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Examining Self-Efficacy, Help-Seeking, and Grit as Predictors of Exclusive Breastfeeding Antepartum to One-Month Postpartum

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A thesis submitted in partial fulfillment of the requirements for the degree in Master of Science

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EXAMINING SELF-EFFICACY, HELP-SEEKING, AND GRIT AS PREDICTORS OF EXCLUSIVE BREASTFEEDING ANTEPARTUM TO ONE-MONTH POSTPARTUM

(Thesis format: Monograph)

by

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Graduate Program in Health and Rehabilitation Sciences

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science

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Abstract

The World Health Organization and Health Canada recommend mothers exclusively breastfeed to six-months postpartum for the many benefits provided to both the mother and the child. The purpose of this study was to examine maternal psychosocial factors that may predict exclusive breastfeeding practice. A 104 primiparous mothers participated in the study by completing online surveys once antepartum and at one-month postpartum. The results showed exclusive breastfeeding rates at one-month postpartum were lower than breastfeeding intentions reported antepartum. Help-seeking was similar among both exclusively and non-exclusively breastfeeding mothers. Conversely, self-efficacy and grit were higher among exclusively breastfeeding mothers both antepartum and postpartum. This study is the first report of antepartum grit as a predictor of exclusive breastfeeding. The findings from this study provide novel insights into exclusive breastfeeding predictors and lay the groundwork for future studies into psychosocial factors as predictors of exclusive breastfeeding behaviour.

Keywords

Breastfeeding, exclusive, primiparous, mothers, self-efficacy, grit, help-seeking, psychosocial factors
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Chapter 1

1 Introduction & Literature Review

1.1 Breastfeeding Guidelines

The World Health Organization (WHO) guidelines recommend infants to be exclusively breastfed from birth through the first six months of life to attain optimal growth, development, and health (WHO, 2013). Following six months of exclusive breastfeeding, appropriate foods should gradually be introduced into an infant’s diet with continued breastfeeding to two years postpartum (WHO, 2013). Breastfeeding initiation is defined as the time-point when a mother attempts to breastfeed or successfully breastfeeds her baby (Health Canada, 2010a). Breastfeeding is considered exclusive when the infant’s diet consists solely of breast milk, either directly from the breast or in the form of expressed milk. Guidelines further stipulate that the infant may receive vitamins, minerals, or medicine, however no other liquids or solids are recommended (Health Canada 2010b; WHO, 2010).

1.2 Significance of Breastfeeding

Human breast milk is naturally produced to fulfill the nutritional needs of a newborn human infant (James & Dobson, 2005). Shortly after giving birth, the body releases colostrum, a nutrient-dense, yellow, milk solution with optimal nutrient composition for a rapidly developing newborn baby (James & Dobson, 2005). As breastfeeding continues, the composition of the mother’s milk changes to suit the altering needs of the growing infant (James & Dobson, 2005; Spatz, 2014).
Breast milk is easily digestible and is composed of carbohydrates, fatty acids, and cholesterol (James & Dobson, 2005). During the early stages of growth and development, breast milk contains low amounts of protein and sodium to prevent unnecessary stress to the kidneys (James & Dobson, 2005; Spatz, 2014). Furthermore, the low sodium content of breast milk allows infants to retain much of the fluid they receive (James & Dobson, 2005). Breast milk also contains necessary amounts of calcium, phosphorous, and magnesium that are easily absorbed by infants (James & Dobson, 2005). The caloric and lipid composition of breast milk adjust based on the amount of milk infants consume at each feeding interval (Spatz, 2014). At the start of a feeding, when the breast is full, infants will consume low-calorie milk meanwhile at the end of the feeding, when the breast is near empty, infants will consume calorie-dense milk high in fat allowing them to feel satiated more quickly (Spatz, 2014). Infants will consume less milk at each feeding if they are fed multiple times throughout the day in comparison to if they are fed a few times a day, they will consume more milk at each feeding (Bergman, 2013; Kent, Prime, & Garbin, 2012).

Milk from other animals is adapted for the specialized needs of their offspring and does not provide human infants with the specific nutritional composition of human breast milk. The unique composition of human breast milk is specific to the needs of the developing human infant unlike other milk products (e.g. formula, cow, goat, soy, or almond milk) and is favorable in the growth and development of newborn infants.
1.3 Benefits of Breastfeeding

Breastfeeding Benefits to the Baby

Many short-term benefits associated with breastfeeding have been identified for infants. A review by Eidelman and Schanler (2012) confirms that these benefits increase with breastfeeding exclusivity and duration as several of the protective benefits of breastfeeding display a dose-response relationship. Any amount of breastfeeding results in a 23% reduction in the risk of otitis media in comparison to exclusive formula-feeding (Eidelman & Schanler, 2012; Ip, Chung, Raman, Trikalinos, & Lau, 2009). Exclusive breastfeeding for three months or more can further reduce this risk to 50% compared to formula-fed infants (Eidelman & Schanler, 2012). For preterm infants, breastfeeding leads to a reduction in the incidence of necrotizing enterocolitis (Eidelman & Schanler, 2012), a common and potentially fatal gastrointestinal disease characterized by bowel tissue death. Importantly, breastfeeding for any duration reduces the chances of sudden infant death syndrome (SIDS), as breastfeeding infants are more likely to wake-up every two to three hours in anticipation of feeding (Hauck, Thompson, Tanabe, Moon, & Vennemann, 2011; Ip, Chung, Raman, Trikalinos, & Lau, 2009).

The protective effects of breast milk extend to various types of infections. Breastfeeding for four months or more results in a 74% reduction in the risk of bronchiolitis caused by respiratory syncytial virus (Eidelman & Schanler, 2012; Nishimura, Suzue, & Kaji, 2009). Additionally, a study found any breastfeeding for four to six months to reduced the risk of upper respiratory, lower respiratory, and gastrointestinal tract infections. When exclusively breastfeeding for four months of more the immediate risk of upper respiratory, lower respiratory, and gastrointestinal tract infections.
infections was significantly reduced and the risk of lower respiratory tract infections continued to reduce to one year (Duijts, Jaddoe, Hofman, & Moll, 2010; Ip et al., 2009). Furthermore, Kramer et al. (2001) conducted a randomized control trial, which found exclusive breastfeeding for three months or more to significantly reduce the risk of developing one or more gastrointestinal tract infections.

In addition to short-term benefits afforded by breast milk there are many long-term benefits associated with breastfeeding. When exclusively breastfed for three months or more, the incidence of clinical asthma, atopic dermatitis, and eczema are reduced (Eidelman & Schanler, 2012; Ip et al., 2009). Additionally, various studies suggest that breast milk contains many anti-infective properties that act as protective agents against type 1 diabetes mellitus for infants with developing immune systems (Patelarou et al., 2012; Pereira, Alfenas, & Araújo, 2014). Evidence suggests the early introduction of cow’s milk and formula milk following birth are linked with a greater chance of developing type 1 diabetes mellitus (Patelarou et al., 2012; Pereira et al., 2014; Sadauskaite-Kuehne, Ludvigsson, Padaiga, Jasinskiene, & Samuelsson, 2004). A short period of breastfeeding or a break in breastfeeding practice can also increase the chances of developing type 1 diabetes mellitus (Patelarou et al., 2012; Sadauskaite-Kuehne et al., 2004).

Optimal neural development in an infant is a fundamental benefit of breastfeeding (Isaacs et al., 2010). Breast milk contains high levels of cholesterol, which is essential for proper myelinated neural development and function (Boutwell, Beaver, & Barnes, 2012; Isaacs et al., 2010; Jedrychowski et al., 2012). Studies have found that children who are breastfed as infants obtain higher-level intelligence quotient (IQ) scores than children
who are not breastfed and this relationship is pronounced for children who are born preterm (Boutwell et al., 2012; Isaacs et al., 2010; Jedrychowski et al., 2012). However, the findings remain controversial as some studies discuss the increase in IQ as attributed to confounding variables such as socio-demographic factors, family lifestyle, and maternal IQ (Der, Batty, & Deary, 2006; Ip et al., 2009; Sajjad et al., 2015).

The effects of many chronic, debilitating autoimmune diseases can also be minimized with breastfeeding. The risk of inflammatory bowel disease is reduced in children who are breastfed and research suggests this also extends to ulcerative colitis and Crohn’s disease (Barclay et al., 2009). The risk of both acute lymphocytic leukemia and Hodgkin’s lymphoma is reduced with breastfeeding (Bener, Hoffmann, Afify, Rasul, & Tewfik, 2008; Ip et al., 2009). Additionally, increasing breastfeeding duration is protective against celiac disease, and infants who are breastfed during their first gluten exposure are significantly less likely to develop a immune reaction against gluten (Akobeng, Ramanan, Buchan, & Heller, 2006; Eidelman & Schanler, 2012).

Decreased rates of obesity have been linked to exclusive breastfeeding; however research in this area remains controversial. Studies indicate a negative association between exclusive breastfeeding and obesity via a dose-response relationship (Dewey, 2003; Spatz, 2014). Specifically, research suggests each additional month of exclusive breastfeeding results in a 4% reduction in the subsequent risk of obesity (Harder, Bergmann, Kallischnigg, & Plagemann, 2005). Previous research suggests that infants who are breastfed for six months or more are less likely to become obese in childhood and adolescence (Armstrong, Reilly, & Information Team Child Health, 2002; Shields, O’Callaghan, Williams, Najman, & Bor, 2006). This is thought to result primarily from
Breastfeeding enhancing an infant’s ability to self-regulate, as the infant will only consume enough milk to satisfy his/her appetite (Dewey, 2003; DiSantis, Hodges, & Fisher, 2013; Spatz, 2014). Infants who are exclusively breastfed from the breast will stop feeding when satiated or by falling asleep (Spatz, 2014). Self-regulation by infants can be overruled by scheduled feedings as infants are fed at specific intervals rather than when they are hungry, potentially causing additional weight gain (Mihrshahi, Battistutta, Magarey, & Daniels, 2011). Recent research suggests, mothers with underweight infants were more likely to pressure the infant into longer feedings, mothers with overweight infants were more likely to restrict infant feedings, and mothers with infants of a healthy weight were not likely to pressure or restrict the feeding process (Fildes, van Jaarsveld, Llewellyn, Wardle, & Fisher, 2015). Furthermore, this study did not find bottle-fed infants to be pressured into drinking more milk compared to breastfed infants (Fildes et al., 2015). Unfortunately, the effect of breastfeeding does not carry forward into adulthood as other lifestyle factors begin to exert larger influence on weight status including but not limited to, poor dietary intake and insufficient amounts of exercise (Shields, Mamun, O’Callaghan, Williams, & Najman, 2010; Spatz, 2014).

**Breastfeeding Benefits to the Mother**

In addition to the benefits conferred to the child, breastfeeding provides many benefits for the mother as well. Regular releasing of produced milk, which occurs naturally after birth, may aid in the loss of pregnancy weight gain but the current findings are inconsistent (Ip et al., 2009; Neville, McKinley, Holmes, Spence, & Woodside, 2014). The baby’s suckling of the breast triggers the release of oxytocin, which allows milk to be released. Additionally, the release of oxytocin results in decreased postpartum
blood loss and faster involution of the uterus (Eidelman & Schanler, 2012; James & Dobson, 2005). Exclusive breastfeeding also triggers lactational amenorrhea, a natural hormonal change characterized by a delayed return of the menstrual cycle, which is thought to be the body’s natural contraceptive mechanism (Eidelman & Schanler, 2012; Vekemans, 1997).

A review conducted by Figueiredo et al. (2013) suggested that breastfeeding serves as a protective agent against early postpartum depression through regulated sleep patterns, hormonal balance, and increased self-efficacy. Previous studies support these results as lower rates of postpartum depression are seen in mothers who breastfeed and the inverse relationship is seen among mothers who formula-feed (Dennis & McQueen, 2009).

Breastfeeding also has many collective benefits. When a history of gestational diabetes mellitus is present, women are encouraged to breastfeed to three-months postpartum to decrease the risk of developing metabolic syndrome and type 2 diabetes mellitus (Thompson et al., 2013). When no history of gestational diabetes mellitus is present, mothers who breastfeed have a lower risk of developing type 2 diabetes mellitus and the risk continues to decrease for each year of breastfeeding (Eidelman & Schanler, 2012; Ip et al., 2009). Research also shows lower rates of rheumatoid arthritis, hypertension, and hyperlipidemia in women who breastfeed for multiple months throughout their childbearing years (Karlson, Mandl, Hankinson, & Grodstein, 2004; Schwarz et al., 2009). Schwarz et al. (2009) also examined the physiology behind the decrease in cardiovascular disease among women who breastfeed. Their results
demonstrated a 10% decrease in risk of cardiovascular disease for women who cumulatively breastfeed for 12 months or more (Schwarz et al., 2009).

Reductions in breast and ovarian cancer rates have also been linked to breastfeeding. A summary report by Ip et al. (2009) described the results of two meta-analyses both confirming the positive effects of breastfeeding on reducing the risk of breast cancer. The meta-analysis by Bernier et al. (2000) found that any amount of breastfeeding yielded a slight protective effect against breast cancer. Similarly a second meta-analysis described that each additional year of breastfeeding led to a 4.3% decrease in breast cancer (Collaborative Group on Hormonal Factors in Breast Cancer, 2002). Cumulative breastfeeding for 12 months or more is also associated with decreased rates of ovarian cancer in comparison to women who breastfeed for fewer than 12 months or not at all (Ip et al., 2009).

1.4 Breastfeeding Rates

Over the past decade, breastfeeding rates having been increasing in both developing (Cai, Wardlaw, & Brown, 2012) and developed (Australian Bureau of Statistics, 2013; Centers for Disease Control and Prevention, 2015; Health Canada, 2010b; NHS England, 2014) countries around the world. Despite this marked increase in breastfeeding rates, they still do not align with the WHO recommended guidelines. On average, in developing countries, 39% of mothers exclusively breastfeed their infant to six months (Cai et al., 2012). Research is more established in developed countries such as the United States where 79% of women initiate breastfeeding at birth but only 19% are exclusively breastfeeding to six months (Centers for Disease Control and Prevention, 2015). Similarly in Australia, 96% of newborns are breastfed at birth however, at six
months only 15% of infants are still being exclusively breastfed (Australian Bureau of Statistics, 2013). In England, 74% of women begin breastfeeding at birth and at two months only 47% are continuing to breastfeed (NHS England, 2014). In Canada, 87% of mothers initiate breastfeeding (Health Canada, 2010a). At six-months postpartum, the minimum recommended time for exclusive breastfeeding, only 26% of Canadian women are exclusively breastfeeding their baby (Health Canada, 2010b). By three-months postpartum, a total of 34% of mothers who initiate exclusive breastfeeding discontinue the behaviour (Health Canada, 2010b). By one-month postpartum a total of 25% of mothers who initiate exclusive breastfeeding discontinue the behaviour (Health Canada, 2010b).

Although the rates of initiation increased from 2001 to 2003, they have remained stable since (Health Canada, 2010c) with over half of the mothers who initiate breastfeeding at birth not meeting the WHO’s recommended guidelines of exclusive breastfeeding duration. Thus, despite stable rates of exclusive breastfeeding over the past decade, the percentage of women exclusively breastfeeding at each month postpartum is still considerably lower than the WHO recommendations. This highlights the need for further examination into predictors of exclusive breastfeeding continuation at monthly intervals to the WHO’s recommended six-months postpartum.

1.5 Breastfeeding Predictors

Non-Theoretical Predictors of Breastfeeding

Previous research has shown socio-demographic factors to be predictive of breastfeeding initiation and continuation. The most influential socio-demographic factors
are age, education, marital status, income, smoking status, and employment (Callen & Pinelli, 2004; Dennis, 2001; Nolan & Goel, 1995; Scott, Binns, Oddy, & Graham, 2006; Scott & Binns, 1998; Shahla, Fahy, & Kable, 2010). Several studies show that women age 25 or older are more likely to initiate and continue breastfeeding (Dennis, 2001; Nolan & Goel, 1995; Scott et al., 2006; Scott & Binns, 1998; Shahla et al., 2010). In the past, research concerning education and breastfeeding has been inconsistent (Scott & Binns, 1998) however, recent studies have shown higher levels of education to be associated with increased breastfeeding initiation and continuation (Callen & Pinelli, 2004; Jessri, Farmer, Maximova, Willows, & Bell, 2013; Shahla et al., 2010). Specifically, Jessri et al. (2013) found that women with post-graduate degrees were approximately four times more likely to continue breastfeeding to six months. Marital status has also been linked to breastfeeding behaviour, as married or common-law women are more likely to breastfeed (Scott & Binns, 1998; Shahla et al., 2010). Previous reports of the relationship between socioeconomic status and breastfeeding have been inconsistent due to confounding variables however, some studies strongly suggest that socioeconomic status may influence breastfeeding initiation (Celi, Rich-Edwards, Richardson, Kleinman, & Gillman, 2005; Flacking, Nyqvist, & Ewald, 2007; Heck, Braveman, Cubbin, Chávez, & Kiely, 2006; Shahla et al., 2010). Consistently, studies have found that mothers who smoke postpartum are less likely to initiate and continue breastfeeding perhaps due to hormonal changes within the body (Dennis, 2001; Scott & Binns, 1998). Status of employment is associated with breastfeeding continuation but not initiation as women who return to work prior to three months tend to discontinue breastfeeding sooner than their counterparts (Dennis, 2001; Scott et al., 2006).
Theoretical Predictors of Breastfeeding: Self-Efficacy, Help-Seeking, and Grit

In addition to socio-demographic factors, various psychosocial factors have also been investigated in relation to breastfeeding. Growing research suggests that psychosocial factors may have a greater influence on breastfeeding behaviours than socio-demographic factors (Jessri et al., 2013).

