<0.10$ presented). The variables which were found to be significant at $p<0.05$ level were included in the logistic regression model. Additionally, demographic variables known to be associated with exclusive breastfeeding from the literature were included. The variables entered into the model included (1) marital status, (2) maternal exclusive breastfeeding plan, (3) paternal exclusive breastfeeding plan, (4) maternal plan to breastfeed 6 months or longer, (5) maternal breastfeeding self-efficacy at baseline, (6) paternal infant feeding attitude at baseline, (7) mother reported father is very supportive of breastfeeding, (8) maternal age, (9) maternal education (attended university), and (10) household income of $80,000 or more. The logistic regression model was constructed using the forced entry procedure and all 10 variables were entered simultaneously into the model (Table 18). The assumptions for linearity and multicollinearity
were met. One outlier was identified and sensitivity analysis was conducted; however, the outcomes did not change (data not shown).

Table 17
Factors Associated with Exclusive Breastfeeding at 12 Weeks Postpartum

<table>
<thead>
<tr>
<th>Variables</th>
<th>Exclusively breastfeeding (N=133)</th>
<th>Not exclusively breastfeeding (N=76)</th>
<th>Univariate analysis P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>124 (93.2)</td>
<td>64 (84.2)</td>
<td>0.03</td>
</tr>
<tr>
<td>Mother planned to breastfeed exclusively</td>
<td>123 (92.5)</td>
<td>62 (81.6)</td>
<td>0.02</td>
</tr>
<tr>
<td>Father planned to exclusively breastfeed</td>
<td>100 (75.2)</td>
<td>48 (63.2)</td>
<td>0.04</td>
</tr>
<tr>
<td>Mother planned to exclusively breastfeed to 6 months</td>
<td>95 (74.8)</td>
<td>41 (69.5)</td>
<td>0.01</td>
</tr>
<tr>
<td>Breastfeeding exclusively in hospital</td>
<td>124 (93.2)</td>
<td>64 (85.3)</td>
<td>0.07</td>
</tr>
<tr>
<td>Mother reports father very supportive of breastfeeding</td>
<td>128 (96.2)</td>
<td>67 (88.2)</td>
<td>0.02</td>
</tr>
<tr>
<td>Gestation 40 weeks or over</td>
<td>75 (56.8)</td>
<td>34 (44.7)</td>
<td>0.09</td>
</tr>
<tr>
<td>Maternal BSES–SF baseline</td>
<td>$M$ 49.3 ($SD$ 9.4)</td>
<td>$M$ 45.9 ($SD$ 9.0)</td>
<td>0.02</td>
</tr>
<tr>
<td>Paternal BSES-SF baseline</td>
<td>$M$ 49.86 ($SD$ 9.7)</td>
<td>$M$ 47.34 ($SD$ 9.6)</td>
<td>0.09</td>
</tr>
<tr>
<td>IIFAS baseline</td>
<td>$M$ 62.1 ($SD$ 6.1)</td>
<td>$M$ 60.0 ($SD$ 5.7)</td>
<td>0.01</td>
</tr>
</tbody>
</table>

BSES-SF = Breastfeeding Self- Efficacy Scale- Short Form
IIFAS = Iowa Infant Feeding Attitude Scale

The full model containing all variables was statistically significant, [$x^2$ (10, $N=206$) =22.65, $p$=0.01], indicating that the model is able to distinguish between mothers who would or would not be exclusively breastfeeding at 12 weeks. However, none of the variables were found to be significant when adjusted for all other variables in the model (Table 18).
Table 18
Factors Entered in Exclusive Breastfeeding at 12 Week Model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Adjusted Odds Ratio</th>
<th>95% CI for Adjusted Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal age</td>
<td>0.98</td>
<td>0.89-1.07</td>
</tr>
<tr>
<td>Household income $80,000 or more</td>
<td>0.73</td>
<td>0.38-1.42</td>
</tr>
<tr>
<td>Mother attended university</td>
<td>1.28</td>
<td>0.62-2.64</td>
</tr>
<tr>
<td>Married</td>
<td>2.60</td>
<td>0.94-7.17</td>
</tr>
<tr>
<td>Mother planned to have infant exclusively breastfed</td>
<td>1.19</td>
<td>0.38-3.75</td>
</tr>
<tr>
<td>Mother planned to exclusively breastfeed over 6 months</td>
<td>1.64</td>
<td>0.80-3.34</td>
</tr>
<tr>
<td>Father planned to have infant exclusively breastfed</td>
<td>1.17</td>
<td>0.57-2.44</td>
</tr>
<tr>
<td>Mother reported father very supportive of breastfeeding</td>
<td>3.03</td>
<td>0.91-10.13</td>
</tr>
<tr>
<td>Paternal IIFAS at baseline</td>
<td>1.05</td>
<td>0.91-1.11</td>
</tr>
<tr>
<td>Maternal BSES-SF at baseline</td>
<td>1.03</td>
<td>0.99-1.06</td>
</tr>
</tbody>
</table>

BSES-SF = Breastfeeding Self- Efficacy Scale- Short Form
IIFAS = Iowa Infant Feeding Attitude Scale

Predictors of Exclusive Breastfeeding at 12 Weeks

Logistic Regression was used to determine predictors of exclusive breastfeeding at 12 weeks ($n=209$). All variables found to be significant at $p=0.05$ level in Table 17 were entered into the model and removed if the change to the -2 log likelihood was not significant. Independent variables found to significantly improve the model were (1) maternal plan to exclusively breastfeed, and (2) paternal IIFAS score at baseline (Table 19). A mother has a 2.5 times greater odds of exclusively breastfeeding to 12 weeks if she planned to exclusively breastfeed at birth. Additionally, for every point increased of the paternal IIFAS score at baseline there is a 1.06 increase odds that the infant will be exclusively breastfed at 12 weeks postpartum.
Table 19
*Variables that Predict Exclusive Breastfeeding at 12 Weeks*

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th><strong>Odds Ratio (95% CI)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex Bf plan</td>
<td>Ex Bf Plan</td>
<td>2.49 (1.03-6.01)</td>
<td></td>
</tr>
<tr>
<td>IIFAS baseline</td>
<td></td>
<td>1.06 (1.01-1.11)</td>
<td></td>
</tr>
<tr>
<td>-2 log likelihood</td>
<td>268.57</td>
<td>263.75</td>
<td></td>
</tr>
<tr>
<td>$x^2$</td>
<td>5.42</td>
<td>4.82</td>
<td></td>
</tr>
<tr>
<td>$p$</td>
<td>0.02</td>
<td>0.03</td>
<td></td>
</tr>
</tbody>
</table>