**Self-Efficacy.** Self-efficacy has been well studied and demonstrated to be a reliable predictor of breastfeeding exclusivity and duration (de Jager, Skouteris, Broadbent, Amir, & Mellor, 2013). Derived from Bandura’s Social Cognitive Theory, self-efficacy refers to an individual’s perceived ability to carry out a specific task or behaviour (Bandura, 1977). There are two aspects of the self-efficacy theory, outcome expectancies and efficacy expectancies (Bandura, 1977). Outcome expectancy is the outcome an individual hopes to receive after completing a specific behaviour (Bandura, 1977). Efficacy expectancy is the belief the individual has that he/she can successfully complete the behaviour to achieve the expected outcome (Bandura, 1977). Efficacy expectations determine (a) whether the person will choose to engage in the behaviour, (b) how much effort the person will expend towards the behaviour, (c) whether the person will have positive or negative thoughts about the behaviour, and (d) how the person will cope with difficulties and barriers (Bandura, 1977; Dennis, 1999).

An individual’s self-efficacy towards a specific behaviour is best assessed when using a direct measurement tool specific to the task (Bandura, 1977). To this end, Dennis and Faux (1999) created the Breastfeeding Self-Efficacy Scale. This tool evaluates women’s levels of confidence towards breastfeeding-specific behaviours. Mothers with
high self-efficacy are more likely to begin breastfeeding and continue the behaviour until the behavior is mastered whereas, mothers with low-self efficacy are unlikely to begin breastfeeding or quit when faced with challenges.

Self-efficacy is a modifiable concept based on four key sources of information: performance accomplishments, vicarious experiences, verbal persuasion, and physiological states (Bandura, 1977). Past performance accomplishment allows a mother’s past experience of breastfeeding to influence her new experience of breastfeeding. For example, research shows that mothers who have breastfed before are more likely to breastfeed again (Dennis, 2001). Vicarious experiences develop when a mother observes another woman successfully breastfeeding and thereby increases her own self-efficacy for completing the behaviour. Verbal persuasion by health professionals, family, and friends can help encourage a mother to initiation and continue breastfeeding. A mother’s physiological state also influences her level of self-efficacy towards breastfeeding such that, if a mother experiences stress and anxiety at the thought of breastfeeding she is less likely to breastfeed because of the emotional effects. On the contrary, if the mother feels calm and collected at the thought of breastfeeding she is more likely to initiate and continue the behaviour. A review by Shahla, Fahy, and Kable (2010), concluded that women with lower breastfeeding confidence discontinued breastfeeding earlier in the postpartum period than those with higher breastfeeding confidence. A more recent study by Loke and Chan (2013) found that women who were more confident in their breastfeeding abilities were more likely to exclusively breastfeed to six-weeks postpartum.
Help-Seeking. Help-seeking is defined as a problem focused, planned behaviour, involving interpersonal interaction with a third-party (Cornally & McCarthy, 2011). This concept has been widely studied in relation to many health concerns such as cancer, bowel incontinence, and mental health (O’Mahony & Hegarty, 2009; Shaw, Brittain, Tansey, & Williams, 2008; Turris, 2009). Studies conducted on these topics have found that women are more likely than men to actively seek help (O’Mahony & Hegarty, 2009). Shaw et al. (2008) found that depending on the individual’s knowledge of potential symptoms and the severity of symptoms, he/she may not seek help. Furthermore, older adults are less likely to seek help because many believe their symptoms are a result of old age (Turris, 2009). Thus far, the relationship between help-seeking and breastfeeding has not been vastly researched. Previous research has largely focused on social support provided to breastfeeding mothers (Britton, McCormick, Renfrew, Wade, & King, 2009) however, examining the support a mother seeks for herself with regards to her breastfeeding problems could provide further insight into additional predictors of breastfeeding.

Cornally and McCarthy (2011) conducted a concept analysis to consolidate all the research conducted on help-seeking behaviour across various fields. The literature widely supported help-seeking to be a multistage process involving the individual/recipient, the third-party/helper, and the problem. The process begins with a problem, such as breastfeeding, that the mother (i.e. the help-seeker) cannot solve alone. She then engages in the intentional action of seeking-help, she admits to herself that she needs additional support and guidance to follow through with the behaviour. The action of seeking help is heavily based on the mother’s “motivational factors such as self-efficacy, past help-seeking experience, gender norms, and failed self-management” (Cornally & McCarthy,
The mother may seek different kinds of help such as informational, instrumental, or emotional (Cornally & McCarthy, 2011). Once she has decided whom she will ask for help, she must reveal her problem. To truly receive help, she must be willing to share her problem with the helper (Cornally & McCarthy, 2011).

Help-seeking behaviour is based on three empirical referents: type, source, and amount (Cornally & McCarthy, 2011). Type of help-seeking can be classified as autonomous or dependent. The autonomous help-seeker will seek help that will provide her the skills to continue the behaviour independently in future situations (Cornally & McCarthy, 2011). Conversely, the dependent help-seeker will seek help that will require her to be with the helper every time she wants to engage in the behaviour (Cornally & McCarthy, 2011). Sources of help can be divided into formal and informal (Cornally & McCarthy, 2011). Formal sources of help include healthcare professionals such as doctors, nurses, and lactation consultants. Informal sources of help include family, friends, and social networks. The number of times the help-seeker seeks help is important in determining whether her problem is solved. A mother may ask her mother for breastfeeding help multiple times due to accessibility but may only seek help from a professional such as a lactation consultant once. Upon defining all the empirical referents there are two possible outcomes to help-seeking behaviour, the more favorable outcome is that the problem will be resolved or unfortunately the problem will remain unresolved (Cornally & McCarthy, 2011).

**Grit.** In the past perseverance has mainly been studied as a behaviour outcome rather than a behaviour predictor. Studies examining perseverance in breastfeeding mothers often do not intend measure it but rather identify perseverance as a theme among
qualitative data. In many of these studies, women have tried to persevere through the difficulties of breastfeeding because they are aware of the many benefits it provides (Symon, Whitford, & Dalzell, 2013). However, due to the qualitative nature of the data, perseverance is seen as a reoccurring theme rather than a measurable concept. Additionally, small sample qualitative studies do not allow for study results to be generalized to other populations. Quantitatively measured data has the potential to add new, more replicable findings to the field of breastfeeding perseverance.

Research by Duckworth et al. (2007) has shown that, similar to self-efficacy, perseverance, specifically grit, is a strong predictor of achievement. Grit is defined as “trait-level perseverance and passion for long-term goals” (Duckworth & Quinn, 2009, p. 166). Grit originated from the Big Five Model, which describes the five major areas of personality: openness, conscientiousness, extroversion, agreeableness, and neuroticism. Specifically, grit stems from the conscientious trait, which refers to individuals who are “careful, reliable, organized, industrious, and self-controlled” (Duckworth et al., 2007, p. 1089).

Duckworth et al. (2007) have found grit to be a more reliable measure of achievement than IQ, self-control, and conscientiousness. Grit requires long-term stamina as it “entails the capacity to sustain both effort and interest in projects that take months or even longer to complete” (Duckworth et al., 2007, p. 166). Individuals high in grit set long-term goals and continue to work towards them even in the absence of positive feedback.
Duckworth et al. (2007) tested the success of grit through a series of six studies. Study 1 found grit increased with age as overtime individuals learned that quitting, shifting goals, and starting over were not effective strategies for success. Study 2 confirmed grit is most closely related to the conscientious trait of the Big Five Model and that grittier individuals were less likely to make repeated career changes. Study 3 found grit was positively associated with grade point average (GPA) scores at the university level. Study 4 and 5 were conducted among incoming military students taking part in a vigorous summer training program. The studies found grit to be the best predictor of whether students remained and completed the program. Lastly, Study 6 was conducted among finalists of 2005 Scripps National Spelling Bee and found that grittier finalists outperformed less gritty finalists because they studied longer. These studies show that the grit applies to individuals of all ages, in all areas of achievement, not just at school and at work.

1.6 Importance of Understanding Predictors

It is important to understand predictors of breastfeeding and the weight each predictor carries in determining how long a mother will exclusively breastfeed. A deeper understanding of these predictors will assist health professionals in determining where extra resources are needed to support mothers during breastfeeding. When exploring these predictors, it is important to differentiate between modifiable and non-modifiable predictors. Non-modifiable predictors of breastfeeding include socio-demographic factors that cannot be altered, such as age, education, and marital status. Modifiable predictors of breastfeeding include psychosocial factors, which can be changed with proper intervention. Such psychosocial factors include self-efficacy, help-seeking, and grit.
Additionally, differentiating between predictors of breastfeeding initiation and continuation is necessary as different resources for support will be required at each phase.

1.7 Purpose of the Study

This study is part of a larger research project examining psychosocial factors as predictors of exclusive breastfeeding initiation and continuation, both short-term (i.e. to one-month postpartum) and long-term (i.e. to six-months postpartum), among primiparous (first time) mothers in Ontario. The current study only examines psychosocial factors as predictors of exclusive breastfeeding initiation and short-term continuation. Specifically, this study aims to determine if self-efficacy, help-seeking, and grit predict exclusive breastfeeding practices to one-month postpartum.

These three psychosocial factors were chosen due to interest in examining modifiable behaviours in conjunction with a personality trait. As previously mentioned, breastfeeding self-efficacy has been well studied in the literature, and it is an underlying factor in help-seeking behaviour (Barker, 2007). Additionally, self-efficacy along with grit are both associated with achievement (Duckworth et al., 2007).

The specific objectives of this study are to (a) determine if self-efficacy, help-seeking, and grit predict short-term exclusive breastfeeding practice, both individually and in combination; and (b) determine whether levels of self-efficacy, help-seeking, and grit change from antepartum to one-month postpartum. It is hypothesized that highly efficacious, gritty, and help-seeking women will initiate and continue to exclusively breastfeed their infant to one-month postpartum and that participants’ level of self-efficacy, help-seeking, and grit will increase from antepartum to postpartum.
Chapter 2

2 Methods

2.1 Participants

Inclusion Criteria

Women who met the following criteria were invited to participate in the study: primiparous pregnant women, expecting a singleton birth, 18 years of age or older, and could provide consent in English. Multiparous women (woman who have previously given birth) were excluded from the study because primiparous and multiparous women may have very different breastfeeding experiences. Women having multiple births (i.e. twins, triplets, or more) were also excluded from the study, as breastfeeding can be more challenging when trying to feed more than one baby at a time.

Sample Size

Based on a sample size calculation (Cohen, 1992) a sample size \((N)\) of approximately 76 participants was required to detect a medium effect size with three independent variables, 80% of the time with a 0.05 alpha level. Taking into consideration breastfeeding discontinuation rates reported by Health Canada (Health Canada, 2010b), we aimed to recruit 200 pregnant women.

Recruitment

Primiparous pregnant women living in Ontario were invited to participate through a variety of active and passive recruitment methods. Expecting mothers were actively recruited through face-to-face invitations at prenatal classes and events. Posters were
distributed to physicians’ clinics and appropriate local businesses. Additionally, advertisements were posted on the social networking site Facebook, which were accessible to anyone who searched the terms “breastfeeding” or “baby” (see Appendix A and B for samples of these recruitment methods). Interested participants were informed that they would be entered in a draw to win one of ten gift cards upon completion of each survey. Individuals who were interested in the study were able to contact the research team using the contact information provided on the recruitment materials.

2.2 Study Design and Procedures

The study design is prospective in that participants were asked to complete self-report questionnaires antepartum (i.e. 29 to 40 weeks pregnancy; Phase 1) and postpartum (i.e. one-month; Phase 2). Ethics approval for the research project was obtained through the University of Western Ontario’s Research Ethics Board (see Appendix C). For recruitment purposes, ethics approval was further obtained through the Middlesex London Health Unit (London, Ontario) and the Queensway Carleton Hospital (Ottawa, Ontario).

Breastfeeding Survey

All women who provided their email or contacted the researcher to participate in the study were sent a generic email (Appendix D) with the Letter of Information (Appendix E) and a link directing them to the online screening survey (Appendix F). Women who completed the screening survey and were eligible to participate were sent the Phase 1 email (Appendix G). Women who were ineligible to participate in the study
were sent an email in which they were thanked for their interest and informed that they did not meet the study eligibility criteria (Appendix H).

**Phase 1**

In the Phase 1 email (Appendix G), women were thanked for their interest in the study, given the Letter of Information (Appendix E), an identification code, and provided the link for Phase 1 of the study. Women were asked to read the Letter of Information prior to deciding whether or not to participate. All women who decided to participate were asked to complete the Phase 1 survey (Appendix H) by clicking on the link provided in the email. Participants were required to input their designated identification code prior to filling out the survey. The first page of the Phase 1 survey displayed the Letter of Information. At the end of the Letter participants were asked for consent by having to select one of the following options before proceeding: (a) I have read the Letter of Information and I wish to participate in the study or (b) I have read the Letter of Information and I do not wish to participate in the study at this time. The survey took approximately 15 minutes to complete in the following order:

1. **Perseverance Questionnaire** (Appendix I): the 12-item Grit Scale (Duckworth et al., 2007) to assess overall level of perseverance.


4. Help-seeking Questionnaire (Appendix I): an investigator-developed four-item questionnaire to assess help-seeking behaviour in regards to breastfeeding.

5. Socio-Demographic Information Questionnaire (Appendix I): an investigator-developed seven-item questionnaire to assess age, income, education, etc.

The final page thanked participants for their time and informed them that they will be contacted upon initiation of Phase 2 of the study.

**Phase 2**

All participants who reported intention to breastfeed and completed the Phase 1 survey were sent the Phase 2 email (Appendix J). Participants were provided with the link to the Phase 2 survey (Appendix K) to be completed at one-month postpartum. The survey was emailed to participants at approximately three-weeks postpartum with a two-week window for survey completion. The survey took approximately 15 minutes to complete in the following order:

1. Perseverance Questionnaire (Appendix K): the 12-item Grit Scale (Duckworth et al., 2007) to assess overall level of perseverance.

2. Birth and Feeding Practices Questionnaire (Appendix K): an investigator-developed eight to ten-item questionnaire and a five-item adjusted version of the Infant Feeding Intentions Scale (Nommsen-Rivers & Dewey, 2009) to assess birthing procedure and feeding intentions.

4. Help-seeking Questionnaire (Appendix K): an investigator-developed seven-item questionnaire to assess help-seeking behaviour in regards to breastfeeding.

The final page thanked participants for their time and participation in the study.

**Instruments and tools**

Below is a description of the instruments and tools that were used for data collection.

**Grit Scale.** The perseverance questionnaire was comprised of the Grit Scale, which was created by Duckworth et al. (2007) to measure an individual’s perseverance and passion for long-term goals. The scale consists of 12 items, all of which are specifically worded for generalizability to adolescents and adults engaging in various tasks. Responses were recorded on a 5-point Likert scale ranging from 1 = *Very much like me* to 5 = *Not like me at all*. The scores are then averaged to indicate an overall level of grittiness. Individuals with a higher overall score were considered grittier than those with a lower overall score. Duckworth et al. (2007) conducted six validation studies in which the 12-item Grit Scale was shown to have high reliability and strong face and predictive validity. Upon further evaluation, Duckworth and Quinn (2009) created the Short Grit Scale (Grit-S). The Grit-S consists of eight items from the original Grit Scale; four items were omitted for efficiency. The Grit-S was tested and shown to have good internal consistency and reliability (Duckworth & Quinn, 2009). The original Grit Scale was administered at each phase of the study as previous validation studies suggested that grit may change over time.
**Birth and Feeding Practices Questionnaire.** This questionnaire collected information regarding the breastfeeding intentions, birth of the baby, and the mother’s current feeding practices. The breastfeeding intentions portion of the questionnaire consisted of an adjusted version of the Infant Feeding Intentions Scale (IFI Scale; Nommsen-Rivers & Dewey, 2009). The original IFI Scale consists of five statements answered on a 5-point Likert scale ranging from 1 = *Very much agree* to 5 = *Very much disagree*. Nommsen-Rivers and Dewey (2009) found the IFI Scale to have good construct and content validity after testing it in two different populations. In Phase 1 the scale was modified to include six items by slightly changing the wording of some statements and adding a statement regarding combined feeding. In Phase 2, the scale consisted of five items as the statement regarding feeding intention at one-month postpartum was omitted. Additionally, in Phase 2, eight to ten investigator-developed questions were asked pertaining to the birth of the baby and the mother’s current feeding practices.

**Breastfeeding Self-Efficacy Scale – Short-Form.** Dennis and Faux (1999) created the Breastfeeding Self-Efficacy Scale (BSES). It is a tool used to assess a woman’s perceived confidence in her ability to breastfeed. The original scale consisted of 33 positively phrased items, all beginning with “I can always”. Responses were recorded on a 5-point Likert scale ranging from 1 = *Not at all confident* to 5 = *Always confident*. Possible scores ranged from 33 to 165, with higher scores representing greater breastfeeding self-efficacy. The BSES was pilot tested, in hospital, among 130 women new breastfeeding mothers. The scale demonstrated good internal consistency reliability, however the results suggested that the number of items could be reduced. The Breastfeeding Self-Efficacy Scale – Short Form (BSES-SF; Dennis, 2003) is the revised
14-item scale. The BSES-SF presents high internal consistency reliability and sufficient construct and predictive validity. It uses the same response scale as the original version, however the range of possible scores is reduced to 14 to 70. The BSES-SF was administered at each phase of the study as it has been tested at various points postpartum and has shown to be effective (Dennis, 2003). Additionally, the scale is valuable in determining breastfeeding duration, as it will measure; (a) whether a mother chooses to breastfeed, (b) how much effort she will dedicate towards breastfeeding, (c) whether she will present positive or negative thoughts towards breastfeeding, and (d) how she will respond emotionally to breastfeeding (Dennis, 1999).

**Help-Seeking Questionnaire.** This questionnaire collected information regarding a mother’s help-seeking behaviour. This investigator-developed questionnaire asked questions regarding a mother’s help-seeking behaviours such as who, when, where, and how many times she sought help prior to and during her breastfeeding experience. Research on help-seeking behaviour and breastfeeding support provided the foundation for the questionnaire, which was pilot tested among health promotion graduate students and professors. Feedback allowed for the adjustment of question phrasing and response options. The questionnaire consisted of four items in Phase 1 and seven items in Phase 2.

**Socio-Demographic Questionnaire.** This is an instigator-developed eight-item questionnaire that was administered in Phase 1 the study. This questionnaire collected socio-demographic information on the participants such as ethnicity, marital status, level of education completed, employment status, household income, and smoking status.
**SurveyMonkey.** Study questionnaires were administered using an online survey system allowing participants to answer survey questions at their convenience within a specified time period. SurveyMonkey allowed the creation of unique online surveys that could be distributed via email. Using anonymous identification numbers, the program recorded the answers of those who completed the survey or partially completed the survey. SurveyMonkey was selected for this study, as it was very adaptable and economical.

### 2.3 Statistical Analyses

Both screening and Phase 1 surveys were administered antepartum. In the screening survey, participants were asked to provide their expected due date so that the lead researcher (SG) could determine individual release dates for the Phase 2 survey. Upon completion of all surveys, data was entered into SPSS (version 21, SPSS Inc., Chicago). Participants were coded as “exclusively breastfeeding” or “non-exclusively breastfeeding” based on self-reported breastfeeding status at one-month postpartum.

Frequencies and/or means were calculated for all data. Additionally, chi-square tests were conducted to examine potential differences between exclusive and non-exclusive breastfeeding mothers in demographics, birthing characteristics, feeding intentions, self-efficacy, and grit. Help-seeking data was recoded into categories based on source (i.e.: reading materials, professionals, family/friends). Frequencies were calculated to determine common sources of help sought out by participants at each time point. Cronbach’s alpha coefficient was calculated to determine the reliability of total breastfeeding self-efficacy scores and grit scores at both time points. Split-plot analysis of variance (ANOVA) tests were conducted for self-efficacy and grit to analyze...
differences between breastfeeding status and time (antepartum versus postpartum). Bivariate correlation analyses were conducted to determine associations between the dependent and independent variables. Lastly, to examine which variables predicted breastfeeding exclusivity, binary logistic regression analyses were conducted.
Chapter 3

3 Results

3.1 Recruitment of Participants

Participants were recruited from August 2014 through to February 2015. A total of 313 expecting mothers expressed interest in the study and after completing the screening survey 129 were deemed eligible. Of these, 123 (95.3%) women completed the Phase 1, antepartum survey and 104 (80.6%) completed the Phase 2, one-month postpartum survey. See Figure 1 for the participation flow diagram. The majority of participants (66.7%; \( n = 86 \)) were recruited via prenatal and breastfeeding classes. The remaining participants were recruited at infant-focused community events (28.7%; \( n = 37 \)) and through word-of-mouth (4.7%; \( n = 6 \)).
Figure 1. An Overview of the Recruitment Process and Participant Response Rates.
3.2 Participant Demographic Characteristics

The following data focuses on the 104 women who completed both, the Phase 1 (antepartum) and Phase 2 (one-month postpartum) surveys. Participants were divided into two groups based on self-reported feeding status: (1) exclusive breastfeeding and (2) non-exclusive breastfeeding (i.e. combined or other feeding). The majority of the participants (76.0%; n = 79) were from London, Ontario. Participant ages ranged from 21 to 40 with an overall mean age of 29.8 years (SD = 4.1). The sample consisted of primarily Caucasian participants (86.5%; n = 90). Most participants were married (72.1%; n = 75) and had completed a bachelor’s degree (34.6%; n = 36) or college or technical training (32.7%; n = 34). When completing the Phase 1 survey, 59.6% (n = 62) of women said they were employed full-time and currently still working. Annual household income ranged throughout the population with 19.2% (n = 20) of women reporting a $100,000 to $149,999 and 14.4% (n = 15) of women reporting $60,000 to $79,999. This was followed by a split between 12.5% (n = 13) of women reporting a $80,000 to $99,999 annual household income and 12.5% (n = 13) of women reporting a $40,000 to $59,999 annual household income. The vast majority of participants (88.5%; n = 92) did not smoke within the year prior to becoming pregnant. Forty-nine percent (n = 51) of women reported a non-induced, vaginal delivery. Antibiotics were received by 26.9% (n = 28) of participants during labour, delivery, or in the early postpartum period. Seventy-five percent (n = 78) of women chose to take an epidural for pain management. The vast majority of participants (81.7%; n = 85) delivered in hospital with a physician and/or an obstetrician/gynecologist (OBGYN). Table 1 further displays demographic and birthing characteristics for participants at Phase 1, prior to giving birth.
Table 1. Demographic and Birthing Characteristics of Primiparous Mothers.

| Demographic characteristics | Breastfeeding | | | | 
|----------------------------|---------------|---|---|---|---|
|                            | Total n (%)   | Exclusive n (%) | Non-Exclusive n (%) | Chi-Square Tests | 
| Age, years                 | Total n (%)   | Exclusive n (%) | Non-Exclusive n (%) | **λ, p**      |
| Mean                       | M = 29.8      | M = 29.4        | M = 30.9            | N/A            |
| Standard Deviation         | SD = 4.1      | SD = 3.7        | SD = 4.6            |               |
| 21-25                      | 16 (15.4)     | 12 (16.9)       | 4 (12.1)            | λ = 25.28, p = 0.152 |
| 26-30                      | 44 (42.3)     | 32 (45.1)       | 12 (36.4)           | p = 0.152     |
| 31-35                      | 34 (32.7)     | 24 (33.8)       | 10 (30.3)           |               |
| 36-40                      | 10 (9.6)      | 3 (4.2)         | 7 (21.2)            |               |
| Education a                |               |                |                     |               |
| Secondary school diploma   | 4 (3.8)       | 3 (4.2)         | 1 (3.0)             | λ = 5.21, p = 0.390 |
| Some post-secondary        | 5 (4.8)       | 2 (2.8)         | 3 (9.1)             |               |
| College or technical training | 34 (32.7) | 22 (31.0) | 12 (36.4) | p = 0.152 |
| Bachelor degree            | 36 (34.6)     | 26 (36.6)       | 10 (30.3)           |               |
| Graduate degree            | 24 (23.1)     | 17 (23.9)       | 7 (21.2)            |               |
| Marital status a           |               |                |                     |               |
| Single, never married      | 8 (7.7)       | 7 (9.9)         | 1 (3.0)             |               |
| Married                    | 75 (72.1)     | 50 (70.4)       | 25 (75.8)           | **χ² = 1.54, p = 0.463** |
| Living with a partner or common-law | 20 (19.2) | 13 (18.3) | 7 (21.2) |               |
| Annual household income a, CAD Dollars | | | | |
| < 24,000                   | 6 (5.8)       | 6 (8.5)         | 0 (0.0)             |               |
| 25,000 – 39,999            | 12 (11.5)     | 7 (9.9)         | 5 (15.2)            |               |
| 40,000 – 59,999            | 13 (12.5)     | 9 (12.7)        | 4 (12.1)            |               |
| 60,000 – 79,999            | 15 (14.4)     | 10 (14.1)       | 5 (15.2)            | λ = 5.98, p = 0.542 |
| 80,000 – 99,999            | 13 (12.5)     | 8 (11.3)        | 5 (15.2)            |               |
| 100,000 – 149,999          | 20 (19.2)     | 14 (19.7)       | 6 (18.2)            |               |
| ≥ 150,000                  | 10 (9.6)      | 6 (8.5)         | 4 (12.1)            |               |
| Prefer not to answer       | 12 (11.5)     | 9 (12.7)        | 3 (9.1)             |               |
| Employment a               |               |                |                     |               |
| Employed FT, on maternity leave | 12 (11.5) | 4 (5.6) | 8 (24.2) |               |
| Employed PT, on maternity leave | 6 (5.8) | 5 (7.0) | 1 (3.0) |               |
| Employed FT, still working | 62 (59.6)     | 42 (59.2)       | 20 (60.6)           | λ = 17.98, p = 0.006* |
| Employed PT, still working | 11 (10.6)     | 11 (15.5)       | 0 (0.0)             |               |
| Self-employed              | 2 (1.9)       | 1 (1.4)         | 1 (3.0)             |               |
| Unemployed                 | 5 (4.8)       | 3 (4.2)         | 2 (6.1)             |               |
| Student                    | 3 (2.9)       | 3 (4.2)         | 0 (0.0)             |               |
| Ethnicity a                |               |                |                     |               |
| Caucasian                  | 90 (86.3)     | 62 (87.3)       | 28 (84.8)           | λ = 2.71, p = 0.438 |
| Asian                      | 5 (4.8)       | 2 (2.8)         | 3 (9.1)             |               |
### Complications during labour/delivery/early postpartum

<table>
<thead>
<tr>
<th>Condition</th>
<th>FT: Full-time</th>
<th>FT: African</th>
<th>FT: First Nations, Métis, Inuit</th>
<th>FT: Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotics</td>
<td>28 (26.9)</td>
<td>19 (26.8)</td>
<td>9 (27.3)</td>
<td></td>
</tr>
<tr>
<td>Excessive hemorrhaging</td>
<td>11 (10.6)</td>
<td>8 (11.3)</td>
<td>3 (9.1)</td>
<td></td>
</tr>
<tr>
<td>Infection</td>
<td>8 (7.7)</td>
<td>4 (5.6)</td>
<td>4 (12.1)</td>
<td>N/A</td>
</tr>
<tr>
<td>Episiotomy</td>
<td>8 (7.7)</td>
<td>5 (7.0)</td>
<td>3 (9.1)</td>
<td></td>
</tr>
<tr>
<td>Fever</td>
<td>11 (10.6)</td>
<td>6 (8.5)</td>
<td>5 (15.2)</td>
<td></td>
</tr>
<tr>
<td>3rd/4th degree tear</td>
<td>13 (12.5)</td>
<td>9 (12.7)</td>
<td>4 (12.1)</td>
<td></td>
</tr>
<tr>
<td>Pain management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epidural</td>
<td>78 (75.0)</td>
<td>52 (73.2)</td>
<td>26 (78.8)</td>
<td></td>
</tr>
<tr>
<td>Spinal</td>
<td>4 (3.8)</td>
<td>3 (4.2)</td>
<td>1 (3.0)</td>
<td>N/A</td>
</tr>
<tr>
<td>Nitrous oxide</td>
<td>15 (14.4)</td>
<td>10 (14.1)</td>
<td>5 (15.2)</td>
<td></td>
</tr>
<tr>
<td>Demerol</td>
<td>1 (1.0)</td>
<td>1 (1.4)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>Natural pain reliever (massage, bath)</td>
<td>27 (26.0)</td>
<td>20 (28.2)</td>
<td>7 (21.2)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>10 (9.6)</td>
<td>8 (11.3)</td>
<td>2 (6.1)</td>
<td></td>
</tr>
</tbody>
</table>

**Notes.**

*a* Missing response.

*b* Check all that apply.

*p* ≤ 0.05

If expected count was violated (i.e. greater than 20%) during for the Pearson Chi-Square ($\chi^2$) test then the Likelihood Ratio ($\lambda$) was used.

FT: Full-time
PT: Part-time
Among exclusively breastfeeding women, the ‘other’ category for ethnicity included Caribbean (1), Middle Eastern (1), South East Asian (1).
Among non-exclusively breastfeeding women, the ‘other’ category for ethnicity included Canadian (mixed Caucasian and first nations; 1).
Among exclusively breastfeeding women, the ‘other’ category for delivery location included: physician and midwife (3), on-call OBGYN (1).
Among non-exclusively breastfeeding women, the ‘other’ category for delivery location included: physician and midwife (1).
Among exclusively breastfeeding women, the ‘other’ category of pain management included: morphine (2), breathing (1), fentanyl (1), unknown IV med during caesarean birth (1), transcutaneous electrical nerve stimulation machine (TENS; 1), did not specify (2).
Among non-exclusively breastfeeding women, the ‘other’ category of pain management included: breathing (1), fentanyl (1).
3.3 Feeding Intentions

Feeding Intentions among All Mothers

**Antepartum.** When posed with the statement “I am planning to exclusively breastfeed” 79.8% (n = 83) responded, “very much agree.” When presented with the statement “When my baby is 1 month old, I will be breastfeeding without using any formula or other milk” 71.2% (n = 74) responded “very much agree.” The disparity in responses to these two statements shows that some women intended to initiate exclusive breastfeeding but planned to discontinue the behaviour before one-month postpartum (see Table 2 for further detail).

**Postpartum.** When posed with the statement “I am exclusively breastfeeding” 68.3% (n = 71) responded, “very much agree.” When comparing women’s antepartum feeding intentions to their postpartum experience, it can be seen that fewer women were actually exclusively breastfeeding at one-month postpartum than those who had intended to be exclusively breastfeeding at one-month postpartum (68.3% compared to 71.2%). Women were presented with additional feeding intention statements, which can be seen in Table 3.
Table 2. Phase 1 (Antepartum) Feeding Intentions of Primiparous Mothers

<table>
<thead>
<tr>
<th>Feeding Intentions</th>
<th>Breastfeeding</th>
<th>Chi-Square Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exclusive n (%)</td>
<td>Non-Exclusive n (%)</td>
</tr>
<tr>
<td>I am planning to only formula and/or other feed my baby</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very much agree</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Some what agree</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Unsure</td>
<td>0 (0.0)</td>
<td>1 (3.0)</td>
</tr>
<tr>
<td>Some what disagree</td>
<td>3 (4.2)</td>
<td>7 (21.2)</td>
</tr>
<tr>
<td>Very much disagree</td>
<td>68 (95.8)</td>
<td>25 (75.8)</td>
</tr>
<tr>
<td>I am planning to combine feed my baby</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very much agree</td>
<td>0 (0.0)</td>
<td>4 (12.1)</td>
</tr>
<tr>
<td>Some what agree</td>
<td>4 (5.6)</td>
<td>1 (3.0)</td>
</tr>
<tr>
<td>Unsure</td>
<td>15 (21.1)</td>
<td>9 (27.3)</td>
</tr>
<tr>
<td>Some what disagree</td>
<td>14 (19.7)</td>
<td>5 (15.2)</td>
</tr>
<tr>
<td>Very much disagree</td>
<td>38 (53.5)</td>
<td>14 (42.4)</td>
</tr>
<tr>
<td>I am planning to exclusively breastfeed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very much agree</td>
<td>60 (84.5)</td>
<td>23 (69.7)</td>
</tr>
<tr>
<td>Some what agree</td>
<td>7 (9.9)</td>
<td>6 (18.2)</td>
</tr>
<tr>
<td>Unsure</td>
<td>2 (2.8)</td>
<td>2 (6.1)</td>
</tr>
<tr>
<td>Some what disagree</td>
<td>2 (2.8)</td>
<td>2 (6.1)</td>
</tr>
<tr>
<td>Very much disagree</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>When my baby is 1 month old, I will be breastfeeding without using any formula or other milk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very much agree</td>
<td>53 (74.6)</td>
<td>21 (63.6)</td>
</tr>
<tr>
<td>Some what agree</td>
<td>13 (18.3)</td>
<td>8 (24.2)</td>
</tr>
<tr>
<td>Unsure</td>
<td>5 (7.0)</td>
<td>3 (9.1)</td>
</tr>
<tr>
<td>Some what disagree</td>
<td>0 (0.0)</td>
<td>1 (3.0)</td>
</tr>
<tr>
<td>Very much disagree</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>When my baby is 3 months old, I will be breastfeeding without using any formula or other milk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very much agree</td>
<td>50 (70.4)</td>
<td>18 (54.5)</td>
</tr>
<tr>
<td>Some what agree</td>
<td>15 (21.1)</td>
<td>11 (33.3)</td>
</tr>
<tr>
<td>Unsure</td>
<td>5 (7.0)</td>
<td>2 (6.1)</td>
</tr>
<tr>
<td>Some what disagree</td>
<td>1 (1.4)</td>
<td>2 (6.1)</td>
</tr>
<tr>
<td>Very much disagree</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>
When my baby is 6 months old, I will be breastfeeding without using any formula or other milk

<table>
<thead>
<tr>
<th></th>
<th>Count (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very much agree</td>
<td>28 (39.4)</td>
</tr>
<tr>
<td>Some what agree</td>
<td>18 (25.4)</td>
</tr>
<tr>
<td>Unsure</td>
<td>22 (31.0)</td>
</tr>
<tr>
<td>Some what disagree</td>
<td>2 (2.8)</td>
</tr>
<tr>
<td>Very much disagree</td>
<td>1 (1.4)</td>
</tr>
<tr>
<td></td>
<td>12 (36.4)</td>
</tr>
<tr>
<td></td>
<td>9 (27.3)</td>
</tr>
<tr>
<td></td>
<td>9 (27.3)</td>
</tr>
<tr>
<td></td>
<td>2 (6.1)</td>
</tr>
<tr>
<td></td>
<td>1 (3.0)</td>
</tr>
</tbody>
</table>

$\chi^2$ test

\[ \chi^2 = \lambda = 1.05, \quad p = 0.902 \]

Notes.
*p ≤ 0.05
If expected count was violated (i.e. greater than 20%) during for the Pearson Chi-Square ($\chi^2$) test then the Likelihood Ratio ($\lambda$) was used.
3.4 Infant Feeding Practices

Feeding Practices Among All Mothers

**Breastfeeding Initiation.** The following information is pertaining to breastfeeding initiation among all mothers. Health Canada defines breastfeeding initiation as the moment when a mother attempts to breastfeed or successfully breastfeeds her newborn baby (Health Canada, 2010a). A total of 71.2% \((n = 74)\) of mothers initiated breastfeeding within one hour after giving birth. An additional 22.1% \((n = 23)\) of mothers initiated between one to four hours postpartum. Seven mothers (6.7%) initiated breastfeeding after five or more hours postpartum or did not attempt to breastfeed.