Ex=exclusive
Bf= breastfeeding
IIFAS = Iowa Infant Feeding Attitude Scale

**Summary of Results**

There was one primary research question, five secondary research questions and several exploratory research questions. The first question sought to determine the effect the coparenting breastfeeding support intervention had on exclusive breastfeeding at 12 weeks. There was no significant difference found between the groups. The secondary questions sought to determine if the intervention had an effect on the duration of breastfeeding, breastfeeding support, the coparenting relationship, paternal attitude or paternal breastfeeding self-efficacy. The intervention did not affect breastfeeding support, coparenting, and paternal infant feeding attitude. However, breastfeeding duration and the change in paternal breastfeeding self-efficacy over the first 6 weeks postpartum were significantly higher in the intervention group compared to the control group.

Exploratory questions sought to determine the impact the intervention had on satisfaction with coparenting information and behaviours as well as the breastfeeding information received. There
was a significant difference in the number of mothers in the intervention group who received help with breastfeeding from their partners in the first 6 weeks and mothers who were satisfied with the partners’ involvement with breastfeeding and the breastfeeding information they received. The two additional exploratory questions sought to determine variables associated with and predictive of exclusive breastfeeding at 12 weeks. Maternal intentions to exclusively breastfeed and paternal infant feeding attitude were found to be predictive of exclusive breastfeeding at 12 weeks.

Process research questions determined maternal and paternal satisfaction with study intervention materials and maternal satisfaction with study participation. Most of the mothers and fathers utilized the study materials at home and indicated they found them helpful. Additionally, the majority of the mothers in both groups indicated they were satisfied with their involvement in the study and would participate in this study again.
CHAPTER FIVE
DISCUSSION

This chapter will review the strengths and weaknesses of the trial, as well it will review the results in relation to existing literature. The primary outcome of this study was exclusive breastfeeding at 12 weeks postpartum. Seventy infants in the intervention group and 63 infants in the usual care group were exclusively breastfeeding at 12 weeks, this was a non-significant difference. Additionally, non-significant differences between groups were found for exclusive breastfeeding at 6 weeks, any breastfeeding at 6 weeks, breastfeeding support, and coparenting at 6 and 12 weeks, as well as paternal infant feeding attitude at 6 weeks. Significant results were found for any breastfeeding at 12 weeks postpartum, with 100 mothers in the intervention group and 92 mothers in the control group providing breast milk to their infants. Additionally, there was a significantly greater increase in the paternal breastfeeding self-efficacy scores over the first 6 weeks postpartum in the intervention group compared to the control group. Logistic Regression found maternal intentions to exclusively breastfeed and paternal infant feeding attitude at baseline to be predictive of exclusive breastfeeding at 12 weeks.

Trial Strengths and Limitations

Trial Strengths

This randomized controlled trial was strengthened by having an intervention that was adapted from a previously evaluated coparenting intervention. The intervention aligned with the coparenting conceptual framework used to guide the study. All of the elements of coparenting were found to be consistent with what is found in the breastfeeding literature related to fathers’ involvement and support for breastfeeding. Both the mode of delivery and focus of the information were altered from the original study, with this study focusing on only one child health outcome, breastfeeding. To ensure consistency with the original coparenting intervention, the author of the original coparenting study reviewed the coparenting workbook and video and validated that the adapted information on coparenting was consistent with the elements and skills addressed in the original intervention and aligned with the coparenting framework. The breastfeeding material provided to couples was of high quality and met the standards of the Baby
Friendly Hospital Initiative and the International Code for Marketing Breast Milk Substitutes. The website was created by an International Board Certified Lactation Consultant and was reviewed by experts in the field.

The intervention materials provided information to couples in a variety of modes to accommodate individual learning styles and preferences. The dosage of the intervention was adequate with all couples receiving the information during the in-hospital discussion and the majority of mothers (98%) and fathers (89.2%) using the material once home. The couples reported finding the intervention material well organized and helpful. There was no significant contamination. Five mothers in the control group were exposed to the *Breastfeeding Matters* booklet, as it is widely available in the community; however, none of the mothers in the control group had access to the coparenting materials. Further, all hospital staff were blinded to the intervention details and study group allocation.

The primary outcome was exclusive breastfeeding to 12 weeks. This was chosen as all leading health authorities recommend exclusive breastfeeding for the first 6 months of life. Twelve-week follow-up was sufficient as a large percentage of the weaning and supplementation occurs in the first 2 weeks postpartum due to difficulties encountered. The measure of exclusive breastfeeding was consistent with that used by the World Health Organization and the definition of full breastfeeding consistently used in the literature (Labbok & Krasovec, 1990). All other outcomes were measured using previously psychometrically tested, reliable measures and the majority of them were found to have high internal consistency with this study sample.

The trial had an adequate sample size, as the power analysis was conducted to determine a 15% difference between groups on the primary outcome, exclusive breastfeeding. Selection bias was not an issue as sequentially numbered sealed opaque envelops were used to determine group allocation. The envelopes were created by a research assistant not involved with the study with a computer generated sequence. Therefore, group allocation was random and concealed. Attrition was low and no differences were found between those who were lost to follow-up and those for whom outcome data were collected. The web-based questionnaire proved to be an effective means of collecting follow-up data from mothers and fathers during the postpartum period. The majority of the participants (96.7%) filled out the survey online and used self-report; however,
for the small number of participants who chose to be followed up by telephone interview, a research assistant blinded to group allocation collected the data.

Although the sample was recruited from one site, the population was multicultural with less than half of the participants born in Canada. This increases the generalizability of the findings to different cultural groups.

**Trial Limitations**

Despite the strengths of the study, there were several limitations. The sample was comprised of a population of couples who intended to breastfeed and to do so exclusively. This decreased the variability in the breastfeeding outcomes and placed the trial at risk of a type II error. This also limited the generalizability of the findings.