**Feeding at 48 Hours Postpartum.** At 48 hours postpartum, 72.1% \((n = 75)\) of mothers were exclusively breastfeeding and 25.0% \((n = 26)\) of mothers were combined feeding. Two mothers (1.9%) were formula/other feeding.

**Feeding at One-Month Postpartum.** At one-month postpartum, 68.3% \((n = 71)\) of mothers were exclusively breastfeeding, 29.8% \((n = 31)\) were combined feeding, and 1.9% \((n = 2)\) were formula/other feeding. A detailed account of breastfeeding initiation and follow-up feeding practices among participants is described in Table 4.

**Feeding Practices Among Exclusively Breastfeeding Mothers**

As previously mentioned, 68.3% \((n = 71)\) of mothers in the study reported exclusively breastfeeding at one-month postpartum. Most of these mothers initiated exclusive breastfeeding immediately after birth and continued to one-month postpartum however, some mothers reported non-exclusive breastfeeding due to various
circumstances. The following section describes breastfeeding initiation among mothers who were exclusively breastfeeding at one-month postpartum.

**Breastfeeding Initiation.** Among exclusively breastfeeding mothers, 73.2% \((n = 52)\) began breastfeeding within one hour of giving birth. An additional, 18.3% \((n = 13)\) began breastfeeding between one to four hours after giving birth. Four (5.6%) mothers reported breastfeeding initiation more than five hours after giving birth. Two of these mothers were both breastfeeding within 48 hours postpartum. The remaining two mothers both reported formula and/or other feeding within 48 hours due to latching difficulties. Both of these mothers reported exclusive breastfeeding at one-month postpartum. Two (2.8%) mothers reported that they did not attempt to breastfeed after birth because both their infants were admitted to the neonatal intensive care unit (NICU) but were exclusively breastfeeding at one-month.

**Feeding at 48 Hours Postpartum.** At 48 hours postpartum, 83.1% \((n = 59)\) of mothers were exclusively breastfeeding. Of mothers who reported exclusively breastfeeding at one-month, 12.7% \((n = 9)\) were combined feeding within 48 hours after giving birth. Majority of these mothers \((n = 6)\) reported latching problems as reason for combined feeding. One mother mentioned general breastfeeding problems for which she sought the help of a lactation consultant. One mother was combined feeding because her infant was in the NICU and one mother did not provide a reason for why she was combined feeding. Two mothers were formula/other feeding at 48 hours postpartum, one mother reported latching difficulties and the other reported infant lactose intolerance. In addition, one participant did not provide a reason for why she was combined feeding at 48 hours.
Feeding Practices Among Non-Exclusively Breastfeeding Mothers

In the study, 31.7% \((n = 33)\) of mothers reported non-exclusively breastfeeding at one-month postpartum. The following section looks at exclusive breastfeeding initiation and cessation within this group of mothers.

**Breastfeeding Initiation.** Among non-exclusively breastfeeding mothers at one-month postpartum, 66.7% \((n = 22)\) reported breastfeeding initiation within one hour after birth. An additional, 30.3% \((n = 10)\) reported breastfeeding initiation between one to four hours after giving birth. One woman (3.0%) reported that she did not attempt to breastfeed her baby immediately after birth however, she was exclusive breastfeeding at 48 hours but then was combined feeding by one-month postpartum.

**Feeding at 48 Hours Postpartum.** Nearly half \((48.5\%; n = 16)\) of the mothers in the non-exclusive breastfeeding group at one-month postpartum were exclusively breastfeeding at 48 hours postpartum. The remaining mothers \((51.5\%; n = 17)\) who reported non-exclusively breastfeeding at one-month postpartum discontinued exclusive breastfeeding within 48 hours after giving birth.

“When did you stop exclusively breastfeeding your baby?” Over half \((57.6\%; n = 19)\) of the mothers discontinued exclusive breastfeeding within one week of giving birth, 18.2% \((n = 6)\) of mothers discontinued exclusive breastfeeding between one to two weeks of giving birth, and 9.1% \((n = 3)\) of mothers discontinued exclusive breastfeeding between two to three weeks postpartum. Between three to six weeks, three mothers (9.1%) discontinued exclusive breastfeeding. One mother (3.0%) did not provide
information on when and why she discontinued breastfeeding. One mother (3.0%) did not attempt to breastfeed their baby after birth.

“Why did you stop exclusively breastfeeding your baby?” In total, 27.3% \((n = 9)\) of participants reported lack of milk supply and 21.2% \((n = 7)\) reported latching problems as cause for cessation of exclusive breastfeeding. A combination of latching problems and lack of milk supply was reported by 9.1% \((n = 3)\) of participants. An additional, 15.2% \((n = 5)\) reported infant weight loss or lack of infant weight gain. Two participants (6.1%) reported a combination of lack of milk supply and lack of weight gain as reason for discontinued exclusive breastfeeding. Three participants (9.1%) reported infant jaundice and were recommended to supplement with formula. The remaining four participants (12.1%) in the non-exclusive breastfeeding group did not attempt to breastfeeding, did not respond to question, or reported infant-related problems.
Table 3. Phase 2 (1-Month Postpartum) Feeding Practices of Primiparous Mothers.

<table>
<thead>
<tr>
<th>Feeding Practices</th>
<th>Total</th>
<th>Breastfeeding</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td><strong>Breastfeeding initiation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within 10 minutes after giving birth</td>
<td>7 (6.7)</td>
<td>6 (8.5)</td>
<td>1 (3.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within 10-20 minutes</td>
<td>22 (21.2)</td>
<td>16 (22.5)</td>
<td>6 (18.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within 21-30 minutes</td>
<td>17 (16.3)</td>
<td>11 (15.5)</td>
<td>6 (18.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within 31-60 minutes</td>
<td>28 (26.9)</td>
<td>19 (26.8)</td>
<td>9 (27.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within 1-2 hours</td>
<td>18 (17.3)</td>
<td>11 (15.5)</td>
<td>7 (21.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within 3-4 hours</td>
<td>5 (4.8)</td>
<td>2 (2.8)</td>
<td>3 (9.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After 5 hours or more</td>
<td>4 (3.8)</td>
<td>4 (5.6)</td>
<td>0 (0.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I did not breastfeed or attempt to</td>
<td>3 (2.9)</td>
<td>2 (2.8)</td>
<td>1 (3.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>breastfeed my baby</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Feeding status at 48 hours</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exclusively breastfeeding</td>
<td>75 (72.1)</td>
<td>59 (83.1)</td>
<td>16 (48.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined feeding</td>
<td>26 (25.0)</td>
<td>9 (12.7)</td>
<td>17 (51.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formula and/or other feeding</td>
<td>2 (1.9)</td>
<td>2 (2.8)</td>
<td>0 (0.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Feeding status at one-month postpartum</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exclusively breastfeeding</td>
<td>71 (68.3)</td>
<td>71 (100.0)</td>
<td>0 (0.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined feeding</td>
<td>31 (29.8)</td>
<td>0 (0.0)</td>
<td>31 (93.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formula and/or other feeding</td>
<td>2 (1.9)</td>
<td>0 (0.0)</td>
<td>2 (6.1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Notes.*

\(^{a}\)Missing response.
3.5 Maternal Help-Seeking

Help-Seeking Behaviour Among All Mothers

**Antepartum.** Ninety-two mothers (88.5%) had completed a parental education program or were currently participating in a program when they completed the Phase 1 survey. Four mothers (3.8%) had already registered for a postnatal or breastfeeding program prior to giving birth and an additional 35.6% (n = 37) were planning on registering in a program. When participants were asked about the number of times they had sought breastfeeding help, 26.0% (n = 27) of women implied that they had not sought any help. Whereas, close to two thirds of the participants (68.3%; n = 71) said they sought help from one to five sources and the remaining 5.8% (n = 6) said they sought help from six or more sources. Fifty-five women (52.9%) said they referred to reading materials for breastfeeding related help, 39.4% (n = 41) of women said they asked a professional, and 39.4% (n = 41) also said they asked a family member or friend. Table 4 provides further detail on antepartum help-seeking behaviours of exclusive and non-exclusive breastfeeding mothers.

**Postpartum.** Eighty-nine women (85.6%) sought breastfeeding help in the time after delivery to one-month postpartum. Of these, 62.5% (n = 65) reported that they sought help from one to five sources and 24.1% (n = 25) of mothers said they sought help from more than five sources. Overall, 55.8% (n = 58) of mothers said they referred to reading materials for breastfeeding related help, 84.6% (n = 88) of mothers said they asked a professional, and 47.1% (n = 49) said they asked a family member or friend. Table 5 provides further detail on postpartum help-seeking behaviours of exclusive and non-exclusive breastfeeding mothers.
Table 4. Phase 1 (Antepartum) Help-Seeking Behaviours of Primiparous Mothers.

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Breastfeeding</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>Exclusive</td>
<td>Non-Exclusive</td>
<td></td>
</tr>
<tr>
<td>Prenatal class participation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participated</td>
<td>40 (38.5)</td>
<td>33 (46.5)</td>
<td>7 (21.2)</td>
<td></td>
</tr>
<tr>
<td>Currently participating</td>
<td>52 (50.0)</td>
<td>32 (45.1)</td>
<td>20 (60.6)</td>
<td></td>
</tr>
<tr>
<td>Have not participated</td>
<td>12 (11.5)</td>
<td>6 (8.5)</td>
<td>6 (18.2)</td>
<td></td>
</tr>
<tr>
<td>Intention to participate in a postnatal/breastfeeding class</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Registered to participate</td>
<td>4 (3.8)</td>
<td>3 (4.2)</td>
<td>1 (3.0)</td>
<td></td>
</tr>
<tr>
<td>Planning to participate</td>
<td>37 (35.6)</td>
<td>27 (38.0)</td>
<td>10 (30.3)</td>
<td></td>
</tr>
<tr>
<td>Undecided</td>
<td>57 (54.8)</td>
<td>38 (53.5)</td>
<td>19 (57.6)</td>
<td></td>
</tr>
<tr>
<td>Will not participate</td>
<td>6 (5.8)</td>
<td>3 (4.2)</td>
<td>3 (9.1)</td>
<td></td>
</tr>
<tr>
<td>Help-seeking amount</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>27 (26.0)</td>
<td>18 (25.4)</td>
<td>9 (27.3)</td>
<td></td>
</tr>
<tr>
<td>1-5</td>
<td>71 (68.3)</td>
<td>49 (69.0)</td>
<td>22 (66.7)</td>
<td></td>
</tr>
<tr>
<td>6-10</td>
<td>6 (5.8)</td>
<td>4 (5.6)</td>
<td>2 (6.1)</td>
<td></td>
</tr>
<tr>
<td>Help-seeking sources*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading materials</td>
<td>55 (52.9)</td>
<td>35 (49.3)</td>
<td>20 (60.6)</td>
<td></td>
</tr>
<tr>
<td>Professionals</td>
<td>41 (39.4)</td>
<td>30 (42.3)</td>
<td>11 (33.3)</td>
<td></td>
</tr>
<tr>
<td>Family/friends</td>
<td>41 (39.4)</td>
<td>31 (43.7)</td>
<td>10 (30.3)</td>
<td></td>
</tr>
</tbody>
</table>

*Check all that apply.

Reading materials (websites, books, pamphlets), professionals (community organization, community clinic, physician, nurse, midwife, lactation consultant), family/friends (spouse, friend, mother, mother-in-law, sister, sister-in-law)
Table 5. Phase 2 (1-Month Postpartum) Help-Seeking Behaviours of Primiparous Mothers.

<table>
<thead>
<tr>
<th>Breastfeeding help sought from birth to one-month postpartum&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Total</th>
<th>Breastfeeding Exclusive</th>
<th>Breastfeeding Non-Exclusive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>89 (85.6)</td>
<td>60 (84.5)</td>
<td>29 (87.9)</td>
</tr>
<tr>
<td>No</td>
<td>14 (13.5)</td>
<td>11 (15.5)</td>
<td>3 (9.1)</td>
</tr>
<tr>
<td>Help-seeking amount</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>14 (13.5)</td>
<td>11 (15.5)</td>
<td>3 (9.1)</td>
</tr>
<tr>
<td>1-5</td>
<td>65 (62.5)</td>
<td>44 (62.0)</td>
<td>21 (63.6)</td>
</tr>
<tr>
<td>6-10</td>
<td>24 (23.1)</td>
<td>16 (22.5)</td>
<td>8 (24.2)</td>
</tr>
<tr>
<td>11 or more</td>
<td>1 (0.96)</td>
<td>0 (0.0)</td>
<td>1 (3.0)</td>
</tr>
<tr>
<td>Help-seeking sources&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading materials</td>
<td>58 (55.8)</td>
<td>36 (50.7)</td>
<td>22 (66.7)</td>
</tr>
<tr>
<td>Professionals</td>
<td>88 (84.6)</td>
<td>58 (81.7)</td>
<td>30 (90.9)</td>
</tr>
<tr>
<td>Family/friends</td>
<td>49 (47.1)</td>
<td>34 (47.9)</td>
<td>15 (45.5)</td>
</tr>
</tbody>
</table>

Notes.
<sup>a</sup>Missing response.
<sup>b</sup>Check all that apply.

Reading materials (websites, books, pamphlets), professionals (community organization, community clinic, physician, nurse, midwife, lactation consultant), family/friends (spouse, friend, mother, mother-in-law, sister, sister-in-law)
3.6 Maternal Self-Efficacy

The Breastfeeding Self-Efficacy Scale - Short Form (BSES-SF), was tested for reliability using Cronbach’s alpha coefficient (\( \alpha \)) and was found to have excellent internal consistency both antepartum (Phase 1; \( \alpha = 0.92 \)) and postpartum (Phase 2; \( \alpha = 0.93 \)). A split plot ANOVA was conducted to examine changes in mean self-efficacy scores across the two time points (antepartum and postpartum) and feeding groups (exclusive breastfeeding and non-exclusive breastfeeding).

Box’s M Test of Equality, of the covariance matrix, revealed that the covariance matrices were not equivalent, Box’s M = 16.639, \( p = 0.001 \). Mauchly’s Test of Sphericity was violated \([w = 1.00, \chi^2 (0) = 0.00, (p < 0.05)]\) suggesting that there were significant differences in sphericity of self-efficacy scores at time one and time two. The Levene’s Test of Homogeneity revealed that at time one, the variance between exclusive breastfeeding and non-exclusive breastfeeding was equivalent, \( F = (1, 102) = 0.862, p = 0.355 \). However, at time two there was a significant difference in variance between exclusive and non-exclusive breastfeeding mothers, \( F (1,102) = 26.563, p < 0.001 \).

Using the Greenhouse-Geisser correction, the effect of time was significant, \( F (1,102) = 28.421, p < 0.001, \eta^2 = 0.218, \) power = 1.00. Therefore, when women were divided by breastfeeding type, their self-efficacy scores were significantly different between time one and time two (see Table 6 for means and standard deviations). Additionally, when isolating by time points, there was a significant effect across breastfeeding groups, \( F (1,102) = 22.541, p < 0.001, \eta^2 = 0.181, \) power = 0.997. Demonstrating that mothers of one breastfeeding type had significantly higher breastfeeding self-efficacy scores than mothers of the other breastfeeding type. Analysis
of the overall interaction between time and breastfeeding type was significant, $F = (1, 102) = 22.904, p < 0.001, \eta^2 = 0.183, \text{power} = 0.997$. Therefore, Bonferroni post hoc tests were used to reveal specific differences in significance between exclusive breastfeeding and non-exclusive breastfeeding at times one and two.

Bonferroni contrasts of means found that the difference between exclusive breastfeeding and non-exclusive breastfeeding at time one (see Table 6 for means and standard deviations) was not significant, $t (102) = -3.331, p = 0.071$. However, at time two the difference between exclusive breastfeeding and non-exclusive breastfeeding was significant, $t (102) = -12.592, p < 0.001$. Among exclusively breastfeeding mothers, there was no significant difference in breastfeeding self-efficacy scores at times one and two, $t (102) = 0.528, p = 0.629$. Whereas, the difference between times one and two for non-exclusively breastfeeding mothers was significant, $t (102) = 9.788, p < 0.001$. 
Table 6. Phase 1 (Antepartum) and Phase 2 (1-Month Postpartum) Average Total Scores for Breastfeeding Self-Efficacy Scale - Short Form (BSES-SF).

<table>
<thead>
<tr>
<th>Classification</th>
<th>BSES-SF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Antepartum</td>
</tr>
<tr>
<td></td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Exclusive Breastfeeding</td>
<td>53.12 (8.09)</td>
</tr>
<tr>
<td>Non-Exclusive Breastfeeding</td>
<td>49.79 (9.78)</td>
</tr>
<tr>
<td>Total</td>
<td>52.06 (8.75)</td>
</tr>
</tbody>
</table>

*Notes.*
Standard deviation (SD)
Individual participant scores were summed, which were then used to calculate the mean breastfeeding self-efficacy score at each time point. Scores can range from 14 to 70.
Antepartum. Table 7 presents mean antepartum breastfeeding self-efficacy scores for exclusively breastfeeding women and non-exclusively breastfeeding women. Although, no overall significant differences were found between the means of two breastfeeding groups antepartum, a series of chi-square tests revealed that exclusively breastfeeding women reported higher scores in their perceived ability to “...breastfeed my baby without using formula as a supplement” $(p = 0.017)$.

Postpartum. Bonferroni post hoc tests revealed that mean postpartum self-efficacy scores were significantly different between exclusive and non-exclusive breastfeeding mothers. A series of chi-square tests further revealed which questions were significantly different between the two groups (see Table 8 for mean postpartum breastfeeding self-efficacy scores for exclusive and non-exclusive breastfeeding women). Exclusively breastfeeding women reported higher scores in their ability to “...determine that my baby is getting enough milk” $(p = 0.002)$; “...successfully cope with breastfeeding like I have with other challenging tasks” $(p = 0.001)$; “...breastfeed my baby without using formula as a supplement” $(p < 0.001)$; “...manage the breastfeeding situation to my satisfaction” $(p < 0.001)$; “...manage to breastfeed even if my baby is crying” $(p = 0.001)$; “...keep wanting to breastfeed” $(p = 0.002)$; “...comfortably breastfeed with my family members present” $(p = 0.017)$; “...be satisfied with my breastfeeding experience” $(p < 0.001)$; “...continue to breastfeed my baby for every feeding” $(p < 0.001)$; and “...manage to keep up with my baby’s breastfeeding demands” $(p < 0.001)$. 
Table 7. Phase 1 (Antepartum) Mean Breastfeeding Self-Efficacy Scale – Short Form Scores for Primiparous Mothers.

<table>
<thead>
<tr>
<th>Breastfeeding</th>
<th>Exclusive</th>
<th>Non-Exclusive</th>
<th>Chi-Square Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>I can always determine that my baby is getting enough milk</td>
<td>3.56 (0.86)</td>
<td>3.27 (0.91)</td>
<td>(\lambda = 5.214, p = 0.266)</td>
</tr>
<tr>
<td>I can successfully cope with breastfeeding like I have with other challenging tasks</td>
<td>3.89 (0.77)</td>
<td>3.64 (0.86)</td>
<td>(\lambda = 4.266, p = 0.371)</td>
</tr>
<tr>
<td>I can always breastfeed my baby without using formula as a supplement</td>
<td>3.92 (0.79)</td>
<td>3.52 (1.09)</td>
<td>(\lambda = 12.432, p = 0.014^*)</td>
</tr>
<tr>
<td>I can always ensure that my baby is properly latched on for the whole feeding</td>
<td>3.76 (0.73)</td>
<td>3.45 (1.00)</td>
<td>(\lambda = 7.516, p = 0.111)</td>
</tr>
<tr>
<td>I can always manage the breastfeeding situation to my satisfaction</td>
<td>3.82 (0.78)</td>
<td>3.61 (0.83)</td>
<td>(\lambda = 1.685, p = 0.640)</td>
</tr>
<tr>
<td>I can always manage to breastfeed even if my baby is crying</td>
<td>3.56 (0.82)</td>
<td>3.27 (0.84)</td>
<td>(\lambda = 2.787, p = 0.426)</td>
</tr>
<tr>
<td>I will always keep wanting to breastfeed</td>
<td>4.06 (0.77)</td>
<td>3.79 (1.08)</td>
<td>(\lambda = 5.730, p = 0.220)</td>
</tr>
<tr>
<td>I can always comfortably breastfeed with my family members present</td>
<td>3.61 (1.22)</td>
<td>3.58 (1.15)</td>
<td>(\lambda = 0.877, p = 0.928)</td>
</tr>
<tr>
<td>I can always be satisfied with my breastfeeding experience</td>
<td>3.76 (0.80)</td>
<td>3.48 (0.83)</td>
<td>(\lambda = 3.452, p = 0.327)</td>
</tr>
<tr>
<td>I can always deal with the fact that breastfeeding can be time consuming</td>
<td>4.04 (0.64)</td>
<td>4.06 (0.86)</td>
<td>(\lambda = 6.694, p = 0.082)</td>
</tr>
<tr>
<td>I can always finish feeding my baby on one breast before switching to the other breast</td>
<td>3.79 (0.81)</td>
<td>3.55 (0.87)</td>
<td>(\lambda = 2.360, p = 0.501)</td>
</tr>
<tr>
<td>I can always continue to breastfeed my baby for every feeding</td>
<td>3.92 (0.75)</td>
<td>3.70 (1.02)</td>
<td>(\lambda = 8.594, p = 0.072)</td>
</tr>
<tr>
<td>I can always manage to keep up with my baby’s breastfeeding demands</td>
<td>3.87 (0.77)</td>
<td>3.48 (0.91)</td>
<td>(\lambda = 6.598, p = 0.086)</td>
</tr>
<tr>
<td>I can always tell when my baby is finished breastfeeding</td>
<td>3.56 (0.82)</td>
<td>3.39 (0.93)</td>
<td>(\lambda = 2.799, p = 0.424)</td>
</tr>
</tbody>
</table>

Notes.

* \(p \leq 0.05\).

If expected count was violated (i.e. greater than 20%) during the Pearson Chi-Square \(\chi^2\) test then the Likelihood Ratio \(\lambda\) was used.
Table 8. Phase 2 (1-Month Postpartum) Mean Breastfeeding Self-Efficacy Scale – Short Form Scores for Primiparous Mothers.

<table>
<thead>
<tr>
<th></th>
<th>Breastfeeding Exclusive</th>
<th>Breastfeeding Non-Exclusive</th>
<th>Chi-Square Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
<td>$\lambda$, $p$</td>
</tr>
<tr>
<td>I can always determine that my baby is getting enough milk</td>
<td>4.08 (0.86)</td>
<td>3.24 (1.12)</td>
<td>$\lambda = 16.632$, $p = 0.002^*$</td>
</tr>
<tr>
<td>I can successfully cope with breastfeeding like I have with other challenging tasks</td>
<td>3.97 (0.76)</td>
<td>3.24 (1.23)</td>
<td>$\lambda = 19.831$, $p = 0.001^{**}$</td>
</tr>
<tr>
<td>I can always breastfeed my baby without using formula as a supplement</td>
<td>4.34 (0.84)</td>
<td>1.97 (1.21)</td>
<td>$\lambda = 70.100$, $p &lt; 0.001^{**}$</td>
</tr>
<tr>
<td>I can always ensure that my baby is properly latched on for the whole feeding(^a)</td>
<td>3.76 (1.07)</td>
<td>3.27 (1.26)</td>
<td>$\lambda = 7.649$, $p = 0.105$</td>
</tr>
<tr>
<td>I can always manage the breastfeeding situation to my satisfaction</td>
<td>3.92 (0.95)</td>
<td>3.06 (1.25)</td>
<td>$\lambda = 19.355$, $p = 0.001^{**}$</td>
</tr>
<tr>
<td>I can always manage to breastfeed even if my baby is crying(^a)</td>
<td>4.11 (0.96)</td>
<td>3.03 (1.36)</td>
<td>$\lambda = 18.821$, $p = 0.001^{**}$</td>
</tr>
<tr>
<td>I will always keep wanting to breastfeed</td>
<td>4.45 (0.82)</td>
<td>3.55 (1.35)</td>
<td>$\lambda = 16.616$, $p = 0.002^*$</td>
</tr>
<tr>
<td>I can always comfortably breastfeed with my family members present</td>
<td>3.75 (1.08)</td>
<td>3.45 (1.54)</td>
<td>$\lambda = 11.596$, $p = 0.021^*$</td>
</tr>
<tr>
<td>I can always be satisfied with my breastfeeding experience</td>
<td>3.94 (0.83)</td>
<td>3.12 (1.32)</td>
<td>$\lambda = 23.152$, $p &lt; 0.001^{**}$</td>
</tr>
<tr>
<td>I can always deal with the fact that breastfeeding can be time consuming</td>
<td>4.06 (0.81)</td>
<td>3.55 (1.18)</td>
<td>$\lambda = 7.656$, $p = 0.105$</td>
</tr>
<tr>
<td>I can always finish feeding my baby on one breast before switching to the other breast</td>
<td>3.85 (1.04)</td>
<td>3.15 (1.33)</td>
<td>$\lambda = 8.897$, $p = 0.064$</td>
</tr>
<tr>
<td>I can always continue to breastfeed my baby for every feeding(^a)</td>
<td>4.44 (0.75)</td>
<td>2.81 (1.47)</td>
<td>$\lambda = 40.724$, $p &lt; 0.001^{**}$</td>
</tr>
<tr>
<td>I can always manage to keep up with my baby’s breastfeeding demands</td>
<td>4.31 (0.79)</td>
<td>2.76 (1.46)</td>
<td>$\lambda = 38.397$, $p &lt; 0.001^{**}$</td>
</tr>
<tr>
<td>I can always tell when my baby is finished breastfeeding</td>
<td>3.82 (0.92)</td>
<td>3.21 (1.22)</td>
<td>$\lambda = 8.946$, $p = 0.062$</td>
</tr>
</tbody>
</table>

Notes.
\(^a\)Missing response

*p $\leq 0.05$, **p $\leq 0.001$

If expected count was violated (i.e. greater than 20%) during for the Pearson Chi-Square ($\chi^2$) test then the Likelihood Ratio ($\lambda$) was used.
3.7 Maternal Grit

The Grit-S, was tested for reliability using Cronbach’s alpha coefficient ($\alpha$) and was found to have good internal consistency both antepartum ($\alpha = 0.79$) and postpartum ($\alpha = 0.76$). A split plot ANOVA was conducted to examine changes in mean grit scores across two time points (antepartum and postpartum) and feeding groups (exclusive breastfeeding and non-exclusive breastfeeding).

Box’s M Test of Equality of the covariance matrix revealed that the covariance matrices are equivalent, Box’s M = 2.80, $p = 0.436$. Mauchly’s Test of Sphericity was violated [$w = 1.00, \chi^2 (0) = 0.00, (p < 0.05)$] suggesting that there were significant differences in sphericity of grit scores antepartum and postpartum. The Levene’s Test of Homogeneity revealed that both antepartum and postpartum, the variance between exclusive breastfeeding and non-exclusive breastfeeding was equivalent, $F (1,102) = 0.587, p = 0.445$ and $F (1,102) = 0.331, p = 0.566$, respectively.

Using the Greenhouse-Geisser correction, the effect of time was not significant, $F (1,102) = 1.155, p = 0.285, \eta^2 = 0.011$, power = 0.186. Denoting when women were divided by breastfeeding type, their grit scores did not significantly differ between times one and two (see Table 9 for means and standard deviations). Furthermore, when isolated by time points, there was no significant effect of breastfeeding type, $F (1,102) = 3.403, p = 0.068, \eta^2 = 0.032$, power = 0.447. Indicating that grit scores were not significantly different between exclusive and non-exclusive mothers. The overall interaction between time and breastfeeding type was not significant for grit, $F = (1, 102) = 2.751, p = 1.00, \eta^2 = 0.026$, power = 0.376. Despite overall non-significance, Bonferroni post hoc tests were used to further explore any potential significant differences between exclusive
breastfeeding and non-exclusive breastfeeding both antepartum and postpartum as grit has not been studied in regards to breastfeeding.

Bonferroni contrasts of means found a significant difference between exclusive breastfeeding and non-exclusive breastfeeding at time one, $t(102) = 1.979$, $p = 0.026$. However, no significant difference was present between exclusive breastfeeding and non-exclusive breastfeeding at time two, $t(102) = -0.946$, $p = 0.254$. The difference between times one and two was significant for exclusive breastfeeding, $t(102) = 0.851$, $p = 0.017$ although not for non-exclusive breastfeeding mothers, $t(102) = -0.182$, $p = 0.724$. 
Table 9. *Phase 1 (Antepartum) and Phase 2 (1-Month Postpartum) Average Scores for Short Grit Scale (Grit-S)*.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Antepartum Mean (SD)</th>
<th>1-Month Postpartum Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusive Breastfeeding</td>
<td>3.79 (0.48)</td>
<td>3.68 (0.47)</td>
</tr>
<tr>
<td>Non-Exclusive Breastfeeding</td>
<td>3.54 (0.59)</td>
<td>3.56 (0.52)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3.71 (0.53)</strong></td>
<td><strong>3.64 (0.49)</strong></td>
</tr>
</tbody>
</table>

*Notes.*
Standard deviation (SD)
Table 10. *Phase 1 (Antepartum) Mean Short Grit Scale (Grit-S) Scores for Primiparous Mothers*

<table>
<thead>
<tr>
<th></th>
<th>Breastfeeding</th>
<th>Chi-Square Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exclusive</td>
<td>Non-Exclusive</td>
</tr>
<tr>
<td>New ideas and projects sometimes distract me from previous ones</td>
<td>3.08 (0.81)</td>
<td>2.88 (0.89)</td>
</tr>
<tr>
<td>Setbacks don’t discourage me</td>
<td>3.37 (0.90)</td>
<td>3.06 (0.93)</td>
</tr>
<tr>
<td>I have been obsessed with a certain idea or project for a short time but later lost interest</td>
<td>3.58 (0.87)</td>
<td>3.24 (1.00)</td>
</tr>
<tr>
<td>I am a hard worker</td>
<td>4.56 (0.63)</td>
<td>4.33 (0.60)</td>
</tr>
<tr>
<td>I often set a goal but later choose to pursue a different one</td>
<td>3.87 (0.70)</td>
<td>3.52 (0.76)</td>
</tr>
<tr>
<td>I have difficulty maintaining my focus on projects that take more than a few months to complete</td>
<td>3.63 (0.93)</td>
<td>3.52 (0.94)</td>
</tr>
<tr>
<td>I finish whatever I begin</td>
<td>4.00 (0.79)</td>
<td>3.73 (0.76)</td>
</tr>
<tr>
<td>I am diligent</td>
<td>4.18 (0.64)</td>
<td>4.03 (0.73)</td>
</tr>
</tbody>
</table>

*Notes.*

*\( ^*p \leq 0.05 \)*

If expected count was violated (i.e. greater than 20%) during for the Pearson Chi-Square (\( \chi^2 \)) test then the Likelihood Ratio (\( \lambda \)) was used.
Table 11. *Phase 2 (1-Month Postpartum) Mean Short Grit Scale (Grit-S) Scores for Primiparous Mothers.*

<table>
<thead>
<tr>
<th>Item</th>
<th>Breastfeeding Exclusive Mean (SD)</th>
<th>Breastfeeding Non-Exclusive Mean (SD)</th>
<th>Chi-Square Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>New ideas and projects sometimes distract me from previous ones</td>
<td>3.07 (0.78)</td>
<td>2.97 (0.95)</td>
<td>( \lambda = 4.545, p = 0.337 )</td>
</tr>
<tr>
<td>Setbacks don’t discourage me</td>
<td>3.31 (0.92)</td>
<td>3.15 (1.09)</td>
<td>( \lambda = 7.931, p = 0.094 )</td>
</tr>
<tr>
<td>I have been obsessed with a certain idea or project for a short time but later lost interest</td>
<td>3.41 (0.89)</td>
<td>3.27 (0.84)</td>
<td>( \lambda = 2.169, p = 0.705 )</td>
</tr>
<tr>
<td>I am a hard worker</td>
<td>4.49 (0.63)</td>
<td>4.39 (0.66)</td>
<td>( \chi^2 = 0.578, p = 0.749 )</td>
</tr>
<tr>
<td>I often set a goal but later choose to pursue a different one</td>
<td>3.60 (0.71)</td>
<td>3.39 (0.90)</td>
<td>( \lambda = 4.390, p = 0.495 )</td>
</tr>
<tr>
<td>I have difficulty maintaining my focus on projects that take more than a few months to complete</td>
<td>3.47 (0.80)</td>
<td>3.48 (0.76)</td>
<td>( \lambda = 2.356, p = 0.798 )</td>
</tr>
<tr>
<td>I finish whatever I begin</td>
<td>3.89 (0.74)</td>
<td>3.79 (0.74)</td>
<td>( \lambda = 7.065, p = 0.216 )</td>
</tr>
<tr>
<td>I am diligent</td>
<td>4.19 (0.71)</td>
<td>4.03 (0.77)</td>
<td>( \lambda = 4.148, p = 0.386 )</td>
</tr>
</tbody>
</table>

*Notes.*

If expected count was violated (i.e. greater than 20%) during the Pearson Chi-Square \( (\chi^2) \) test then the Likelihood Ratio (\( \lambda \)) was used.
3.8 Predictors of Breastfeeding Exclusivity

Correlations

Correlation analyses were conducted to determine the relationship between breastfeeding status, self-efficacy, grit, help-seeking amount, and help-seeking source (reading materials, professionals, family/friends). Grit was the only variable that showed a positive significant correlation with feeding status, $r(102) = 0.218, p = 0.026$. Grit was positively correlated with help-seeking from professionals and family or friends but negatively correlated with help-seeking amount and help-seeking from reading materials (see Table 12). Although not significant, grit and self-efficacy also showed a positive correlation with each other, $r(102) = 0.172, p = 0.081$. Self-efficacy was also positively correlated with breastfeeding status although, not significantly, $r(102) = 0.178, p = 0.071$. Self-efficacy was significantly positively correlated with help-seeking in the form of professional help, $r(102) = 0.220, p = 0.025$. None of the help-seeking variables were significantly correlated with breastfeeding status. All except, help-seeking from reading materials, showed a positive relationship with breastfeeding status. As expected amount of help-seeking was positively and significantly correlated with all three sources of help-seeking. Additionally, all of the help-seeking sources showed positive correlations with each other, with professional help-seeking being significantly correlated with both help-seeking from reading materials and family and/or friends.
Table 12. Correlations between Breastfeeding Status and Self-Efficacy, Grit, Help-Seeking Amount, Help-Seeking Source 1 (Reading Materials), Help-Seeking Source 2 (Professionals), and Help-Seeking Source 3 (Family and/or Friends).