At the 6 weeks data collection, mothers were given the PPSS and CRS-brief forms to fill out. These scales were intended to collect data on breastfeeding support and the coparenting relationship. Many mothers in the control group indicated that they enjoyed completing the questionnaires as it helped them reflect on their relationship with their partners. Although the purpose of the study had been kept from the participants to decrease expectation and social desirability bias, having been exposed to this information at 6 weeks may have changed the behaviour of couples and introduced measurement bias when these scales were completed at 12 weeks. This may be the reason that there were insignificant differences on these measures at 12 weeks. Although we did collect information on usage of the *Breastfeeding as Coparents* booklet, we did not determine the extent to which it was used; thus, greater surveillance would have provided more accurate knowledge of dosage of the coparenting information. This was a multifaceted intervention with a variety of materials provided to the couples. These materials offered extensive information on both coparenting and breastfeeding in a variety of modes. It is therefore not know which specific components of the intervention are related to the increased duration of breastfeeding or increase in paternal breastfeeding self-efficacy.

Although the term satisfaction was used in the study results section, technically we were measuring participant feedback. This feedback related to their contentment with participation in the study and the usefulness of the intervention material.
Review of Trial Findings

Primary Outcome

What is the effect of a coparenting breastfeeding support intervention on exclusive breastfeeding at 12 weeks postpartum among primiparous breastfeeding mothers?

Although more mothers in the intervention group were exclusively breastfeeding at 12 weeks, the difference between the groups was not statistically significant. One possible explanation is that the participants were highly motivated to exclusively breastfeed in both groups, with 88.8% of the mothers and 71% of the fathers indicating plans to exclusively breastfeed at baseline. At 12 weeks postpartum, the exclusive breastfeeding rate in the control was 60.0% and 67.3% in the intervention group, which is above the national rate which is 51% overall across Canada (Public Health Agency of Canada, 2009). A previously conducted survey found only 53.6% of mothers from NYGH were exclusively breastfeeding at 2 weeks postpartum (Toronto Public Health, 2010). The trial exclusive breastfeeding rates were above the hospital rate of exclusive breastfeeding. The limited variability in the primary outcome suggests these findings may be at risk for a type II error.

It is possible that the benefits of exclusive breastfeeding were not sufficiently promoted in this intervention as they were mainly addressed in the Breastfeeding Matters booklet. The in-hospital discussion had a limited time span and exclusively breastfeeding may not have been communicated clearly enough to the couples to influence their breastfeeding behaviour.

Another reason why we may not have seen a difference in exclusive breastfeeding rates between groups is that some of the couples were planning to supplement or were supplementing at the time of recruitment. Sensitivity to these couples’ feeding choice had to be ensured as to not make them feel badly regarding their choice or turn them off further participation in the study. This may have prevented the message of the importance of exclusive breastfeeding from being communicated. As well, the information on benefits of any breastfeeding versus exclusive breastfeeding may not have been distinguished.

The findings from this study are not consistent with the findings of the quasi-experimental studies which evaluated intervention with fathers conducted by Pisacane et al. (2005) and Susin
et al. (2008). Both of these studies found that the inclusion of fathers in the breastfeeding intervention increased exclusive breastfeeding at 16 and 24 weeks. It is possible that the outcome in our study was measured too early to detect a difference between groups, as this was a population of couples who were highly motivated to breastfeed and planned to do so to 12 weeks. If the outcome was measured at 16 or 24 weeks, as done in these previously conducted breastfeeding studies, the difference between groups could have been greater. These two previously conducted studies included a segment on the importance of breastfeeding, so it is possible that in these interventions more time was spent on the benefits of exclusive breastfeeding than was provided to couples during the in-hospital discussion in this trial.

Secondary Outcomes

Among primiparous mothers and fathers, what is the effect of coparenting breastfeeding support intervention on: breastfeeding duration at 6 and 12 weeks postpartum?

The breastfeeding duration rates differed between the groups at 12 weeks postpartum with significantly more mothers in the intervention group breastfeeding (96.2% compared to 87.6%). The findings indicated that there was a 10% risk reduction in weaning in the first 12 weeks postpartum if the couples were provided with the coparenting intervention, with the true risk reduction being between 1% and 19%. Possible explanations for the difference include more fathers in the intervention group provided breastfeeding help to the mothers in the critical first 6 weeks. This paternal support may have helped mothers overcome breastfeeding difficulties and continue to breastfeed. Additionally, more mothers in the intervention group indicated they were more satisfied with the breastfeeding information they received than those in the control group.

This is the first trial to find that including fathers in a breastfeeding support intervention increased breastfeeding duration. The findings from this trial differ from those of the two quasi-experimental studies which delivered breastfeeding interventions to fathers (Susin et al., 2008; Pisacane et al., 2005). These studies found their interventions did not impact breastfeeding duration, only exclusivity. Additionally, Wolfberg et al. (2004) did not find an antenatal intervention delivered to fathers affected breastfeeding duration at 8 weeks. While Stremler and Lovera (2004) found the mothers whose partners received peer support breastfed longer than those in the control group, the differences were not significant (25.3% vs. 17.8% breastfed <12
weeks, 18.8% vs. 20.2% breastfed 12 to 24 weeks, 32.6% vs. 24/2% breastfed 24 to 52 weeks, and 30.7% vs. 30.3% breastfed >52 weeks). The previously conducted studies with fathers did not include coparenting information. It is possible that the coparenting approach, having parents work as partners towards a joint goal, influenced the length of breastfeeding and decreased the chance of discontinuing, as 68% (n=67) of couples in the intervention group had jointly decided on a breastfeeding goal. It is also possible that the breastfeeding information and health benefits were interpreted by the couples as relating to duration rather than exclusivity.

**Among primiparous mothers and fathers, what is the effect of coparenting breastfeeding support intervention on maternal perception of coparenting at 6 and 12 weeks postpartum?**

The coparenting relationship was not found to differ between the groups. This may be due to the fact that the couples did not have adequate time to review the information and incorporate the findings into their relationship or daily activities. The timing of this intervention early in the postpartum period may have prevented the couples from having sufficient time to complete the activities in the workbook. Although 88% of the mothers at 12 weeks and 63% of the fathers at 6 weeks reported having reviewed the coparenting workbook, the extent to which the couples completed the activities or used the material is unknown. Therefore, the dose of the intervention may not have been sufficient to change the coparenting behaviour. Additionally, the coparenting relationship may have been measured at too early a time point to identify differences between the groups. The couples had just begun their parenting journey and it is possible that as more challenges arise in the later part of the first year the coparenting elements and skills would have proven to be effective in response to those situations.