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Breastfeeding</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. Self-efficacy</td>
<td>0.178</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. Grit</td>
<td>0.218*</td>
<td>0.172</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4. Help-seeking</td>
<td>0.046</td>
<td>0.162</td>
<td>-0.038</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5. Help-seeking (Source 1)</td>
<td>-0.105</td>
<td>-0.189</td>
<td>-0.123</td>
<td>0.534**</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>6. Help-seeking (Source 2)</td>
<td>0.085</td>
<td>0.220*</td>
<td>0.047</td>
<td>0.644**</td>
<td>0.210*</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>7. Help-seeking (Source 3)</td>
<td>0.127</td>
<td>0.087</td>
<td>0.015</td>
<td>0.623**</td>
<td>0.091</td>
<td>0.235*</td>
<td>-</td>
</tr>
</tbody>
</table>

Notes.
* \( p \leq 0.05 \), ** \( p \leq 0.001 \)
Source 1: Reading materials (websites, books, pamphlets)
Source 2: Professionals (physician, nurse, midwife, lactation consultant, community clinic and/or organization)
Source 3: Family and/or friends (spouse, mother, sister, mother-in-law, sister-in-law, etc.)
Logistic Regressions

A binary logistic regression was conducted to determine if demographic factors, self-efficacy, grit, and help-seeking (amount and source) improved prediction of whether a mother would exclusively breastfeed. Predictors consisted of both continuous and categorical data. The results showed three iterations to produce the best fitting estimate for the null model, \(-2\log(\text{likelihood}) = 181.494\) with an odds ratio of \(\text{Exp}(\beta) = 2.167\). The weight for the constant assuming a null model was \(\beta = 0.773\), \(SE = 0.221\). The Wald \((1) = 12.271, p < 0.001\) test for the null model was significant. Using chi-square tests of association, the association between exclusive breastfeeding and each individual predictor was examined (see Table 13). Chi-square tests revealed employment and grit to be significant independent predictors of group membership. Since employment is a categorical variable its significance must be interpreted with caution.

Following individual predictions, all variables were entered into a model to reveal combined predictive ability of exclusive breastfeeding. Five iterations indicated that the model at this stage had a fit function of \(-2\log(\text{likelihood}) = 90.528\). The Omnibus test examined the difference between the fit function for the null model \((181.494)\) and the model at this stage \((90.528)\) yielding a value of \(\chi^2(13) = 27.967, p = 0.009\) suggesting that the new model is significantly better than the null model. The Cox and Snell value and the Nagelkerke value provide interpretation as an index of effect size or proportion of variance explained. Based on the Cox and Snell value, the model has accounted for 25.5% of the variance and based on the Nagelkerke value, the model has accounted for 35.8% of the variance. Using the Hosmer and Lemeshow test, goodness-of-fit of the model was indicated to be \(\chi^2(8) = 12.135, p = 0.145\). The absence of significance, using
an alpha less than 0.025 as the threshold of significance, is an indication of good fit. Therefore, the Hosmer and Lemeshow test suggests that this model was a good fit. When all variables were entered in to the prediction equation, employment status and grit yielded as significant unique predictors of exclusive breastfeeding (see Table 14). However, as previously mentioned employment is a categorical variable hence its significance must be interpreted with caution. Overall the results suggest that when all of the variables are entered in to the prediction equation, employment status and grit significantly contribute to predicting exclusive breastfeeding.
Table 13. Logistic Regression Analyses of Phase 1 (Antepartum) Independent Predictors on Phase 2 (1-Month Postpartum) Breastfeeding Exclusivity.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Chi-Square Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>$X^2(1) = 2.063, p = 0.151$</td>
</tr>
<tr>
<td>Ethnicity(^a)</td>
<td>$X^2(1) = 0.659, p = 0.417$</td>
</tr>
<tr>
<td>Marital status(^a)</td>
<td>$X^2(1) = 0.454, p = 0.500$</td>
</tr>
<tr>
<td>Education(^a)</td>
<td>$X^2(1) = 0.771, p = 0.380$</td>
</tr>
<tr>
<td>Employment(^a)</td>
<td>$X^2(1) = 4.397, p = 0.036^*$</td>
</tr>
<tr>
<td>Salary</td>
<td>$X^2(1) = 0.000, p = 0.991$</td>
</tr>
<tr>
<td>Smoking status(^a)</td>
<td>$X^2(1) = 1.755, p = 0.185$</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>$X^2(1) = 1.402, p = 0.236$</td>
</tr>
<tr>
<td>Grit</td>
<td>$X^2(1) = 5.481, p = 0.019^*$</td>
</tr>
<tr>
<td>Help-seeking (amount)</td>
<td>$X^2(1) = 0.444, p = 0.505$</td>
</tr>
<tr>
<td>Help-seeking (source 1)(^a)</td>
<td>$X^2(1) = 0.454, p = 0.500$</td>
</tr>
<tr>
<td>Help-seeking (source 2)(^a)</td>
<td>$X^2(1) = 0.812, p = 0.368$</td>
</tr>
<tr>
<td>Help-seeking (source 3)(^a)</td>
<td>$X^2(1) = 3.248, p = 0.072$</td>
</tr>
</tbody>
</table>

Notes.

\(^*p \leq 0.05\)
\(^a\)Categorical data

Source 1: Reading materials (websites, books, pamphlets)
Source 2: Professionals (physician, nurse, midwife, lactation consultant, community clinic and/or organization)
Source 3: Family and/or friends (spouse, mother, sister, mother-in-law, sister-in-law, etc.)
Table 14. *Logistic Regression Model of Phase 1 (Antepartum) Predictors on Phase 2 (1-Month Postpartum) Breastfeeding Exclusivity.*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$\beta$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.171</td>
<td>0.055</td>
</tr>
<tr>
<td>Ethnicity$^a$</td>
<td>-0.633</td>
<td>0.175</td>
</tr>
<tr>
<td>Marital status$^a$</td>
<td>-0.438</td>
<td>0.438</td>
</tr>
<tr>
<td>Education$^a$</td>
<td>0.419</td>
<td>0.224</td>
</tr>
<tr>
<td>Employment$^a$</td>
<td>0.625</td>
<td>0.011*</td>
</tr>
<tr>
<td>Salary</td>
<td>0.032</td>
<td>0.860</td>
</tr>
<tr>
<td>Smoking status$^a$</td>
<td>0.986</td>
<td>0.279</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>0.022</td>
<td>0.532</td>
</tr>
<tr>
<td>Grit</td>
<td>1.355</td>
<td>0.031*</td>
</tr>
<tr>
<td>Help-seeking (amount)</td>
<td>-0.435</td>
<td>0.237</td>
</tr>
<tr>
<td>Help-seeking (source 1)$^a$</td>
<td>-0.217</td>
<td>0.802</td>
</tr>
<tr>
<td>Help-seeking (source 2)$^a$</td>
<td>0.758</td>
<td>0.342</td>
</tr>
<tr>
<td>Help-seeking (source 3)$^a$</td>
<td>1.724</td>
<td>0.074</td>
</tr>
</tbody>
</table>

*Notes.*

* *$p \leq 0.05$*

*Categorical data*

Source 1: Reading materials (websites, books, pamphlets)
Source 2: Professionals (physician, nurse, midwife, lactation consultant, community clinic and/or organization)
Source 3: Family and/or friends (spouse, mother, sister, mother-in-law, sister-in-law, etc.)
Chapter 4

4 Discussion

The purpose of this study was to examine breastfeeding practices, help-seeking, self-efficacy, and grit among primiparous mothers prospectively, from before birth to one-month postpartum. The primary objectives of this study were to determine whether help-seeking, self-efficacy, and grit predicted breastfeeding exclusivity at one-month postpartum, individually and combined. The secondary objectives of this study were to determine whether levels of help-seeking, self-efficacy, and grit changed from antepartum to one-month postpartum.

4.1 Demographic Information and Participant Representativeness

Overall, 123 eligible women volunteered to participate in the study. All women completed the Phase 1, antepartum, survey and 104 (84.6%) women completed the Phase 2, one-month postpartum survey. Data analyses presented within are focused on the 104 women who completed both surveys.

The majority of study participants (76.0%) were from London, Ontario and completed a post-secondary education (67.3%). According to Statistics Canada (2011a), 53.3% of London, Ontario women aged 25 to 64 have completed a post-secondary education. Interestingly, the vast majority of women in the study reported being married or living with a common-law partner (91.3%), which is much greater than the 51.9% of women who reported being married or living with a common-law partner in London, Ontario according to census data (Statistics Canada, 2011b). Annual household income
varied throughout the study population with the most commonly reported household income of $100,000 to $149,000 (19.2%). This is much higher than the average household income of approximately $73,000 reported for families in London, Ontario (Statistics Canada, 2011a). It is likely that the average most frequently reported household income for participants is at least nominally affected by marital status, where spouses or common-law partners allow for combined income. The difference between the average London population and the study population could be a result of more educated women being more interested and aware of the importance of in participating in research.

Demographic information from study participants was similar to the demographics of Canadian mothers who initiate breastfeeding after giving birth. For instance, the average maternal age was 29.8 years within the study and 28.1 years among primiparous mothers in Canada (Statistics Canada, 2008). Additionally, marital status was also similar as 91.3% of mothers in the study were married or living in a common-law relationship and 88.5% of Canadian mothers are married or living in a common-law relationship (Health Canada, 2010a).

4.2 Birth and Feeding Practices

In Canada, 87.3% of mothers breastfeed or attempt to breastfeed their baby after giving birth (Health Canada, 2010a). In the current study we found that 97.1% ($n = 101$) of mothers either successfully breastfed or attempted to breastfeed within the first five hours after parturition. Breastfeeding initiation rates within participants are likely higher as a results of intention to breastfeed being included in the eligibility criteria, thus those mothers who did not intend to breastfeed were excluded, whereas the Canadian statistic includes all mothers regardless of their breastfeeding intentions.
Previous studies have found intention to be significantly associated with breastfeeding duration (Blyth et al., 2004; Dennis, Gagnon, Van Hulst, & Dougherty, 2012; Kronborg & Vaeth, 2004; Oakley, Henderson, Redshaw, & Quigley, 2014; Whalen & Cramton, 2010). Blyth et al. (2004) reported that between 50% and 70% of mothers decided early in their pregnancy how they would feed their baby. Specifically, mothers who set up feeding plans or decided how long they intended to breastfeed prior to giving birth were more likely to continue breastfeeding for a longer duration (Dennis et al., 2012). In the current study, 92.3% of women agreed that they intended to exclusive breastfeed however, prenatal intention to exclusively breastfeed did not significantly predict breastfeeding status at one-month postpartum. Conversely, women who planned to formula/other feed or combined feed were significantly more likely to be non-exclusively breastfeeding at one-month postpartum ($p = 0.009$ and $p = 0.030$ respectively). Previous studies have reported similar findings, where women who intended to non-exclusively breastfeed were more likely to discontinue breastfeeding prior to six months postpartum (Blyth et al., 2004; Oakley et al., 2014).

Participants reported their feeding type based on the definitions provided for exclusive breastfeeding, combined feeding, and formula/other feeding. Exclusive breastfeeding was defined according to the WHO definition entailing that exclusive breastfeeding occurs when the infant consumes only breast milk from the breast, a bottle, or a wet nurse and no other liquids or solids are consumed except vitamins and medicines if necessary (WHO, 2010). Participants were then analyzed according to their reported feeding status (i.e. exclusive or non-exclusive) at one-month postpartum. Since the methodology measured mothers’ psychosocial perceptions, women were accepted as
exclusively breastfeeding at one-month postpartum (if that was how they reported feeding) despite if they may have combined or formula fed within the first 48 hours.

By one-month postpartum, 31.7% of mothers had discontinued exclusive breastfeeding, 5.8% higher than the average cessation rate for Canadian mothers (25.9%). Previous studies have found both multiparous and primiparous mothers are most likely to discontinue exclusive breastfeeding within the first five weeks after giving birth (Hauck, Fenwick, Dhaliwal, & Butt, 2011; Kronborg & Vaeth, 2004). Multiparous mothers are more likely to cease breastfeeding within the first two weeks postpartum versus three to four weeks postpartum for primiparous mothers (Hauck et al., 2011). The most commonly cited reasons for breastfeeding cessation in the current study included insufficient milk supply, latching difficulties, and lack of infant weight gain or excessive infant weight loss.

In the current study, several women reported exclusive breastfeeding cessation due to insufficient milk supply. Previous research has commonly reported the same findings among primiparous women (Blyth et al., 2002, 2004; Gatti, 2008; Otsuka, Dennis, Tatsuoka, & Jimba, 2008). A review examining insufficient milk supply gathered that many women use infant satisfaction cues as judgment for milk supply rather than evaluating actual milk supply (Gatti, 2008). Therefore, many women believe they lack milk supply when in actuality they may not. Otsuka et al. (2008) found that 73% of mothers discontinued exclusive breastfeeding due to perceived milk supply. Providing new mothers techniques or resources to test for milk supply could encourage women to exclusively breastfeed if they are truly producing enough milk. Women in the current study also reported latching difficulties as another reason to discontinue exclusive
breastfeeding, this is consistent with previous studies (Blyth et al., 2004; Odom, Li, Scanlon, Perrine, & Grummer-Strawn, 2013; Symon et al., 2013). A few mothers reported a lack of infant weight gain or excessive infant weight loss as reasoning for supplementation with formula rather than cessation of exclusive breastfeeding.

4.3 Help-Seeking

Help-seeking is based on three empirical referents: type, source, and amount (Cornally & McCarthy, 2011). In the current study, source and amount of help-seeking were directly measured and type was indirectly measured via level breastfeeding exclusivity. Although help-seeking was not a significant predictor of exclusive breastfeeding, many important observations were made.

Previous research has found maternal help-seeking in the prenatal period to be a strong predictor of breastfeeding behaviour (Forde & Miller, 2010). Furthermore, prenatal education has been deemed highly effective in encouraging mothers to initiate and continue exclusive breastfeeding immediately after birth (Blyth et al., 2004; Forde & Miller, 2010; Spark, 2007). In the current study, the majority of women participated in a prenatal education program, with exclusive mothers having participated 10% more than non-exclusive mothers. However, due to convenience sampling, this finding must be interpreted with caution.

Antepartum, the most common source of help-seeking was reading materials such as websites, books, and pamphlets. A correlation analysis revealed that help-seeking from reading materials was negatively correlated with exclusive breastfeeding, suggesting that reading materials are not an effective source of help for mothers intending to exclusively
breastfeed. Postpartum, mothers were much more likely to seek a professional for help which, included a community organization or clinic, physician, nurse, midwife, and/or lactation consultant. It is expected that primiparous mothers would seek more professional help postpartum, during the hospital stay and afterwards, as professionals can provide viable instrumental help. Additionally, breastfeeding education in the early postnatal period has been found to be very effective in continued exclusive breastfeeding (Spark, 2007).

Consistent with the findings, a recent Cochrane Review (Renfrew, McCormick, Wade, Quinn, & Dowswell, 2012) found that support, when sought out by the mother, was not significantly associated with successful exclusive breastfeeding. Rather, scheduled support sessions were more conducive to exclusive breastfeeding continuation (Renfrew et al., 2012). Planned support sessions allow mothers to preemptively seek-help as help sessions are scheduled antepartum or early postpartum. Therefore, help-seeking as opposed to support, may be more beneficial in the antepartum period when mothers are beginning to learn about breastfeeding. Active help-seeking by the mother allows her to explore various resources and determine which will be the most useful. Then, closer to birth, health professionals such as physicians, midwives, or lactation consultants can provide support by scheduling follow-up appointments with the mother once she has given birth. Furthermore, collaborative support provided by health professionals, family, and friends may encourage mothers to continue breastfeeding for a longer duration of time (Demirtas, 2012; Nelson, 2006).
4.4 Breastfeeding Self-Efficacy

Past studies have identified significant positive associations between self-efficacy and exclusive breastfeeding however; many of these studies only examined breastfeeding self-efficacy postpartum (Loke & Chan, 2013; Otsuka et al., 2008; Semenic, Loiselle, & Gottlieb, 2008). To date, breastfeeding self-efficacy has been assessed antepartum by only a handful studies. Three of such studies all used the 33-item BSES antepartum and found significant associations between breastfeeding self-efficacy scores and exclusive breastfeeding (Blyth et al., 2002, 2004; Creedy et al., 2003).

In the current study we opted to use the BSES-SF, a condensed version of the BSES that consists of 14 items. We found exclusively breastfeeding mothers scored higher than non-exclusively breastfeeding mothers both antepartum and postpartum where postpartum, the scores were significantly different. Additionally, breastfeeding self-efficacy scores for non-exclusive breastfeeding mothers dropped significantly from antepartum to postpartum. Although a positive association was seen between higher breastfeeding self-efficacy and exclusive breastfeeding, antenatal breastfeeding self-efficacy scores were not a significant predictor, individually or when combined with other variables, of exclusive breastfeeding at one-month postpartum. Blyth et al. (2002) found a similar result when they assessed the impact of antepartum and early postpartum breastfeeding self-efficacy scores on exclusive breastfeeding at four-months postpartum. It was shown that assessing breastfeeding self-efficacy early postpartum was a better predictor of long-term breastfeeding than breastfeeding self-efficacy assessments done in the antepartum period. de Jager et al. (2015) further found that mothers’ breastfeeding self-efficacy increased with experience and success as vicarious experiences and
performance accomplishments are two of fundamental sources that drive self-efficacy. They found that primiparous mothers had higher levels of breastfeeding self-efficacy at six-months postpartum compared to two-months postpartum because they had more practice and successful breastfeeding experiences as time went on (de Jager et al., 2015).

4.5 Grit

Grit has been applied to several different situations among several different populations and yielded very interesting results (refer to section 1.5 Breastfeeding Predictors, Grit, for more information). Until now, the concept has never been linked to any prenatal or postnatal behaviour. The application of the Grit Scale allowed us to assess a woman’s overall level of perseverance and passion for long-term goals, which was then applied to the goal of exclusive breastfeeding up to one-month postpartum. We found that antepartum grit scores significantly predicted exclusive breastfeeding among primiparous mothers at one-month postpartum ($p < 0.026$). Specifically, exclusively breastfeeding mothers had significantly higher grit scores than non-exclusively breastfeeding mothers when assessed antepartum. This finding suggests that grittier women are more likely to exclusively breastfeed compared to less gritty women. Studies examining grit have found similar results in that grittier individuals are more likely to continue on with a behaviour or task in comparison to less gritty individuals (Duckworth et al., 2007).

Exclusively breastfeeding mothers had significantly different scores antepartum and postpartum, as their grit scores decreased between the two time points. However, exclusively breastfeeding mothers maintained higher grit scores than non-exclusively breastfeeding mothers at one-month postpartum. This finding suggests that when faced with breastfeeding challenges early in the postpartum period, even gritty mothers’
perseverance waivered however, it is expected, that truly gritty mothers will continue to persevere through the difficulties of breastfeeding and regain higher grit scores if assessed again later into the postpartum period.

Grit and self-efficacy were measured to determine their individual and combined predictive ability on exclusive breastfeeding. When measured antepartum, grit was shown to be a predictor of exclusive breastfeeding however, self-efficacy was not. Previous research strongly supports higher self-efficacy to be predictive of exclusive breastfeeding behaviour, particularly when measured in the early postpartum period (Blyth et al., 2002). The findings suggest that grit is a better antepartum predictor of exclusive breastfeeding within the early postpartum period and as supported by previous research, self-efficacy is a better postpartum predictor of long-term exclusive breastfeeding. This suggests a woman’s level of perseverance drives her ability to begin exclusively breastfeeding immediately after giving birth and once into the postpartum period, self-efficacy is then a more reliable predictor of how long a woman will continue to exclusively breastfeed. This novel finding adds to the growing area of research on modifiable predictors of exclusive breastfeeding however, further research is necessary to conclusively identify strategies to modify breastfeeding outcomes.

4.6 Prediction Model

Demographic factors, self-efficacy, grit, and help-seeking (amount and source) were entered into a logistic regression model to determine their combined ability to predict exclusive breastfeeding in primiparous mothers at one-month postpartum. The model revealed grit and employment status to be significantly predictive of exclusive breastfeeding above all other variables. Employment status was measured categorically
therefore its significance is uncertain. Grit was also found to be a significant predictor of breastfeeding exclusivity both individually and when combined with all other variables. This supports our hypothesis that a woman’s level of antepartum grit can predict her level of breastfeeding exclusivity at one-month postpartum.

4.7 Strengths

The current study had many strengths. The study design was prospective in that participant data was collected at two time points, antepartum and one-month postpartum. This design allowed us to follow-up with individual participants and compare their antepartum survey answers to their postpartum survey answers and evaluate how their responses influenced their breastfeeding behaviour. Additionally, the study looked at differences in predictors for exclusive breastfeeding and non-exclusive breastfeeding.

Many studies in the past have looked at any breastfeeding (Murray, Ricketts, & Dellaport, 2007; Oakley et al., 2014; Odom et al., 2013) and although there are many benefits to providing any breast milk, the WHO encourages mothers to breastfeed exclusively for the first six months of life as the benefits are much greater (WHO, 2013). Following this guideline, we were interested in examining the differences in psychosocial factors between exclusively breastfeeding and non-exclusively breastfeeding mothers. In the interest of exploratory research, this study examined modifiable behaviours in conjunction with a personality trait. The novel findings from this study can be used to inform prenatal and postnatal programming, of new factors imperative to encouraging and supporting mothers, on continued exclusive breastfeed. One of the biggest strengths of this study was determining the predictive ability of grit on exclusive breastfeeding
behaviour. Grit was found to be a significant predictor of exclusive breastfeeding above all other predictors included in the study.

Although many of the demographic characteristics of the participants were different than the general London population, many of the characteristics such as age and marital status were similar to that of most mothers in Canada. Therefore, study results may be generalized to major cities in Canada, however caution is recommended.

4.8 Limitations

Participants were recruited via convenience sampling and much of the recruitment was conducted in London, Ontario via prenatal classes and infant-focused events. The study population was highly educated possibly due to educated women being more interested in attending prenatal education classes as well as participating in research studies conducted by educational institutions. Additionally, there were many women who completed the screening survey but did not complete the Phase 1 survey or completed the Phase 1 survey but not complete the Phase 2 follow-up survey. It is unknown as to why these women chose not to complete the remaining surveys. After giving birth, the follow-up survey was administered at one-month postpartum. Some questions were asked about the in-hospital stay but many details were not requested, as they were not directly related to the study objectives. Therefore, breastfeeding mismanagement was not measured. This includes information about infants who were separated from their mother after birth (unless reported by the mother), whether rooming-in was practiced and if not, if it affected exclusive breastfeeding behaviour. Furthermore, finding an appropriate, valid, and reliable help-seeking measurement tool was difficult. The researcher-
developed help-seeking questionnaire was sufficient for this study however; some oversights were apparent post data collection.
Chapter 5

5 Conclusion

The aforementioned study examined breastfeeding related help-seeking, self-efficacy, and grit among primiparous mothers in Ontario. Researchers have heavily examined non-modifiable predictors breastfeeding and are beginning to shift their focus towards modifiable predictors of breastfeeding. Following in this direction, the current study aimed to examine previous and potentially new modifiable predictors of breastfeeding, specifically exclusive breastfeeding to one-month postpartum. Therefore, this study contributes supporting evidence to previously conducted research, sheds new light on previous predictors, and adds new knowledge that will help guide further research.

Consistent with previous research, help-seeking was more useful in the antepartum stage when women generally turned to reading materials however, postpartum help-seeking was not the most effective approach when in need of breastfeeding help. Additionally, it was found that administering the BSES-SF prior to giving birth was an uncertain predictor of breastfeeding exclusivity for a primiparous mother. However, breastfeeding self-efficacy at one-month postpartum may be more predictive of exclusive breastfeeding at three- or six-months postpartum once mothers have experienced breastfeeding and had time to practice the behaviour. For the first time in this field, this study examined the association between grit and exclusive breastfeeding. As hypothesized, grit was found to be a significant predictor of breastfeeding exclusivity in the one-month postpartum period. Additionally, both
antepartum and postpartum, the study found that women who were exclusively breastfeeding had higher grit scores than non-exclusively breastfeeding mothers.

Researchers and health professionals can use the results from this study to further explore psychosocial factors as predictors of exclusive breastfeeding behaviour. Future areas of research may include analyses of help-seeking behaviour throughout the prenatal period, further detail into the link between self-efficacy and grit, and strategies required to increase an individual’s level of grit. These findings may then be used to inform prenatal and postnatal or breastfeeding education programs focused on primiparous mothers in Ontario. Specifically, the current research along with future research can be used to create and tailor programs towards women at a higher risk of exclusive breastfeeding cessation within the early postpartum period. Overall, the findings from this study provide novel insights into exclusive breastfeeding predictors and lay the groundwork for future studies into psychosocial factors as predictors of exclusive breastfeeding behaviour.
References


doi:10.1203/PDR.0b013e3181d026da


Appendices

Appendix A: Recruitment Poster

EXEMPLARY A BABY?
Breastfeeding Practices Study

Our research team at Western University is inviting first time expectant mothers to complete short surveys to help better understand breastfeeding practices.

Who can participate?
Pregnant woman, first time birth, single birth, 18 or older, able to provide informed consent in English.

What does participation involve?
Complete surveys (either online or telephone) once prior to birth, 1 month after birth and possibly 3 and 6 months after birth. Surveys will take approximately 15 minutes to complete and will ask about your demographic information and breastfeeding practices.

If interested, please contact:
Shilpa Goel (Master’s student)
Appendix B: Facebook Page

Breastfeeding Practices Study

EXPECTING A BABY?
Breastfeeding Practices Study

WHAT is the purpose of this study?
The purpose of this study is to understand breastfeeding practices both short-term and long-term among first time mothers. This is a research project being conducted by Dr. Anita Cramp from Western University and Master’s student Shilpa Goel... See More
Appendix C: Ethics Approval Form

The Western University Health Science Research Ethics Board (HSREB) has reviewed and approved the above named study, as of the HSREB Initial Approval Date noted above.

HSREB approval for this study remains valid until the HSREB Expiry Date noted above, conditional to timely submission and acceptance of HSREB Continuing Ethics Review. If an Updated Approval Notice is required prior to the HSREB Expiry Date, the Principal Investigator is responsible for completing and submitting an HSREB Updated Approval Form in a timely fashion.

The Western University HSREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use Guideline for Good Clinical Practice Practices (ICH E6 R1), the Ontario Personal Health Information Protection Act (PHIPA, 2004), Part 4 of the Natural Health Product Regulations, Health Canada Medical Device Regulations and Part C, Division 5, of the Food and Drug Regulations of Health Canada.

Members of the HSREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The HSREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000940.

Ethics Officer, on behalf of Dr. Joseph Gilbert, HSREB Chair

<table>
<thead>
<tr>
<th>Ethics Officer to Contact for Further Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erika Basile</td>
</tr>
<tr>
<td><a href="mailto:erika.basile@uwo.ca">erika.basile@uwo.ca</a></td>
</tr>
</tbody>
</table>

This is an official document. Please retain the original in your files.

Western University, Research, Support Services Bldg., Rm. 5850
London, ON, Canada N6A 3K7 1.519.660.3036, 1.519.850.2466 www.uwo.ca/research/services/ethics
Appendix D: Screening Survey Email

To:

CC:

BCC:

Subject: Breastfeeding Study

From:

Message Size: 108 KB

Hello,

I hope you’re doing well!

Thank you for showing interest in participating in my master’s research study. Below I have provided a copy of the Letter of Information which will provide you with all the information you need to know before deciding whether or not to participate. If you decide to participate please click on the link below which will take you to a short general survey that you will need to complete before I can send you Phase 1 of the study questionnaires. Upon completion of Phase 1 you will be entered in a draw to win 1 of 10, $25 gift cards to Walmart. If you have any questions please don’t hesitate to email me. Your participation in my study is greatly appreciated!

Breastfeeding Study
Letter of Information

Survey Link: https://www.surveymonkey.com/s/2014breastfeedingstudysurvey

Thanks for participating!

S. Jay, BSc
MSc Student, Health Promotion
Health and Rehabilitation Sciences Program
Western University
Appendix E: Letter of Information

Letter of Information

Project Title: Examining predictors of exclusive breastfeeding initiation and continuation up to six months postpartum

Principal Investigator: Dr Anita Cramp
Adjunct Professor
School of Health Studies
Western University

Master’s Student: Ms Shilpa Goel

You are being invited to take part in a research study. Before you decide whether to participate, it is important for you to be aware of why the research is being done and what it will involve. Please take time to read the following information carefully and ask if there is anything that is not clear or if you would like more information. Take your time to decide whether or not you wish to take part.

Invitation to Participate
You are being invited to participate in this research study because you are a first-time expectant mother.

What is the purpose of this study?
The World Health Organization’s breastfeeding guidelines recommend that women exclusively breastfeed for the first six months after giving birth. In Canada, 87% initiate breastfeeding while, only 26% continue to exclusively breastfeed for the first six months. Therefore, purpose of this study is to understand breastfeeding practices both short-term and long-term among first time mothers.

Who can take part in the study?
- First-time expectant mothers
- Expecting a single birth
- 18 years of age and older
- Able to read and comprehend English

What will I be asked to do in this study?
After reviewing this information and agreeing to participate, you will be given a unique identification number that you will use to gain access to the study surveys. You will be asked to complete at least two surveys, once before giving birth and at 1 month after birth. If you continue breastfeeding until 1 month, you will be asked to complete a survey at 3 months after birth. If you continue breastfeeding until 3 months, you will be asked to complete the final survey at 6 months after birth. Again, you will only be asked to continue to each subsequent phase of the study if you continue breastfeeding. Each survey will take you approximately 15 minutes to complete. Surveys may be filled out either online or over the phone, depending on your choice. Online surveys will administered using SurveyMonkey software. Phone surveys will be

v. 17 July 2014
completed over the phone with you, while a member of the research team inputs your answers into the online survey. The survey questions will ask about your determination and ability to persevere through difficult tasks, level of confidence in your ability to breastfeed and views on seeking help for breastfeeding.

**What are the potential benefits and risks associated with my involvement in this study?**
The research will add to the current literature on breastfeeding practices, however, there will be no direct benefit to you. If you experience any discomfort in completing some of the survey questions regarding your current feeding practices, please contact the Family Health Team at your local health unit.

**Are there any costs associated with participation?**
There are no direct costs associated with participation in the study.

**Will information obtained in the study be confidential?**
All of the information you provide to the researcher will be kept in the strictest confidence. You will be assigned an identification number and all data collected from you will be recorded and stored under this number only. All data will be stored in coded form on computers accessible only to research staff. You will not be identified in any documents relating to the research. No information obtained during the study will be discussed with anyone outside of the research team. By participating in this research study, you are agreeing that your results may be used for scientific purposes, including publication in scientific and health journals. The results of the study will be reported without identifying you personally, so your confidentiality will be maintained. The online data centre being used to store the questionnaire data is located in the United States of America (U.S.A.) and therefore is subject to U.S.A. laws including the U.S.A. Patriot Act.

**Do I have to take part?**
Participation is voluntary. You are under no obligation to participate. Furthermore, if you decide to participate, you may leave any questions blank that you do not wish to answer. If you decide to withdraw from the study, you maintain the right to request that any data collected from you not be used in the study. If you make such a request, all of the data collected from you will be destroyed. If you choose to withdraw from the study you may be approached to identify why you have withdrawn. This information may be valuable for future research and may give the researchers information on ways to improve the study, but you do not have to provide a reason if you do not want to.

Before you make your decision, the researchers will be available to answer any questions you might have concerning this project. **BY NOT PARTICIPATING YOUR CURRENT OR FUTURE CARE WILL NOT BE AFFECTED.**

**How will the results be shared?**
Results of the project may be developed into various publications in peer-reviewed journals. Results may also be presented at conferences. **YOU WILL NOT BE IDENTIFIED IN ANY OF THESE PUBLICATIONS OR PRESENTATIONS.** After study completion, you may also request the overall results of the study by emailing the Principal Investigator at

v. 17 July 2014
Further information or any problems
If you have any questions about your rights as a research participant or the conduct of the study you may contact the Office of Research Ethics (Phone: 519-661-3036; Email: ethics@uwo.ca).

If you have any questions about the study you can contact the study investigator, Dr. Anita Cramp

If you have any questions about breastfeeding you can contact the Family Health Team at your local health unit.

THIS LETTER IS FOR YOU TO KEEP. If you have any concerns, please feel free to contact one of the researchers listed on the first page of this letter.
Consent Form to Participate in Research
I have read the Letter of Information and all my questions have been answered. My consent is based on the understanding that the study involves the procedures as explained in Letter of Information above. BY COMPLETING THE SURVEYS, I UNDERSTAND THAT I AM CONSENTING TO PARTICIPATE IN THE STUDY.

Please select one of the following responses below.

[ ] I have read the Letter of Information and I wish to participate in the study

[ ] I have read the Letter of Information and I DO NOT wish to participate in the study at this time
Appendix F: Screening Survey

2014 Breastfeeding Study: Breastfeeding Survey

1. Consent Form to Participate in Research
I have read the Letter of Information and all my questions have been answered. My consent is based on the understanding that the study involves the procedures as explained in Letter of Information above. BY COMPLETING THE SURVEYS, I UNDERSTAND THAT I AM CONSENTING TO PARTICIPATE IN THE STUDY.

Please select one of the following responses below.