This finding differs from that of the original coparenting intervention evaluated by Feinberg and Kan (2008). The significant difference found in the original study may be due to the fact that the intervention was delivered in a different manner. In this study, the coparenting information was provided in a workbook and video and in the original study it was delivered to couples over eight classes spread throughout the prenatal and postnatal period. Additionally, in the original study the first outcome was assessed at 24 weeks, which is a later time point than those in this study. It is possible that the couples in this trial had limited time due to the demands of parenthood and they may have reviewed more of the breastfeeding information than the coparenting information. The breastfeeding information may have addressed their immediate needs, whereas the
coparenting information may have been seen as information they could review in the future, when they have more time. This may be why Feinberg and Kan (2008) found a difference at 24 weeks.

Lastly, this was a sample of couples who were agreeing to participate in a study on how parents work together around infant feeding. These couples likely had more secure relationships than those who were not interested in participating and/or the general public. This intervention may be more effective with couples who have difficulty communicating or problem solving effectively, as these skills are addressed in the intervention.

Among primiparous mothers and fathers, what is the effect of coparenting breastfeeding support intervention on maternal perceived breastfeeding support at 6 and 12 weeks postpartum?

Significantly more mothers in the intervention group reported receiving breastfeeding help from their partners and that this help was offered more often. This is consistent with other breastfeeding studies targeting fathers that found (1) significantly more mothers in the intervention group reported to have received support and help from their partner with breastfeeding compared to the control group (Pisacane et al., 2005), (2) mothers reported their partner as the one who gave the most support for their breastfeeding efforts (Tohotoa et al., 2010), and (3) mothers reported their partners had been very helpful and kept them breastfeeding (Ingram & Johnson, 2004).

Despite the mothers in the intervention group reporting that they received significantly more help from their partners, the findings on the PPSS were insignificant. This discrepancy could be due to the fact that mothers perceived the scale to be addressing general postpartum support provided by their partners and not specifically breastfeeding support. Adapting the PPSS scale so that the wording reflects breastfeeding support may increase the accuracy of measuring partners’ breastfeeding support compared to general postpartum support.

Among primiparous mothers and fathers, what is the effect of coparenting breastfeeding support intervention on paternal breastfeeding self-efficacy at 6 weeks postpartum?

Paternal breastfeeding self-efficacy is the fathers’ confidence in his ability to assist the mother in breastfeeding their infant. Although there was no difference between the groups regarding the
The fathers in the intervention group had a significantly greater increase in paternal breastfeeding self-efficacy scores over the initial 6 weeks postpartum. The information package and the in-hospital discussion provided information on the mechanics of breastfeeding, how to tell baby is getting enough, fathers’ involvement with breastfeeding and where to get help; this information may have been related to this increase in paternal breastfeeding self-efficacy. Additionally, the intervention included information that specifically targeted fathers. The sources of information that may have increased breastfeeding self-efficacy among fathers included (1) verbal persuasion, through the in-hospital discussions; (2) vicarious experiences, through pictures of fathers helping with breastfeeding in the intervention materials; and (3) performance accomplishments, while watching the mother as she breastfed (Dennis, 1999).

Paternal breastfeeding self-efficacy has not been previously examined. Although we did not measure paternal breastfeeding anxiety in this study, it would be interesting to know if this breastfeeding intervention decreased paternal anxiety, thus increased self-efficacy. Tohotoa et al. (2011), in a trial of Australian fathers (n=342) evaluating a breastfeeding support intervention, found that postpartum anxiety at 6 weeks was significantly lower in the intervention group than the control group \( (p=0.048) \). It may be that fathers’ anxiety is amenable to such interventions as mediated through breastfeeding self-efficacy.

A study conducted by de Montigny, Lacharite and Devault (2012) found fathers’ involvement to be related to his self-efficacy. Fathers in our trial were encouraged to be involved as this was one of the elements of coparenting covered in the intervention. Fathers in the intervention group may have been more involved with breastfeeding as they provided more breastfeeding help in the first 6 weeks and this involvement may have increased paternal breastfeeding self-efficacy.

_Georgia et al._ found that the couples in this study included fathers who already had supportive attitudes towards breastfeeding as all mothers had initiated and planned to continue to 12 weeks postpartum or more. Another reason why we may have not found differences between groups is that the reliability measure for the attitude scale was low to moderate in this study population.
(Cronbach’s alpha at baseline 0.56 and 0.72 at 6 weeks). This is an unexpected finding as the Cronbach’s alpha was found to be good in other studies (Shaker et al., 2004).

Other Research Questions

What factors are associated with and predictive of exclusive breastfeeding at 12 weeks?

Factors related to exclusive breastfeeding at 12 weeks include marital status, household income, maternal age and educational level, maternal and paternal intentions to exclusively breastfeed, and maternal intentions to breastfeed for 6 months or longer, maternal breastfeeding self-efficacy at baseline, paternal infant feeding attitude at baseline, and maternal perceived paternal support for breastfeeding. Of these variables, mothers’ plan to exclusively breastfeed and paternal infant feeding attitude at baseline were found to be significantly predictive of exclusive breastfeeding at 12 weeks. The maternal factors are consistent with previous research (Dennis, 2002; Meedya et al., 2010). The paternal factors extend current breastfeeding risk factor literature (Arora et al., 2000; Kong & Lee, 2004; Swanson & Powers, 2004) and provide opportunities for further exploration with modifiable variables for future intervention studies.
CHAPTER SIX
SUMMARY, IMPLICATIONS FOR PRACTICE AND RESEARCH

Summary

This randomized controlled trial was conducted to address the longstanding clinical problem of suboptimal breastfeeding rates. The modifiable risk factor of paternal support for breastfeeding was incorporated into the intervention due to the good evidence suggesting that paternal support and positive attitudes improves breastfeeding outcomes. The coparenting model (Feinberg, 2003) was used as the conceptual framework to guide the trial and formed the main content of the coparenting breastfeeding support intervention (Feinberg and Kan, 2008). Two hundred and fourteen couples were recruited from a postpartum unit during their first two days postpartum. The participants were randomly assigned to either the usual care group, who received standard care in the hospital and community, or the intervention group, who received usual care plus a multifaceted coparenting breastfeeding support intervention. This intervention included an in-hospital discussion with a research coordinator, a take-home coparenting workbook, a provincially published breastfeeding booklet, a coparenting DVD, and access to a secure website over the study period. Follow-up emails were also sent to couples in the intervention group and those mothers also received a telephone call at 2 weeks postpartum. The intervention was well received by study participants, all couples were provided with the information in the hospital and the majority of couples were present for the full in-hospital discussion. The majority of couples reviewed the take-home material over the postpartum period.

The primary outcome, differed between the groups, with 67.3% of the intervention group (n=70) and 60.0% of the control group (n=63,) exclusively breastfeeding at 12 weeks postpartum. However, this difference was not significant. The same trend was apparent at 6 weeks postpartum for both exclusive breastfeeding (n=75, 72.1% compared to n=62, 60.8%) and any breastfeeding (n= 102, 98% compared to n=94, 92.2%). At 12 weeks postpartum, the rate of any breastfeeding was found to be significantly different between the study groups: the intervention group had 96.2% (n=100) of mothers breastfeeding while the control group had 87.6% (n=92) of mothers breastfeeding.
Secondary outcomes of coparenting relationship, breastfeeding support and paternal attitude were found to not significantly differ between study groups at any time. While the paternal breastfeeding self-efficacy mean scores did not differ between the groups at 6 weeks postpartum, there was a significantly greater increase in scores in the intervention group over the first 6 weeks postpartum.

Exploratory data were collected to determine the mothers’ satisfaction with coparenting behaviours and breastfeeding information. It was revealed that more mothers in the intervention group reported fathers had helped them with breastfeeding ($n=76$, $71\%$ compared to $n=56$, $52\%$), as well the fathers in this group provided breastfeeding help more frequently than those in the control group ($n=52$, $53.1\%$ compared to $n=34$, $36.4\%$). The mothers in the intervention group also reported being more satisfied with the fathers’ involvement ($n=89$, $89\%$, compared to $n=75$, $78.1\%$) and the breastfeeding information they received than those in the control group ($n=81$, $81\%$ compared to $n=60$, $62.5\%$).

Exploratory analyses were conducted using logistic regression to identify factors related to exclusive breastfeeding at 12 weeks. Factors found to be statistically significant ($p<0.05$) when analyzed using univariate logistic regression were entered into the model and included: marital status, maternal exclusive breastfeeding plan, paternal exclusive breastfeeding plan, maternal plan to breastfeed 6 months or longer, maternal breastfeeding self-efficacy at baseline, paternal infant feeding attitude at baseline, mothers reported father is very supportive of breastfeeding, maternal age, maternal education (attended university), and household income of $80,000$ or more. Logistic regression was then used to identify factors that may predict exclusive breastfeeding. The two factors which made a significant contribution as evident by the difference in the $-2$ log likelihood were mothers plan to exclusively breastfeed at birth, and paternal infant feeding attitude (IIFAS score) at baseline.

The findings of the study indicate that involving couples in a coparenting breastfeeding support intervention may increase breastfeeding duration at 12 weeks, as well as paternal breastfeeding self-efficacy, breastfeeding help received from fathers, and maternal satisfaction with their partners’ involvement.
**Research Implications**

**Timing of Intervention**

This study provides preliminary evidence that a coparenting breastfeeding support intervention may increase breastfeeding rates. While the intervention materials were used by the majority of couples, introducing the intervention materials in the prenatal period may allow couples more time to review the information before the infant arrives. Creative ways of engaging and recruiting fathers in the antenatal period may be required. The reason that the postnatal period was chosen in this study is that fathers are difficult to access prenatally in the Canadian health care system. Although some fathers do attend prenatal class, this is a subset of the populations and usually the couples differ from the general population. They are usually older, more educated and of higher socio-economic status, thus, not representing the larger population (Lumley & Brown, 1993; William, Sturrock & Johnson, 2007). Recruiting couples in prenatal classes would also be a challenge as contamination would likely occur in a randomized controlled trial, with couples talking and sharing intervention material with their classmates.

Accessing fathers on the postpartum floor proved to be beneficial in this study, as the recruitment was completed in a short period of time. Additionally, in the couples recruited approximately 40% of the fathers had not attended prenatal class. Nevertheless, providing the information in the postpartum period may have prevented the couples from finding the time to review the information in detail. The couples may have covered the breastfeeding information in the depth needed to address the immediate breastfeeding concerns; however, the coparenting workbook activities may not have been completed in the depth necessary to change coparenting behaviour.

**Web-based Communication**

In this study, the online options for communication were favoured by participants over telephone contacts, as 96.7% of the couples completed the follow up questionnaires online. Increased use of email, Skype, and online videos could be incorporated in future studies to improve accessibility of the information for couples. This may increase recruitment options and compliance as participants can access the information at their convenience. Telephone contact proved to be very difficult early in the postpartum period due to call screening, voice mail, cell phones being turned off, and poor reception.
Information Delivery

This multifaceted intervention provided extensive information on breastfeeding and coparenting to couples in a variety of modes. It is necessary to ensure information is easily accessible. Therefore, charts, tabs, and a search feature on the website should be included to direct couples to the information they require. This became apparent as some mothers indicated that it was easier for them to search Google to find information than it was to access the password protected study website. This indicates that people want information to be retrieved quickly. Additionally, follow up emails should include links to helpful websites, as this would assist mothers in accessing high quality, reliable information. Further studies should be designed to evaluate the effectiveness of different modes of information delivery.

Paternal Attrition

Fathers’ attrition was low in this study. From the past research it was assumed that fathers were difficult to follow (Laantera et al., 2010; Salonen et al., 2008; Wolfberg et al., 2004) and therefore in the design of this study minimal data was collected from fathers. Future research should collect data on fathers’ perspective and fathers’ outcomes as well as mothers’.

Paternal Infant Feeding Attitude

Paternal infant feeding attitude at the time of birth has been found to greatly influence breastfeeding initiation, exclusivity and duration (Arora et al., 2000; Giugliani et al., 1994; Littman et al., 1994; Rempel & Rempel, 2004; Scott et al., 2001; Shaker et al., 2004; Swanson et al., 2004). Interventions that are intended to increase paternal infant feeding attitude towards breastfeeding have not been designed or evaluated. Such interventions may increase breastfeeding duration and exclusivity rates, since this variable was found to be predictive of exclusive breastfeeding at 12 weeks.

Coparenting Information

It is possible that the dose of coparenting information received by couples in this trial was not sufficient to change coparenting behavior. Future trial should include booster sessions to promote the coparenting relationship and ensure sufficient dose is received.
Study Sample

This trial should be tested on couples at high risk for not exclusively breastfeeding or continuing to breastfeed. This was a low risk sample and this may have increased the likelihood of a type II error and decreased the generalizability of the findings to higher risk populations.
Clinical Implications

The findings from this research have several clinical implications.

Exclusive and Any Breastfeeding

There was a 7% percent difference in exclusive breastfeeding at 12 weeks between study groups. Calculation of the number needed to treat indicates that if 14 couples were given this intervention one additional mother would be exclusively breastfeeding at 12 weeks. This intervention increased breastfeeding at 12 weeks by 9% (95% CI [1%, 19%]). Calculation of the number needed to treat indicates that if 12 couples were to receive the intervention, one less mother would have weaned from breastfeeding at 12 weeks postpartum. The administration of this intervention may increase the duration of breastfeeding in low risk samples. Policy makers should consider targeting both fathers and mothers when implementing support programs aimed to increase breastfeeding rates.

Paternal Breastfeeding Support and Self-Efficacy

This intervention increased paternal breastfeeding self-efficacy. Mothers in the intervention group also received help from their partners more frequently than mothers in the control group. Interventions which increase paternal support should be implemented in practice settings, as the breastfeeding literature indicates support from the infant’s father has been identified as the most important source of support for breastfeeding women (Arora et al., 2000; Bar Yam & Darby, 1997; Kong & Lee, 2004; Moore & Coty, 2006; Nelson, 2006; Swanson & Power, 2005; Tohotoa et al., 2010). Fathers should be included in breastfeeding education provided to mothers in the hospital during the early days of breastfeeding. The fathers in this study benefited from the in-hospital discussion and indicated it was the most valuable component of the intervention.

In-hospital discussions with fathers have previously been evaluated and were found to (1) increase breastfeeding exclusivity (Pisacine et al., 2008; Susin & Giuglani, 2008), (2) increase fathers’ ability to providing breastfeeding support (Picasine et al., 2005), and (3) increasing breastfeeding knowledge (Susin et al., 1999). This may be a critical time to engage and educate fathers, not only on how breastfeeding works, but also on how they can help and be part of the breastfeeding experience. Fathers should be provided with breastfeeding information which
includes images of fathers providing care to their infants and support to breastfeeding women. This visual reinforcement may be related to the increase in breastfeeding self-efficacy experienced by fathers in the intervention group. The fathers indicated they appreciated this information and found it to be directed towards fathers as well as mothers.

**Conclusion**

A randomized controlled trial was conducted where a multifaceted coparenting breastfeeding support intervention was evaluated with breastfeeding mothers and the infants’ fathers in the first two days postpartum. The intervention was well received and utilized by the couples. The control group received usual care in the hospital and community. The couples were followed to 12 weeks postpartum. The primary outcome of the study was exclusive breastfeeding at 12 weeks postpartum. Although there were more women exclusively breastfeeding in the intervention group at 6 and 12 weeks, these differences were not significant. The intervention group did have significantly higher rates of any breastfeeding at 12 weeks postpartum. The intervention did not impact the breastfeeding support or the coparenting relationship at 6 or 12 weeks, or paternal infant feeding attitude at 6 weeks. However, fathers in the intervention group had a significantly greater increase in breastfeeding self-efficacy at 6 weeks than fathers in the control group. Mothers in the intervention group reported receiving more help with breastfeeding from fathers in the first 6 week postpartum. They were also found to be more satisfied with fathers’ involvement and the breastfeeding information they received than those in the control group. This feasible intervention addresses the longstanding clinical problem of suboptimal breastfeeding rates. This study may be of interest to a diverse group of health care professionals providing care to childbearing families, as well as policy makers who design programs for young families.
References


Hall, R., Mercer, A., Teasley, S., McPherson, D., Simon, S., Santos, S., Meyers, B. &


Pollock, C., Bustamanet-Forest, R. & Giarratano, G. (2002). Men of diverse cultures:


Does parental breastfeeding knowledge increase breastfeeding rates? Birth, 26, 149-156.


Appendices
# Appendix A Partners Attitude and Support and Breastfeeding Initiation

<table>
<thead>
<tr>
<th>Authors</th>
<th>Population</th>
<th>Methods</th>
<th>Results</th>
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<tbody>
<tr>
<td>Arora, et al. 2000</td>
<td>Mothers of children 6 months to 3 years old</td>
<td>Cross-sectional study 28 question survey mailed</td>
<td>Formula feeding mothers reported they may have breastfed with more support from family members (grandmother and family members, 90.9%) and more support from the baby’s father (80.0%). #1 reason for initiating formula feeding over breastfeeding was the mother’s perception of the father’s preference and attitude</td>
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<tr>
<td></td>
<td>mailed a survey N= 123</td>
<td>Survey collected information regarding feeding choices, duration and attitudes</td>
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<td></td>
<td>Northwestern Pennsylvania</td>
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<td>Freed, et al. 1992</td>
<td>N=258 expectant fathers</td>
<td>Cross-Sectional study Infant-feeding attitudes on anonymous questionnaire in childbirth preparation class</td>
<td>Significant differences found: Breastfed infants’ fathers know more of the benefits of breastfeeding Fathers who chose formula feeding had more misconceptions about breastfeeding and were unaware of the benefits</td>
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<td></td>
<td>Houston, Texas</td>
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<td>Giugliani, et al. 1994</td>
<td>Compared n=100 breastfeeding to n=100 formula feeding mothers (non-matched)</td>
<td>Cross-sectional case control study Questionnaire on sources of breastfeeding support answered in first 24 hrs in hospital</td>
<td>Fathers’ opinion about breastfeeding was the most important factor related to breastfeeding (OR=32.8) after adjusting for confounders, favourable attitude for partner was present in 98% of the breastfeeding group</td>
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<td></td>
<td>Baltimore, Maryland U.S</td>
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<td>Kessler et al. 1995</td>
<td>Mothers and significant others (71% father /29% grandmother)</td>
<td>Telephone interviews were conducted with the women prenatally and then at 7-10 days postpartum The significant others were interviewed in the third trimester to determine feeding preferences and behavioural beliefs about infant feeding.</td>
<td>Maternal intentions to breastfeed were associated with the significant others preference for breastfeeding vs. bottle-feeding (adjOR=58.82; 95% CI [47.82, 69.82]). If the significant other preferred breastfeeding the mothers were more likely to be breastfeeding at 7 days (adjOR =66.70, 95% CI [64.1, 69.3])</td>
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<td>N=133</td>
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<td>Baltimore City, U.S</td>
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<td>Kong et al. 2004</td>
<td>First-time mothers in N= 230</td>
<td>Descriptive survey using a questionnaire (on feeding decision, knowledge and support) 48-72 hrs post delivery followed by in-depth interviews with open-ended questions with a convenience sample of breastfeeding mothers (n=26) conducted in the hospital 48-72hrs post delivery</td>
<td>Breastfeeding mothers (n=94) Formula feeding mothers (n=104) Both breast and formula (n= 32) Mothers knowledge and attitude followed by husbands support were important factors identified in decision regarding infant feeding 79.5 % agreed encouragement and support from husband was important to breastfeeding. Kappa statistical analysis (0.4, p&lt;0.001) demonstrated significant agreement between fathers preference and feeding method</td>
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<td>From 13 hospitals in Hong Kong</td>
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<tr>
<td>Study</td>
<td>Setting</td>
<td>Methodology</td>
<td>Findings</td>
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</table>
| Littman, et al. 1994 | Postpartum mothers (N=115) Fairview, suburb of Cleveland, Ohio | Within 24 hr of delivery an anonymous survey, questionnaire on factors to determine the intention to breastfeed | Breastfeeding (46%)  
Formula feeding (32%)  
Both breast and formula (21.7%)  
The only factors that significantly related to intention were fathers’ education and his approval of breastfeeding. Higher levels of breastfeeding if fathers approved (98.1%), low levels if fathers was indifferent or did not approve (26.9%; p<0.001) |
| Shaker, et al. 2004 | N=108 Couples in the prenatal period (8-12 weeks postpartum) Southern suburbs of Glasgow | Self-administered questionnaire of feeding attitudes and face-to-face interview with mother for demographic information and intended feeding method  
Self-administered questionnaire to be filled out by primary support person. Feeding method, at discharge obtained from medical record.  
Validated tool used - Iowa Infant Feeding Attitude Scale | At discharge,  
Breastfeeding (49.1%)  
Formula feeding (50.9%)  
Fathers of breastfed infants had significantly higher attitude score (IIFAS) compared to fathers of formula fed infants (62.7 ±7.6% vs. 55.1 ± 8.8%, p<0.001),  
Fathers of breastfed infants compared to formula fed infants who believed BF ideal infant food (92.5% vs. 56.4%, p<0.001, respectively) and that breastfed infants are healthier than formula fed infants (58.5% vs. 29.1%, p=0.001, respectively) |
| Scott et al 1997 | Mothers (N= 556) Australia | Self-administered questionnaire  
Mothers breastfeeding on discharge were followed up monthly until breastfeeding stopped or for 6 months postpartum | At discharge 83.8% of mothers were breastfeeding. Women who perceived and their partner had a preference for breastfeeding were 10 times more likely to initiate breastfeeding (OR=10.18 95% CI [4.42, 23.42]).  
Partners preference was the number on factor related to breastfeeding initiation. |
| Scott et al. 2001 | Mothers in 2 sites  
Perth, Western Australia  
Queensland, Australia  
n= 556 (urban)  
n= 503 (rural)  
Australia | Prospective cohort study  
Mothers were visited in the first 3 days in the hospital, following birth  
Breastfeeding mothers at baseline were followed up by telephone 4-6 times (depending on site) for 24 weeks, questionnaires | Perceived paternal support of breastfeeding was most strongly associated with breastfeeding at discharge (OR 9.13 95% CI [4.83,17.26])  
Mothers who perceived paternal support were less likely to stop breastfeeding at discharge (RR= 0.58; 95% CI [0.45, 0.75]) |
<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Description</th>
<th>Methodology</th>
<th>Findings</th>
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</table>
| Sullivan et al. 2004  | Primiparous women and their partner/husband, N=115, Chicago, U.S                    | Prospective cohort study, women and partners were individually interviewed in 2nd trimester to 4 months postpartum. | Fathers had plans to have infant exclusively breastfeed prenatally, 33.3% in early cessation group 64.4% in late cessation group  \( p<.01 \).  
Women whose partners did not plan to have infant exclusively breastfeed had 1/0.46 or 2.2 times the odds of early cessation compared to those whose partners expected exclusive breastfeeding (\( ExpB 0.46 \)). |
| Swanson & Powers 2005 | New mothers, n=203, Central and Northern Scotland                                    | Semi-structured questionnaires on maternity ward followed by postal questionnaires at 6 wks | Breastfeeding mothers rated partners’ views more important (\( M 6.0 SD 1.3 \)) compared to formula feeding mothers (\( M 5.5, SD 1.7 \) \( t (194)=2.7, p<0.01 \)  
Partners’ views were important at baseline (\( M 6.0, SD 1.2 \) vs. \( M 3.4 SD 1.4 \), 95% CI, \( [-3.0,-2.3] \)) and follow-up (continuers mean 6.0 SD 1.2 compared to combined feeders mean 5.5 SD 1.4 compared to discontinuers mean 3.8 SD 1.6, \( f=11.6, p<.001 \)).  
Both breast-feeders and bottle-feeders rated there partners views as more important than other social referents.  
Discontinuers perceived their partners to be more pro formula feeding. |
| Rempel et al. 2004    | Male partners of expecting mothers, N=317, Mothers, Waterloo, Ontario               | Longitudinal study, Mothers completed questionnaires prenatally and at 1, 2, 4, 6, 9 and 12 months  
Questionnaires were filled out by partners prenatally  
Maternal measures  
Breastfeeding Reasons Questionnaire (BRQ)  
Breastfeeding intentions  
Perceived partner approval  
Perceived partner helpfulness  
Maternal measures  
Men’s BRQ  
Men’s beliefs about breastfeeding | Multiple regression indicated women’s prenatal perception of their partners’ approval and beliefs significantly predicted their prenatal duration intentions (\( B=.48 R^2 \Delta=.22, p<.001 \)). This was consistent for women breastfeeding at 9 months (\( B=.36 R^2 \Delta=.12, p<.01 \)).  
Partners’ helpfulness predicted intentions to continue to breastfeeding.  
Mothers behave in accordance with their partners’ thoughts about breastfeeding over their own intentions. |
**Appendix B:**

**Controlled Trials: Support Interventions with Fathers**

<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention</th>
<th>Outcome</th>
<th>Findings</th>
<th>Limitations/Strengths</th>
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<tbody>
<tr>
<td>Pisacane et al. Pediatrics 2005</td>
<td>40 min education session with fathers: control – child care intervention - breastfeeding (BF) management, difficulties and how to cope with them, role of father in supporting breastfeeding partner.</td>
<td>Follow-up by telephone interview 6 &amp; 12 months (mo.)</td>
<td>Full BF at 6 months higher in the intervention group (n=35, 25% vs. n=21, 15%; p &lt;.05)</td>
<td>Limitations: Control group did receive information on benefits of breastfeeding, may have been contaminated as control group time block was after intervention. Changed practices among staff and history bias could be present. Tools used for outcome measurement not adequately described.</td>
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<td></td>
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<td>Questions regarding: BF exclusivity and duration, support received from father, and BF problems experienced</td>
<td>Full BF at 6 months with BF problems was significantly higher in intervention group (n=23, 24% vs. to n=4, 4.5%, p&lt;.001)</td>
<td>Potential recall bias with 6 &amp; 12 mo. Follow-up</td>
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<td>Significant differences in: Insufficient milk supply (intervention group n=12, 8.6% vs. control group n=38, 27%) &amp; stopping due to problems (intervention group n=6, 4% vs. control group n=25, 18%).</td>
<td>Strengths: Controlled trial, all eligible participants asked to participate, blocked time allocation. The outcome assessor blinded.</td>
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<td>Intervention group reported more support and relevant help from father. (intervention group n=128, 91% vs. control group n=48, 34%)</td>
<td>Participants were blinded to the objectives of the study. The intervention and outcomes clearly defined. None of the participants were lost to follow-up.</td>
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<tr>
<td><strong>Susin et al.</strong>&lt;br&gt;Journal of Human Lactation 2008</td>
<td><strong>Intervention:</strong> Pediatrician delivered breastfeeding intervention 18 min video, discussion &amp; handout and covered information on WHO recommendations management of common problems, and importance of paternal participation</td>
<td>F/U at home 1, 2, 4, 6 months or until breastfeeding stopped. Information on BF practices collected</td>
<td>BF at 6 mo. was significantly higher in the mother only intervention. Exclusive BF at 4 mo. was higher in the mother-father group (16.4% vs. 11.1% in mother only and 5.7% in the control group ( p=0.003 )) The inclusion of fathers in the intervention significantly decreased the risk of discontinuing exclusive BF before 6 mo. ((HR, 0.80 [0.65-0.98])) Fathers in intervention with schooling &lt;8yrs negatively impacted BF outcomes Intervention group 1&amp; 2 had &gt; knowledge for breastfeeding vs. control group ((p&lt;0.0001)) Fathers in the intervention group had higher mean scores ((p&lt;0.01)). Fathers BF knowledge (greater than mean score ) was sig. for frequency of exclusive BF during the 1st mo.((44.3% \text{ vs. } 27.3% \text{ OR } 1.76 [1.18, 2.64] \text{ and any BF at 3 and } (80.5% \text{ vs. } 71.5%, \text{ OR } 1.91 [1.21, 3.00]) \text{ &amp; 6 mo. (60.6% vs. } 47.7% \text{ OR } 1.64 [1.11-2.40])) Fathers who scored higher in knowledge had a 1.76 times higher chance of their infant BF exclusively at 1 mo and 1.64 higher chance of BF to 6 mo.</td>
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<td><strong>Sample:</strong>&lt;br&gt;1) 201 control&lt;br&gt;2) 192 mothers only&lt;br&gt;3) 193 couples</td>
<td><strong>Control:</strong> No intervention</td>
<td>Limitations: Non-random allocation Block allocation into groups, history bias possible, although authors mention no citywide breastfeeding campaign took place at the time. Physician facilitated intervention, may be a co-intervention Tools used for outcome measurement not adequately described Culturally sensitive video, intervention not piloted, did not have the desired effect with the intended audience Unknown if outcome assessor was blind (Susin 1999)</td>
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<tr>
<td><strong>Location:</strong> Brazil</td>
<td><strong>BF- breastfeeding</strong>&lt;br&gt;mo.- month</td>
<td>Strengths Controlled trial, eligibility and inclusion described, loss to follow-up comparable in each group Outcome assessor blinded (Susin 2008) Adjusted for confounders in analysis</td>
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<tr>
<td><strong>Susin et al.</strong>&lt;br&gt;Birth 1999</td>
<td><strong>Sample:</strong>&lt;br&gt;1) 208 Control&lt;br&gt;2) 197 mothers only&lt;br&gt;3) 196 couples</td>
<td><strong>F/U at home 1, 2, 4, 6 months or until breastfeeding stopped. Information on BF practices collected</strong></td>
<td>**BF at 6 mo. was significantly higher in the mother only intervention. Exclusive BF at 4 mo. was higher in the mother-father group (16.4% vs. 11.1% in mother only and 5.7% in the control group ( p=0.003 )) The inclusion of fathers in the intervention significantly decreased the risk of discontinuing exclusive BF before 6 mo. ((HR, 0.80 [0.65-0.98])) Fathers in intervention with schooling &lt;8yrs negatively impacted BF outcomes Intervention group 1&amp; 2 had &gt; knowledge for breastfeeding vs. control group ((p&lt;0.0001)) Fathers in the intervention group had higher mean scores ((p&lt;0.01)). Fathers BF knowledge (greater than mean score ) was sig. for frequency of exclusive BF during the 1st mo.((44.3% \text{ vs. } 27.3% \text{ OR } 1.76 [1.18, 2.64] \text{ and any BF at 3 and } (80.5% \text{ vs. } 71.5%, \text{ OR } 1.91 [1.21, 3.00]) \text{ &amp; 6 mo. (60.6% vs. } 47.7% \text{ OR } 1.64 [1.11-2.40])) Fathers who scored higher in knowledge had a 1.76 times higher chance of their infant BF exclusively at 1 mo and 1.64 higher chance of BF to 6 mo.</td>
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