- [ ] I have read the Letter of Information and I wish to participate in the study
- [ ] I have read the Letter of Information and I DO NOT wish to participate in the study at this time

2. What are you initials?

3. What is your age?

4. How many weeks pregnant are you?

5. Is this your first baby?
- [ ] Yes
- [ ] No

6. Are you having twins, triplets, etc. (i.e., a multiple birth)?
- [ ] Yes
- [ ] No

7. What is your expected due date?

8. Do you intend to breastfeed?
- [ ] Yes
- [ ] No

9. How do you prefer to complete the study questionnaires?
- [ ] Email
- [ ] Phone
10. Email address

11. Phone number

Thank you for your participation. You will be contacted upon initiation of Phase 1 of the study. If you have any questions or concerns please contact Shilpa Goel.
Appendix G: Phase 1 Email

Breastfeeding Study - Thank You

To:  
Cc:  
Bcc:  

Subject: Breastfeeding Study - Thank You

From:  
Signature:  

Hello,

Thank you for completing the screening survey for the Breastfeeding Study. Unfortunately, at this time you did not meet the eligibility criteria for this study.

Thanks again,
Shilpa Goel, BHSc  
MSc Student, Health Promotion  
Health and Rehabilitation Sciences Program  
Western University
Appendix H: Ineligibility Email

To: 
Cc: 
Bcc: 

Subject: Breastfeeding Study - Thank You

From: Signature: Signature #1

Hello,

Thank you for completing the screening survey for the Breastfeeding Study. Unfortunately, at this time you did not meet the eligibility criteria for this study.

Thanks again,
Shilpa Goel, BHSc
MSc Student, Health Promotion
Health and Rehabilitation Sciences Program
Western University
Appendix I: Phase 1 Survey

2014 Breastfeeding Study: Phase 1

*1. Consent Form to Participate in Research
I have read the Letter of Information and all my questions have been answered. My consent is based on the understanding that the study involves the procedures as explained in Letter of Information above. **BY COMPLETING THE SURVEYS, I UNDERSTAND THAT I AM CONSENTING TO PARTICIPATE IN THE STUDY.**

Please select one of the following responses below.

- [ ] I have read the Letter of Information and I wish to participate in the study
- [ ] I have read the Letter of Information and I DO NOT wish to participate in the study at this time

*2. Participant ID number:

Perseverance

Survey Questionnaire Instructions: Please answer the following questions to the best of your ability and as truthfully as possible. When given response options, please check the box/boxes that is/are most appropriate. For open-ended (written) responses, please use full sentences but feel free to write as much or as little as you would like. You can skip any questions, not answer questions, or withdraw from the study at any time. Completion of the survey implies consent. Thank you very much for taking the time to complete the survey.

Directions for taking the Grit Scale: Here are a number of statements that may or may not apply to you. For the most accurate score, when responding, think of how you compare to most people - not just the people you know well, but most people in the world. There are no right or wrong answers, so just answer honestly!

3. I have overcome setbacks to conquer an important challenge.

- [ ] Very much like me
- [ ] Mostly like me
- [ ] Somewhat like me
- [ ] Not much like me
- [ ] Not like me at all

4. New ideas and projects sometimes distract me from previous ones.

- [ ] Very much like me
- [ ] Mostly like me
- [ ] Somewhat like me
- [ ] Not much like me
- [ ] Not like me at all
5. My interests change from year to year.
   - Very much like me
   - Mostly like me
   - Somewhat like me
   - Not much like me
   - Not like me at all

6. Setbacks don't discourage me.
   - Very much like me
   - Mostly like me
   - Somewhat like me
   - Not much like me
   - Not like me at all

7. I have been obsessed with a certain idea or project for a short time but later lost interest.
   - Very much like me
   - Mostly like me
   - Somewhat like me
   - Not much like me
   - Not like me at all

8. I am a hard worker.
   - Very much like me
   - Mostly like me
   - Somewhat like me
   - Not much like me
   - Not like me at all

9. I often set a goal but later choose to pursue a different one.
   - Very much like me
   - Mostly like me
   - Somewhat like me
   - Not much like me
   - Not like me at all
10. I have difficulty maintaining my focus on projects that take more than a few months to complete.

- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

11. I finish whatever I begin.

- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

12. I have achieved a goal that took years of work.

- Very much like me
- Mostly like me
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- Not much like me
- Not like me at all

13. I become interested in new pursuits every few months.

- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
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- Very much like me
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Birth and Feeding Practices

Refer to the following definitions for clarification:
- Exclusive breastfeeding: infant only receives breast milk (including expressed milk) without any additional food or drink, not even water
- Combined feeding: infant receives breast milk and formula milk
- Formula and/or other feeding: infant receives formula milk and/or other milk (i.e., cow's milk, goat's milk, soy milk, almond milk, solids)

Instructions: Provided are some statements about feeding your baby. Please choose the answer that most closely matches your opinion, considering both your feeding plans and the likelihood that you will carry out those plans.

15. I am planning to only formula/other feed my baby (I will not breastfeed at all).
   - Very much agree
   - Some what agree
   - Unsure
   - Some what disagree
   - Very much disagree

16. I am planning to combine feed my baby.
   - Very much agree
   - Some what agree
   - Unsure
   - Some what disagree
   - Very much disagree

17. I am planning to exclusively breastfeed.
   - Very much agree
   - Some what agree
   - Unsure
   - Some what disagree
   - Very much disagree

18. When my baby is 1 month old, I will be breastfeeding without using any formula or other milk.
   - Very much agree
   - Some what agree
   - Unsure
   - Some what disagree
   - Very much disagree
19. When my baby is 3 months old, I will be breastfeeding without using any formula or other milk.

- Very much agree
- Somewhat agree
- Unsure
- Some what disagree
- Very much disagree

20. When my baby is 6 months old, I will be breastfeeding without using any formula or other milk.

- Very much agree
- Somewhat agree
- Unsure
- Some what disagree
- Very much disagree

### Self-Efficacy

The following items ask about the confidence or belief you have in your ability to breastfeed in various situations. For each statement, please check your degree of confidence in performing the designated tasks/situations on a scale of 1 ("not at all confident") to 5 ("always confident"). All statements begin with "I will always be able to..."

21. Determine that my baby is getting enough milk.

<table>
<thead>
<tr>
<th>1 (Not at all confident)</th>
<th>2</th>
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<th>4</th>
<th>5 (Always confident)</th>
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22. Successfully cope with breastfeeding like I have with other challenging tasks.

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23. Breastfeed my baby without using formula as a supplement.

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24. Ensure that my baby is properly latched on for the whole feeding.

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25. Manage the breastfeeding situation to my satisfaction.

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<th>1 (Not at all confident)</th>
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26. Manage to breastfeed even if my baby is crying.

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</table>
27. Keep wanting to breastfeed.

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28. Comfortably breastfeed with my family members present.

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29. Be satisfied with my breastfeeding experience.

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30. Deal with the fact that breastfeeding can be time-consuming.

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31. Finish feeding my baby on one breast before switching to the other breast.

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32. Continue to breastfeed my baby for every feeding.

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<tr>
<th></th>
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33. Manage to keep up with my baby’s breastfeeding demands.

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<tr>
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34. Tell when my baby is finished breastfeeding.

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<th></th>
<th>1 (Not at all confident)</th>
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<th>4</th>
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### Help-Seeking

35. Have you participated in a prenatal education program/class?

- [ ] I have participated in a prenatal education program/class. Please specify when and the name of the program/class below.
- [ ] I am currently participating in a prenatal education program/class. Please specify when and the name of the program/class below.
- [ ] I have not participated in a prenatal education program/class.

Please specify when and the name of the program/class here.

36. Do you plan on participating in a postnatal/breastfeeding education program/class?

- [ ] I am already registered to participate in a postnatal/breastfeeding education program/class. Please specify when and the name of the program/class below.
- [ ] I am planning to be registered to participate in a postnatal/breastfeeding education program/class.
- [ ] I am undecided about registering to participate in a postnatal/breastfeeding education program/class.
- [ ] I will not be participating in a postnatal/breastfeeding education program/class.

Please specify when and the name of the program/class here.
37. If you have sought breastfeeding help, where did you seek it from? Check all that apply.

- Online (e.g., websites, forums)
- Community organization (e.g., La Leche League)
- Printed materials (e.g., books, pamphlets, etc.)
- Community clinic
- Doctor
- Nurse
- Lactation consultant
- Midwife
- Spouse
- Friend
- Mother-in-law
- Sister-in-law

Other (please specify)

38. Who would you seek breastfeeding help from first?

Demographic Information

39. What are the first 3 letters/numbers of your postal code?

40. What is your ethnicity?

- Caucasian
- Asian
- African
- First Nations, Métis, Inuit
- Hispanic

Other (please specify)

41. What is your current marital status?

- Single, never married
- Married
- Living with a partner (e.g., common law partner)
- Separated
- Divorced
- Widowed
42. What is the highest level of education that you completed?

- Some secondary school
- Secondary school diploma
- Some post-secondary
- College or technical training
- Bachelor degree
- Graduate degree
- Other (please specify)

43. What is your current employment status?

- Employed full-time and on maternity leave
- Employed part-time and on maternity leave
- Employed full-time and currently still working
- Employed part-time and currently still working
- Stay at home mother
- Self-employed
- Unemployed
- Student

44. Please indicate your approximate yearly household income.

- Under $24,999
- $25,000 - $36,999
- $40,000 - $55,999
- $60,000 - $70,999
- $60,000 - $95,999
- $100,000 - $149,999
- Over $150,000
- Prefer not to answer

45. Did you smoke within the year prior to becoming pregnant?

- Yes
- No

46. If YES, on average how many cigarettes a day do you smoke?

Thank you for your participation. You will be contacted upon initiation of Phase 2 of the study. If you have any questions or concerns please contact Shilpa Goel
Appendix J: Phase 2 Email

Hello,

I hope you and your baby are doing well!

Thank you for completing the Phase 1 survey. Phase 2 of the breastfeeding study you are participating in is now open. I would appreciate if you could fill out this questionnaire within the next 2 weeks. Upon completion of Phase 2 you will be entered in a draw to win 1 of 10 $25 gift cards to President’s Choice. If you have any questions please do not hesitate to email me. Your participation in my study is greatly appreciated!

Participant ID: _____
Survey link: https://www.surveymonkey.com/s/2014breastfeedingstudyphase2

Thanks for participating!

Shilpa Goel, BHSc
MSc Student, Health Promotion
Health and Rehabilitation Sciences Program
Western University
Appendix K: Phase 2 Survey

2014 Breastfeeding Study: Phase 2

*1. Participant ID number:

Survey Questionnaire Instructions: Please answer the following questions to the best of your ability and as truthfully as possible. When given response options, please check the box/boxes that is/are most appropriate. For open-ended (written) responses, please use full sentences but feel free to write as much or as little as you would like. You can skip any questions, not answer questions, or withdraw from the study at any time. Completion of the survey implies consent. Thank you very much for taking the time to complete the survey.

Perseverance

Directions for taking the Grit Scale: Here are a number of statements that may or may not apply to you. For the most accurate score, when responding, think of how you compare to most people - not just the people you know well, but most people in the world. There are no right or wrong answers, so just answer honestly!

2. I have overcome setbacks to conquer an important challenge.
   - Very much like me
   - Mostly like me
   - Somewhat like me
   - Not much like me
   - Not like me at all

3. New ideas and projects sometimes distract me from previous ones.
   - Very much like me
   - Mostly like me
   - Somewhat like me
   - Not much like me
   - Not like me at all

4. My interests change from year to year.
   - Very much like me
   - Mostly like me
   - Somewhat like me
   - Not much like me
   - Not like me at all
5. Setbacks don’t discourage me.
- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

6. I have been obsessed with a certain idea or project for a short time but later lost interest.
- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

7. I am a hard worker.
- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

8. I often set a goal but later choose to pursue a different one.
- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

9. I have difficulty maintaining my focus on projects that take more than a few months to complete.
- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all
10. I finish whatever I begin.
- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

11. I have achieved a goal that took years of work.
- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

12. I become interested in new pursuits every few months.
- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

13. I am diligent.
- Very much like me
- Mostly like me
- Somewhat like me
- Not much like me
- Not like me at all

**Birth and Feeding Practices**

Refer to the following definitions for clarification:
- Exclusive breastfeeding: infant only receives breast milk (including expressed milk) without any additional food or drink, not even water
- Combined feeding: infant receives breast milk and formula milk
- Formula and/or other feeding: infant receives formula milk and/or other milk (i.e., cow's milk, goat's milk, soy milk, almond milk, solids)

14. How many days/weeks old is your baby?

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Days</th>
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</table>
15. What was the gestational age of your baby when born?
- <35 weeks
- 35 - 36 weeks
- 37 - 38 weeks
- 39 - 40 weeks
- 41 - 42 weeks

16. How was your baby delivered?
- Vaginally and not induced
- Vaginally and induced
- Planned cesarean
- Emergency cesarean

17. Did you have any of the following during this labour/delivery/early postpartum? Please check all that apply.
- Antibiotics
- Excessive hemorrhaging (bleeding)
- Infection
- Episiotomy
- Fever
- 3rd/4th degree tear

18. What did you do for pain management? Please check all that apply.
- Epidural
- Spinal
- Nitrous oxide
- Demerol
- Natural pain reliever (massage, bath, shower)

Other (please specify)

19. Where was your baby delivered?
- Hospital with physician/ObGyn
- Hospital with midwife
- Home birth

Other (please specify)
20. How long after your delivery did you breastfeed or try to breastfeed your baby for the very first time?
   - Within 10 minutes after giving birth
   - Within 10-20 minutes
   - Within 21-30 minutes
   - Within 31-60 minutes
   - Within 1-2 hours
   - Within 3-4 hours
   - After 5 hours or more
   - I did not breastfeed or attempt to breastfeed my baby

22. From the period from birth until now, how are you feeding your baby?
   - Exclusive breastfeeding
   - Combined feeding
   - Formula and/or other feeding

23. If you are currently combined feeding, when did you stop exclusively breastfeeding?
   Please specify in days or weeks postpartum.

24. What led you to the decision to stop exclusively breastfeeding?

25. If you are currently formula and/or other feeding, when did you stop breastfeeding?
   Please specify in days or weeks postpartum.

26. What led you to the decision to stop exclusively breastfeeding?

Instructions: Provided are some statements about feeding your baby. Please choose the answer that most closely matches your opinion, considering both your feeding plans and the likelihood that you will carry out those plans.

27. I am only formula and/or other feeding my baby (Not breastfeeding at all).
   - Very much agree
   - Some what agree
   - Unsure
   - Some what disagree
   - Very much disagree
28. I am combined feeding my baby.
   - Very much agree
   - Some what agree
   - Unsure
   - Some what disagree
   - Very much disagree

29. I am exclusively breastfeeding
   - Very much agree
   - Some what agree
   - Unsure
   - Some what disagree
   - Very much disagree

30. When my baby is 3 months old, I will be breastfeeding without using any formula or other milk.
   - Very much agree
   - Some what agree
   - Unsure
   - Some what disagree
   - Very much disagree

31. When my baby is 6 months old, I will be breastfeeding without using any formula or other milk.
   - Very much agree
   - Some what agree
   - Unsure
   - Some what disagree
   - Very much disagree

**Self-Efficacy**

The following items ask about the confidence or belief you have in your ability to breastfeed in various situations. For each statement, please check your degree of confidence in performing the designated tasks/situations on a scale of 1 ("not at all confident") to 5 ("always confident"). All statements begin with "I can always..."

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<th>38. Keep wanting to breastfeed.</th>
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<th>45. Tell when my baby is finished breastfeeding.</th>
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<tr>
<td>Not at all confident</td>
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Help-Seeking

46. Did you seek breastfeeding help prior to delivery?
   - Yes
   - No
   Please describe the help the sought (i.e., when and from whom)

47. Did you seek help with breastfeeding after birth (after delivery to 1 month postpartum, help from anyone)?
   - Yes
   - No

48. If yes, approximately how many times did you get help in total after the delivery of your baby?
   - 1-5
   - 6-10
   - 11-15
   - 16-20
   - 20 or more

49. Please describe the help that was given (e.g., what help was given and by whom, what help did you ask for and by whom, was it useful help, was it encouraging?)

50. If you have sought breastfeeding help, where did you seek it from? Check all that apply.
   - Online (e.g., websites, forums)
   - Community organization (e.g., La Leche League)
   - Printed materials (e.g., books, pamphlets, etc.)
   - Community clinic
   - Doctor
   - Nurse
   - Lactation consultant
   - Midwife
   - Spouse
   - Friend
   - Mother/ in-law
   - Sister/ in-law
   - Other (please specify)
51. Who would you seek breastfeeding help from first?

52. Describe the 2 most useful help-seeking experiences you had.

Experience #1

Experience #2

53. Do you currently smoke cigarettes?

☐ Yes

☐ No

54. If yes, how many cigarettes a day do you smoke?

Thank you for your participation in the study. If you have any questions or concerns please contact Shilpa Goel at...
Curriculum Vitae

Name: Shilpa Goel

Post-secondary Education and Degrees:

The University of Western Ontario
London, Ontario, Canada
Health and Rehabilitation Sciences;
Health Promotion (MSc Student)
2013-Present

The University of Western Ontario
London, Ontario, Canada
Honors Specialization in Health Sciences (BHSc)
2009-2013

Honours and Awards:

Dean’s Honors List
2013

Related Work Experience

Teaching Assistant
The University of Western Ontario
2013-2014

Presentations:

