10-5-2017

Investigating Predictors of Prenatal Breastfeeding Self-Efficacy

Kathryn Corby
University of Windsor

Investigating Predictors of Prenatal Breastfeeding Self-Efficacy

By

Kathryn Corby

A Thesis
Submitted to the Faculty of Graduate Studies
through the Faculty of Nursing
in Partial Fulfillment of the Requirements for
the Degree of Master of Science in Nursing
at the University of Windsor

Windsor, Ontario, Canada

2017

Investigating Predictors of Prenatal Breastfeeding Self-Efficacy

by

Kathryn Corby

APPROVED BY:

R. Menna
Department of Psychology

D. Dayus
Faculty of Nursing

D. Kane, Advisor
Faculty of Nursing

Aug 8, 2017

DECLARATION OF ORIGINALITY

I hereby certify that I am the sole author of this thesis and that no part of this thesis has been published or submitted for publication.

I certify that, to the best of my knowledge, my thesis does not infringe upon anyone’s copyright nor violate any proprietary rights and that any ideas, techniques, quotations, or any other material from the work of other people included in my thesis, published or otherwise, are fully acknowledged in accordance with the standard referencing practices. Furthermore, to the extent that I have included copyrighted material that surpasses the bounds of fair dealing within the meaning of the Canada Copyright Act, I certify that I have obtained a written permission from the copyright owner(s) to include such material(s) in my thesis and have included copies of such copyright clearances to my appendix.

I declare that this is a true copy of my thesis, including any final revisions, as approved by my thesis committee and the Graduate Studies office, and that this thesis has not been submitted for a higher degree to any other University or Institution.

ABSTRACT

The purpose of this study was to identify predictors of breastfeeding self-efficacy in the prenatal period among both primiparous and multiparous women. A sample of 401 Canadian women in their third trimester of pregnancy completed an online survey. Stepwise multiple linear regression was used to identify predictors of breastfeeding self-efficacy, as measured by the breastfeeding self-efficacy scale – short form (BSES-SF). The following eight variables were found to explain 41.2% of the variance in BSES-SF scores: feeling prepared for labour and birth, number of living children, breastfeeding knowledge, trait anxiety, length of plan to exclusively breastfeed, income, plan to exclusively breastfeed and type of healthcare provider. After exploring predictors of breastfeeding self-efficacy among the primiparous women in the sample, the following six variables explained 31.6% of the variance in BSES-SF scores: feeling prepared for labour and birth, income, trait anxiety, length of plan to exclusively breastfeed, education and marital status. Among the multiparous women in the sample the following four variables explained 33.6% of the variance in BSES-SF scores: trait anxiety, length of prior exclusive breastfeeding experience, breastfeeding knowledge and plan to exclusively breastfeed. Through the identification of predictors of breastfeeding self-efficacy in the prenatal period, healthcare providers can strategically target women at risk of low breastfeeding self-efficacy and intervene early to promote breastfeeding.

DEDICATION

While this is a Canadian study, I would like to dedicate this work to all mothers worldwide. This includes mothers with children in their arms, mothers with children above, mothers-to-be and mothers at heart.

May we support each other and bring each other up throughout our lifespan. May our healthcare decisions be truly informed, respected and supported.

ACKNOWLEDGEMENTS

I would like to acknowledge my principle advisor, Dr. Kane for your guidance throughout this journey. Thank you for your support and dedication. Dr. Dayus, my internal reader, thank you for providing your expertise and support throughout this process. My external reader, Dr. Menna, thank you for providing your perspective and for your contributions toward this document.

As the recipient of the 2016 Dr. Steve Radin Graduate Nursing Award, I would also like to acknowledge the Victorian Order of Nurses for continuing to support community health nurses in their pursuit of higher level education. I would also like to acknowledge the Thesis Research Award for providing financial support for this study.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

Problem Statement

Breastfeeding is considered the normal, natural method of infant feeding. According to the World Health Organization (WHO), "virtually all mothers can breastfeed, provided they have accurate information, and the support of their family, the health care system and society at large" (WHO, 2016a). The Public Health Agency of Canada's (PHAC) ascertains breastfeeding as the optimal method to provide nutritional, emotional and immunological nurturing to both infants as well as toddlers (PHAC, 2014). The current recommendation for infant feeding is exclusive breastfeeding for the first six months of life; with the addition of supplemental foods at six months and continued breastfeeding until age two and beyond (WHO, 2016a). This is consistent with both the Dietitians of Canada (2016) and the Canadian Pediatric Society's (2016) recommendations of exclusive breastfeeding for the first six months of life with the addition of a vitamin D supplement of 400 International Units per day. Despite the recommendations, the rates of exclusive breastfeeding are suboptimal in Canada. While 89% of women initiate breastfeeding after birth, only 26% are breastfeeding exclusively at six months of age (Statistics Canada, 2013). The term "exclusive breastfeeding" describes an infant receiving no fluids other than breastmilk with the exception of vitamins or medicines (WHO, 2016b). The inconsistency between the current breastfeeding recommendations and the infant feeding reality for the majority of Canadian mothers demonstrates the need for continued research into the promotion and protection of breastfeeding.

Inadequate breastfeeding rates come with a substantial cost to both the infant and the mother, as well as to the healthcare system and society as a whole. Breastfeeding has both short-term as well as long-term benefits to infants. Short-term benefits include a decrease in the occurrence of diarrhea and pneumonia; as well as a decrease risk of infant mortality due to respiratory infection and diarrheal disease (WHO, 2013a). Long-term benefits to the breastfed child include a lower risk of hypertension, type II diabetes and lower risk of obesity later in life (WHO, 2013b). Breastfed infants perform better on intelligence tests later in life (PHAC, 2015; WHO, 2013b). The exact mechanism of how breastmilk decreases the risks of adverse infant health is not fully understood. It has been described as having an epigenetic effect on an infant's predisposition to adverse health effects by turning "on" and "off" genes, through a process known as gene expression (Verducci et al., 2014).

Benefits of breastfeeding are not limited to the breastfed infant. Mothers who do not breastfeed are at an increased risk of breast cancer, ovarian cancer and osteoporosis later in life (PHAC, 2015). Breastfeeding is associated with maternal psychological benefits in addition to physical benefits. The act of breastfeeding releases maternal hormones, which promote attachment, emotional bonding and mothering behaviours (American Academy of Pediatrics, 2011). Breastfeeding has not only been shown to increase bonding within the mother-infant dyad, but has also been shown to actually influence maternal brain response (Kim et al., 2011). According to Kim et al (2011), mothers who exclusively breastfed showed a greater response in the amygdala, striatum, precuncus, insula and superior frontal gyrus regions of the brain when their infants cried compared to mothers using breastmilk substitutes, which led to increased maternal sensitivity to their infants and promoted both bonding and empathy. Emerging research is linking unsuccessful breastfeeding with increased risk of post-partum depression whereby the woman's intention is key; that is, women who intend to breastfeed, but whom are unsuccessful, are at an increased risk of developing post-partum depression compared to women who do not intend to breastfeed (Borra, Iacovou, & Sevilla, 2015; Gregory, Butz, Ghazarian, Gross & Johnson, 2015). This has great implications for Canadian mothers, given that only 26% of mothers are still exclusively breastfeeding at six months despite the fact that 89% of women initiate breastfeeding after birth (Statistics Canada, 2013).

Although there have been no studies that have estimated the financial burden of inadequate breastfeeding rates in Canada, in the United States, it has been estimated that $10.5 billion US dollars could be saved if 80% of the population followed the recommendation of exclusive breastfeeding for the first six months of life (Bartick & Reinhold, 2010). If 90% American mothers followed the same recommendation, this number increases to $13 billion US dollars per year (Bartick & Reinhold, 2010). The use of breastmilk substitutes, commonly known as infant formula, costs individual families hundreds to thousands of dollars (PHAC, 2015). Breastfeeding also has environmental implications. Breast milk production and breastfeeding has no associated pollution, packaging or landfill waste; unlike the production of breastmilk substitutes and bottle feeding (PHAC, 2015).

Breastfeeding and breast milk cannot be directly compared to breastmilk substitutes. The composition of breastmilk, i.e. the amount of proteins, lipids, carbohydrates, vitamins and mineral, changes with time to meet the unique needs of the growing child (PHAC, 2015). Not only does it change over the course of lactation, the composition of human milk changes within a single breastfeed to meet the infant's needs (Andreas, Kampmann & Le-Doare, 2015). Breastmilk is a bioactive, living substance, delivering live enzymes, stem cells, immunoglobulins, hormones and antibodies to the infant (Bode et al., 2014; Andreas et al., 2015). It primes the infant's intestinal microbiota and immune system (Andreas et al., 2015). Human milk oligosaccharides are strictly found in breast milk and have been described as a prebiotic, which also lowers the risk for bacterial, viral and parasitic infections by preventing the attachment of pathogens on mucosal surfaces (Bode, 2012). Although breastmilk substitutes contain the basic necessary composition of nutrients to support life, they are lacking in hundreds of other compounds that make it incomparable to breastmilk. Thus, the support of breastfeeding research is still necessary in order to explore why most Canadian women are not meeting the WHO guideline of exclusive breastfeeding for the first six months of life.

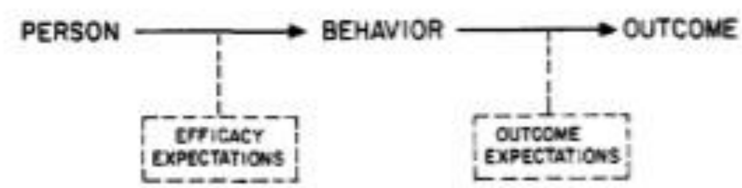
Significance to Nursing

Given the suboptimal breastfeeding rates in Canada and the implications it has on both infant and maternal health, more must be done to promote and support breastfeeding mothers. Healthcare providers, including nurses, are in an ideal position to facilitate this change. Healthcare providers have been found to have either a positive empowering role in helping mothers to breastfeed, or contrarily, can have a disempowering effect on the breastfeeding mother (Leeming, Williamson, Johnson & Lyttle, 2015). Furthermore, mothers want realistic education on breastfeeding challenges in the prenatal period (Leurer & Misskey, 2015). First time mothers were surprised at how difficult breastfeeding could be, the amount of time required and of the physical discomfort sometimes experienced when breastfeeding (Leurer & Misskey, 2015). This suggests new mothers have identified the need for more prenatal breastfeeding knowledge to better prepare themselves to breastfeed once their infant arrives. Thus, the role of the nurse is crucial to ensure nursing care is delivered effectively in order to support breastfeeding mothers in meeting their breastfeeding goals.

The term “breastfeeding self-efficacy” refers to a mother’s confidence in her ability to breastfeed her child (Dennis, 1999). Breastfeeding self-efficacy has been shown to be positively correlated with breastfeeding success in the literature (Babakazo, Donnen, Akilimali, Mala Ali & Okitolonda, 2015; Blyth et al., 2002; De Jager et al., 2015; Dennis, 2006; Hauck, Hall & Jones, 2007; Henshaw, Fried, Siskind, Newhouse & Cooper, 2015; McCarter-Spaulding & Gore, 2009; Noel-Weiss, Rupp, Cragg, Bassett & Woodend, 2006; Otsuka, Dennis, Tatsuoka & Jimba, 2008; Pollard & Guill, 2009; Wu, Hu, McCoy & Efird, 2014). Despite the multitude of studies supporting the positive link between breastfeeding self-efficacy and breastfeeding success, not all aspects of breastfeeding self-efficacy are clearly understood. Predictors of breastfeeding self-efficacy have been identified for mothers in the immediate post-partum (Dennis, 2006; Hinic, 2016). Dennis (2006) found the following variables to be predictive of breastfeeding self-efficacy in the immediate post-partum period: education, support from women with other children, type of delivery, satisfaction with pain relief during labour, satisfaction with post-partum care, perceived breastfeeding progress, feeding infant as planned and anxiety. Similarly, Hinic (2016) found birth satisfaction, infant feeding intention and in-hospital formula supplementation to be predictors of post-partum breastfeeding self-efficacy. Despite the literature surrounding post-partum predictors of breastfeeding self-efficacy, to date, there have been no studies conducted to identify predictors of breastfeeding self-efficacy in the prenatal period.

Theoretical Framework

Given the importance of the role self-efficacy plays in breastfeeding, the theoretical framework for this study will be Bandura's (1977) self-efficacy theory. The term "self-efficacy", as defined by Bandura (1995), refers to "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations" (Bandura, 1995, p. 2). According to Bandura's theory, the person's efficacy expectations lead to a behaviour, whereby their outcome expectations lead to the outcome (Bandura, 1977).



Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84*(2)*, 191-215.

Efficacy expectations are "the conviction that one can successfully execute the behavior required to produce the outcome" (Bandura, 1977, p. 193). They have been described as a key factor in behaviour change. There are four antecedents which lead to an individual's efficacy expectations including: emotional arousal, verbal persuasion, vicarious experience and performance accomplishments (Bandura, 1977). Outcome expectations are "a person's estimate that a given behavior will lead to certain outcomes" (Bandura, 1977, pg. 193). According to self-efficacy theory, an individual with high self-efficacy is more likely to have a greater ability to persist when faced with challenges and difficulties and is better able to overcome difficulties and challenges (Bandura, 1977).

Dennis (1999) applied Bandura's self-efficacy theory to breastfeeding. Performance accomplishments refer to an individual's ability to achieve a specific task. To apply this to breastfeeding, if a new mother has difficulty latching her infant to breastfeed, this would decrease her sense of breastfeeding self-efficacy. Conversely, if she successfully latches and breastfeeds her infant, this would increase her breastfeeding self-efficacy. The term vicarious experience involves learning through observation. For example, according to this theory, a woman who has never observed another mother breastfeed will have lower self-efficacy than a woman who has seen other women breastfeed. Emotional arousal with regards to breastfeeding includes anxiety, stress, fatigue and pain which would negatively impact breastfeeding self-efficacy. Emotions such as excitement and satisfaction could increase breastfeeding self-efficacy. Verbal persuasion such as praise and attention by family members, peers and healthcare providers would improve breastfeeding self-efficacy. Whereas negative verbal persuasion would decrease a woman's breastfeeding self-efficacy (Dennis, 1999). When this theory is applied to breastfeeding, women with a high sense of breastfeeding self-efficacy are more likely to persevere when faced with breastfeeding difficulties and are more likely to overcome such difficulties, thus improving their likelihood of breastfeeding success (Dennis, 1999).

Purpose

As the role of maternal breastfeeding self-efficacy has been deemed an influential component to breastfeeding outcomes, this study sought to explore maternal breastfeeding self-efficacy in more detail. Specifically, the area of prenatal breastfeeding self-efficacy predictors has not yet been examined in the literature. The purpose of the study was to determine prenatal predictors of maternal breastfeeding self-efficacy. The study sought to answer the following research questions:

1. What are the prenatal predictors of breastfeeding self-efficacy?
2. What are the prenatal predictors of breastfeeding self-efficacy among primiparous women?
3. What are the prenatal predictors of breastfeeding self-efficacy among multiparous women?

CHAPTER 2

LITERATURE REVIEW

This chapter will comprehensively explore the association between breastfeeding self-efficacy and breastfeeding outcomes by examining the current state of knowledge between these two variables. At the forefront, the search strategy used to conduct this literature review will be described. This will be followed by a thorough review of the current evidence linking the concept of breastfeeding self-efficacy and breastfeeding outcomes as well as the importance of the prenatal period on breastfeeding outcomes. Lastly, this chapter will present the gaps in literature identified by conducting this literature review.

Search Strategy

The concept of self-efficacy was explored in the context of breastfeeding. The databases utilized included: The Cumulative Index to Nursing and Allied Health Literature (CINAHL), ProQuest and PubMed. Initially, the shortened word "breastfeed*" was entered as a keyword with the term "self-efficacy" entered as another keyword. On CINAHL, without limits set, this yielded a total of 204 results. Limits were then set to academic journals only and peer reviewed journals. In order to refine the search for more relevant articles, the term "self-efficacy" was entered as a Major Subject Heading and "breastfe*" was entered as a title. This yielded 65 results. Upon review, the articles appeared to be relevant to the topic at hand. Additionally, the terms were searched using ProQuest and PubMed, which yielded similar research articles.

To investigate the association between the prenatal period and breastfeeding outcomes, the term “prenatal” was entered as a subject in the CINAHL database. Results were refined by limiting the major subject heading to “breastfeeding”. Results were limited to peer reviewed, academic journals in the English language. This yielded 234 research articles, of these approximately 45 were relevant to the influence of the prenatal period on breastfeeding outcomes.

Along with the academic literature, information from professional nursing bodies were also explored. The Registered Nurses Association of Ontario’s (RNAO) Best Practice Guidelines were reviewed for relevancy as well as the College of Nurses of Ontario’s (CNO) website and standards of practice.

The Link between Breastfeeding Self-Efficacy and Breastfeeding Outcomes beyond North American Populations

Breastfeeding self-efficacy has been positively correlated with breastfeeding outcomes in the literature across various populations both within and outside of North America. The following will provide an overview of the this linkage in countries across the globe, including Australia, England, Turkey, Finland, Croatia, Poland, Italy, Spain, Brazil, Puerto Rico, China, Japan, Iran, Bangladesh and the Democratic of Congo.

In an Australian study, Blyth, Creedy, Dennis, Moyle, Pratt and De Vries (2002) investigated the link between maternal confidence, as measured by the Breastfeeding Self-Efficacy Scale (BSES), and breastfeeding outcomes. The authors found a significant relationship between BSES scores and breastfeeding outcomes at both 1 week and 4 months post-partum. Women who were exclusively breastfeeding were significantly more likely to have high breastfeeding self-efficacy scores at both 1 week (*p*=<0.001) and 4 months post-partum (*p*=<0.001). There were no significant differences found between self-efficacy scores and marital status, ethnicity, education or maternal age. A significant difference was found between self-efficacy scores and multiparous women with breastfeeding experience versus primiparous women at both 1 week (*p*=0.01) and 4 months post-partum (*p*=0.01) (Blyth et al., 2002). In a follow-up article, the researchers investigated modifiable antenatal variables and their predictive effect on breastfeeding outcomes. It was found that intended breastfeeding duration (*p*=<0.001) and breastfeeding self-efficacy (*p*=<0.001) were the most significant modifiable variables linked to breastfeeding outcomes (Blyth, Creedy, Dennis, Moyle, Pratt, De Vries & Healy, 2004).

Another Australian study found an association between breastfeeding self-efficacy and breastfeeding outcomes. In this study, the participants completed questionnaires prenatally at 32 weeks and at 2 and 6 months post-partum. The women's confidence to achieve exclusive breastfeeding, measured at 32 weeks gestation, was a predictor of exclusive breastfeeding at 6 months (*p*=<0.05). Similarly, at 2 months post-partum, breastfeeding self-efficacy, as measured by the Breastfeeding Self-Efficacy Scale - Short Form (BSES-SF) was predictive of breastfeeding duration (*p*=<0.01) (De Jager, Broadbent, Fuller-Tyszkiewicz, Nagale, McPhie & Skouteris, 2015). Similarly, Hauck, Hall and Jones (2007) found that Australian women who scored higher on the BSES were more likely to be exclusively breastfeeding at 12 weeks post-partum (*p*=<0.001) compared to those with lower scores. Neither of these studies investigated characteristics among women with high breastfeeding self-efficacy versus those with low breastfeeding self-efficacy.

Another Australian study looked into the effect of breastfeeding self-efficacy on breastfeeding duration. This study also explored variables which may confound the effect of breastfeeding self-efficacy (Baghurst, Pincombe, Peat, Henderson, Reddin & Antoniou, 2007). Breastfeeding self-efficacy, measured both with the BSES and the BSES-SF, was found to be a predictor of breastfeeding duration, independent of other factors including: intention of breastfeeding duration, education level, country of birth, smoking status, housing and mode of delivery (Baghurst et al., 2007).

Researchers in England investigated the use of a new breastfeeding measurement tool, the Bristol Breastfeeding Assessment Tool (BBAT) which looked at the position, sucking, swallowing and attachment behaviours of the newborn at the breast. Their study showed a significant correlation (0.57) between breastfeeding self-efficacy, as measured by the BSES-SF, with BBAT scores, indicating women with a better breastfeeding technique had higher breastfeeding self-efficacy scores. (Ingram, Johnson, Copeland, Churchill & Taylor, 2015). The researchers did not specifically study factors associated with breastfeeding self-efficacy. Entwistle, Kendall and Mead (2010) identified four themes influencing breastfeeding outcomes among low-income women in the United Kingdom. The four themes were: 1) the woman's self-confidence with breastfeeding (her breastfeeding self-efficacy), 2) her social environment, 3) her knowledge of breastfeeding, and 4) maternity services provided (Entwistle et al., 2010). Gregory, Penrose, Morrison, Dennis & MacArthur (2008) found women with high BSES-SF scores in the immediate post-partum period were significantly more likely to be exclusively breastfeeding at 4 weeks post-partum (p=<0.001) among an ethnically diverse sample of women in the United Kingdom compared to women with low breastfeeding self-efficacy scores. In this study, Caucasian mothers had significantly lower BSES-SF scores than those who were not Caucasian (p=0.04) (Gregory et al., 2008).

In Turkey, BSES scores were found to be significantly higher among women exclusively breastfeeding at 1 week post-partum (p=<0.01), 4 weeks post-partum (p=<0.01) and 8 weeks post-partum (p=<0.05) (Eksioglu & Ceber, 2011). Women who initiated the first breastfeed sooner had higher breastfeeding self-efficacy at 1 week (p=<0.05) and 4 weeks post-partum (p=<0.05) compared to women who delayed the first breastfeed, although this did not remain statistically significant at 8 weeks post-partum. Level of education did not significantly influence breastfeeding self-efficacy scores (Eksioglu & Ceber, 2011). This finding is in contrast to Alus Tokat, Okumus and Dennis (2010) who found education level to be significantly correlated with BSES-SF scores both in the prenatal period (p=0.002) as well as in the postnatal period (p=0.01) among a sample of Turkish women. This study explored demographic and obstetrical variables with breastfeeding self-efficacy. Maternal age was not found to be significantly correlated with BSES-SF scores in neither the prenatal nor the postnatal period. Significant relationships were found between higher BSES-SF scores in the postnatal period and: income (p=0.01) and vaginal delivery (p=<0.001). Similarly, in the prenatal period significant relationships between BSES-SF scores and income (p=0.04) were found. In this study, BSES-SF scores both in the prenatal period and in the postnatal period were found to predict breastfeeding (p=0.04, p=<0.001 respectively) (Alus Tokat et al., 2010).

Among pregnant women in Finland, those who viewed breastfeeding as difficult, those who viewed breastfeeding as exhausting and the women's parity, explained 38.1% of the variation in confidence scores (Laantera, Pietila, Ekstrom & Polkki, 2012). Primiparous women had significantly lower maternal breastfeeding confidence compared to multiparous women. In this study, the researcher's developed their own tools to measure breastfeeding confidence (Laantera et al., 2012).

Pavicic Bosnjak, Rumboldt, Stenojevic and Dennis (2012) translated and validated the BSES-SF into Croatian for its use among post-partum breastfeeding women in Zagreb, Croatia. Breastfeeding self-efficacy in the immediate postpartum was found to be predictive of both breastfeeding at one month post-partum (p=<0.001) and six months post-partum (p=<0.001); as well as breastfeeding exclusivity at one month post-partum (p=<0.001) and six months post-partum (p=<0.001). Maternal age was found to be the only variable significantly related to breastfeeding self-efficacy scores (p=0.03) (Pavicic Bosnjak et al., 2012).

Similarly, the BSES-SF was translated and validated among a sample of 105 breastfeeding women in the immediate post-partum in Poland (Wutke & Dennis, 2007). In-hospital BSES-SF scores predicted breastfeeding duration and exclusivity at both 8 weeks (p=0.003) and 16 weeks (p=0.001) post-partum. Women with previous breastfeeding experience had significantly higher BSES-SF scores (p=0.002) than those women without. Multiparous women had significantly higher BSES-SF scores than primiparous women (*p*=0.018) (Wutke & Dennis, 2007). This finding was in contrast to Petrozzi and Gagliardi (2016), who found no significant relationship between Italian BSES-SF scores and parity among post-partum women in Italy. Other variables found to be insignificant with breastfeeding self-efficacy were: mode of delivery, maternal age, biological sex of the infant and citizenship. Consistent with previous findings, this Italian study also found BSES-SF scores in the immediate post-partum to be predictive of breastfeeding duration to 3 months (*p*=0.004). Furthermore, BSES-SF scores were inversely correlated with depressive symptomology, as measured by the Edinburgh Postnatal Depression Scale (EDPS) with a *p* value of <0.05 (Petrozzi & Gagliardi, 2016).

A study which translated the BSES-SF into Spanish, found BSES-SF scores to be predictive of exclusive breastfeeding at 3 weeks post-partum among a sample of 135 women breastfeeding in-hospital in Spain (Oliver-Roig, d'Anglade-Gonzalez, Garcia-Garcia, Silva-Tubio, Richart-Martinez & Dennis, 2012). Additionally, mothers with a higher number of children, those with previous breastfeeding experience of six months or more and those who rated their previous breastfeeding experience as "very positive" all had higher levels of breastfeeding self-efficacy, with *p* values of *p*=0.024, *p*=<0.001 and *p*=<0.001 respectively (Oliver-Roig et al., 2012).

Despite the numerous studies to support the link between self-efficacy and breastfeeding, findings have been inconsistent among post-partum women in Brazil. Brazilian researchers Fernandes do Carmo Souza and Quintella Fernandes (2014) did not find a significant correlation between the Brazilian version of the BSES-SF and breastfeeding outcomes. However, upon a closer look into the data, the article revealed 82.3% of women had high breastfeeding self-efficacy while 17.7% of women reported moderate scores. This indicated that no women in the sample of 100 post-partum mothers scored low on the BSES-SF. The mean age of women sampled was 32.8 years, 94.6% of the women were married, 70% had higher education and 90% of the women held jobs; indicating the sample of women were of an upper class (Fernandes do Carmo Souza & Quintella Fernandes, 2014). Therefore the generalizability of this study is limited. Various other Brazilian studies on breastfeeding self-efficacy were conducted and found to have different outcomes.

Brazilian authors, Lemos Uchoa, Araujo Gomes, Silva Joventino, Bastista Oria, Barbosa Ximenes and de Almeida (2014) specifically studied the association between sociodemographic and obstetrical variables and self-efficacy scores among an urban population in Pacatuba, Brazil. This relatively small (n=50), longitudinal study utilized a translated BSES-SF tool to measure breastfeeding self-efficacy. The researchers found many significant associations. The authors reported significant associations between mean maternal breastfeeding self-efficacy and age, marital status, maternal education, paternal education, income, number of people in household, recipient of government sponsorship, access to sewage treatment and access to public water. The authors also reported a link between self-efficacy and the following obstetrical variables: no previous history of miscarriage, having 2 living children, multiparity, breastfeeding experience, multiple pregnancy, lack of breastfeeding difficulties, previous positive breastfeeding experience, mothers who themselves were breastfed as an infant and those who knew women who had breastfed (Lemos Uchoa et al., 2014).

Another Brazilian study looked into variables associated with breastfeeding self-efficacy, as measured by the Portuguese BSES-SF. Those with one to three people living on one income (*p*=0.014), lack of drug use (*p*=0.003), women with two or more children (*p*=0.009), breastfeeding experience (*p*=0.018), women who exclusively breastfed for more than five months (*p*=0.002), and women who reported a positive breastfeeding experience (*p*=<0.001) were found to have higher breastfeeding self-efficacy scores (Peripolli Rodrigues, de Mello Padoin, de Paula, de Oliveira Souza, de Almeida, & Ximenes, 2015). There were no women who scored low on breastfeeding self-efficacy; 81.1% of women scored high and 18.9% scored moderate BSES-SF scores. In a similar Brazilian study by the same lead researcher, the only statistically significant variable associated with breastfeeding self-efficacy was timing of the first breastfeed. Women who breastfed within the first hour after birth had significantly higher BSES-SF scores (*p*=0.018) (Peripolli Rodrigues, de Mello Padoin, de Azevedo Guido & Dias Lopes, 2014).

Inconsistent with previous findings, Oria, Ximenes, de Almeida, Glick and Dennis (2009) found women with previous breastfeeding experience did not have higher BSES scores than those without previous breastfeeding experience among a sample of pregnant Brazilian women. Although this study did not explore the predictive ability of breastfeeding self-efficacy, it did find significant relationships between prenatal BSES scores and maternal age (*p*=0.01), education level (*p*=0.01) and marital status (*p*=0.04). Additionally, women who reported previous satisfactory breastfeeding experience had higher BSES scores than those who did not have previous satisfactory breastfeeding experience (*p*=0.001). No significant findings were found between occupation, family income, smoking status or number of previous pregnancies and prenatal BSES scores (Oria et al., 2009).

The last Brazilian study found a significant link between breastfeeding self-efficacy and quality of life. Zubaran and Foresti (2011) found quality of life, as measured by the Multicultural Quality of Life index (MQLI), to be a significant predictor of breastfeeding self-efficacy as measured by the BSES-SF (r squared=0.27, p=<0.001). In this study, level of education and socioeconomic status was not a significant predictor of BSES-SF scores (Zubaran & Foresti, 2011).

In Puerto Rico, the BSES was translated into Spanish and scores were found to be predictive of breastfeeding exclusivity (p=<0.001) among Puerto Rican women in the immediate post-partum period (Molina Torres, Davila Torres, Parrilla Rodriguez & Dennis, 2003). Mothers with previous breastfeeding experience were found to have higher levels of breastfeeding self-efficacy than those without previous breastfeeding experience (p=0.02), consistent with previous findings (Molina Torres et al., 2003).

An Iranian randomized controlled trial investigated the correlation between immediate skin-to-skin contact after birth and breastfeeding self-efficacy as measured by the BSES-SF. Aghdas, Talat and Sepideh (2014) found the women who had immediate skin-to-skin contact with their newborns had significantly higher breastfeeding self-efficacy scores (p=0.0003). This study is not investigate the effect of BSES-SF scores on breastfeeding outcomes.

There were inconsistent findings among a large sample (n=2400) of women from rural Bangladesh. Women who received breastfeeding counseling reported higher breastfeeding knowledge and breastfeeding attitudes, however surprisingly, they also reported lower breastfeeding self-efficacy (p=0.05) (Thomas et al., 2015). Another surprising finding was that higher income was inversely correlated with breastfeeding self-efficacy (Thomas et al., 2015), although the p value was not reported. A limitation to this study is the measurement of breastfeeding self-efficacy utilized was not a validated tool.

Wu, Hu, McCoy and Efird (2014) evaluated the effects of a breastfeeding self-efficacy intervention among primiparous women in China. They found that baseline breastfeeding self-efficacy scores, as measured by the translated BSES-SF, predicted exclusive breastfeeding both at 4 weeks (p=<0.001) and 8 weeks (p=<0.001) post-partum (Wu, Hu, McCoy & Efird, 2014). Similarly, Yuen and Chan (2013) found Chinese women with higher BSES-SF scores were more likely to be exclusively breastfeeding at 6 weeks post-partum (p=<0.001). Neither of these studies investigated the predictors associated with breastfeeding self-efficacy.

A Chinese study by Ku and Chow (2010) investigated the characteristics of breastfeeding self-efficacy among primiparous women. They found that women who lived with their mother-in-law (p=<0.001), those with higher income (p=<0.001) and those who had experienced a pregnancy loss (either spontaneously or through therapeutic abortion), (p=<0.001) had higher breastfeeding self-efficacy scores, as measured by the BSES. A significant correlation (0.29) was found between breastfeeding knowledge and self-efficacy (p=0.008). Women who decided to breastfeed later in pregnancy (p=<0.001), those with their father-in-law helping practice 'pei-yue', the Chinese practice where the new mother is to stay home and avoid all household duties for the first month post-partum (p=0.009), and women with higher maternal age (p=0.017) had lower breastfeeding self-efficacy scores (Ku & Chow, 2010). The finding of the history of miscarriage and higher breastfeeding self-efficacy is inconsistent with findings reported by Lemos Uchoa et al. (2014) who investigated the relationship among a Brazilian sample.

Dai and Dennis (2003) translated and validated the BSES into Mandarin among a sample of 186 Chinese women in the immediate post-partum period. Breastfeeding self-efficacy in the immediate post-partum period in hospital was found to be predictive of breastfeeding at 4 weeks (*p*=<0.001) and 8 weeks post-partum (*p*=<0.001), whereby women with higher postpartum BSES scores were more likely to be breastfeeding, and doing so exclusively (Dai & Dennis, 2003).

Similarly, Ip, Yeung, Choi, Chair and Dennis (2012) translated the BSES-SF into Cantonese and explored breastfeeding self-efficacy and breastfeeding outcomes among 185 post-partum Chinese women in Hong Kong, China. High levels of breastfeeding self-efficacy were significantly correlated with breastfeeding duration to 6 months (*p*=<0.001) as well as breastfeeding exclusivity at both 1 month post-partum (*p*=<0.001) and 6 months post-partum (*p*=<0.001) (Ip et al., 2012).

In Japan, it was shown that women were less likely to be exclusively breastfeeding if they had low breastfeeding self-efficacy scores, as measured by the Japanese version of the BSES-SF (Otsuka, Dennis, Tatsuoka & Jimba, 2008). Self-efficacy scores were not correlated with age, marital status, education or household income. Significant correlations were found between BSES-SF scores and parity (*p*=<0.001), whereby primiparous women had lower scores than multiparous women; breastfeeding intention (*p*=<0.001), where women intending to exclusively breastfeed had higher scores; and women who had a history of prior exclusive breastfeeding for longer than 3 months had higher self-efficacy scores (*p*=<0.001). A link between perceived insufficient milk supply and breastfeeding self-efficacy was found. Women with low BSES-SF scores were more likely to report insufficient milk supply at 4 weeks post-partum (r=0.45, *p*=<0.001). BSES-SF scores were found to explain 21% of the variance in perceived insufficient milk supply (Otsuka, Dennis, Tatsuoka & Jimba, 2008).

Another Japanese study found a need to consider routine hospital practices when measuring breastfeeding outcomes. The Baby-Friendly hospital initiative was developed by the World Health Organization in 1991 as a global initiative to include standard practices that support breastfeeding (WHO, 2016c). Otsuka et al. (2014) found an intervention to increase breastfeeding self-efficacy was more effective among hospitals with a Baby-Friendly initiative in place. At Baby-Friendly hospitals, the intervention increased breastfeeding self-efficacy (*p*=0.037); at hospitals without the Baby-Friendly designation, no significant differences were noted. Although this study did not look specifically into factors surrounding breastfeeding self-efficacy, it did provide information into the importance of standard hospital practices on breastfeeding outcomes (Otsuka et al., 2014).

In the Democratic of Congo in Africa, breastfeeding is accepted universally, yet by 2-3 months post-partum, 65% of mothers have either discontinued breastfeeding, or have supplemented with artificial milk (Yotebieng, Lambert Chalachala, Labbok & Behets, 2013). A study looking into self-efficacy among women in the Democratic of Congo found those with low breastfeeding self-efficacy, as measured by the BSES-SF were significantly more likely to discontinue breastfeeding by six months (p=0.002) (Babakazo et al., 2015). The factors behind the differences among breastfeeding self-efficacy scores were not investigated in this study.

Meedya, Fahy and Kable (2010) found self-efficacy to be one of the modifiable variables associated with breastfeeding duration through a literature review. Other variables found were breastfeeding intention and social support. Non-modifiable variables found to be associated with breastfeeding duration were: older age, being married, higher education level and higher income level (Meedya et al., 2010).

The Link between Breastfeeding Self-Efficacy and Breastfeeding Outcomes in North America

The Registered Nurses Association of Ontario (RNAO) provided an updated supplement to their 2003 Breastfeeding Best Practice Guideline which added the inclusion of maternal breastfeeding self-efficacy among nurses' postnatal assessment (RNAO, 2007). This guideline was updated due to the overwhelming evidence to support the link between maternal breastfeeding self-efficacy and breastfeeding outcomes. This guideline is scheduled to be reviewed in January 2017, with an updated guideline anticipated by winter 2018 (K. Wallace, RNAO program manager, personal communication, November 10th, 2016).

Hinic (2016) identified characteristics of women with high breastfeeding self-efficacy among a sample of 107 women in Northeastern United States within the first four days post-partum. Similar to Dennis (2006), she found a number of variables which significantly correlated with breastfeeding self-efficacy. BSES-SF scores were positively correlated with number of children ($p=<0.05$), partner support ($p=<0.01$), feeding plans ($p=<0.01$), intention to exclusively breastfeed for 6 months or longer ($p=<0.01$), feeling prepared for birth ($p=<0.01$) and feeling satisfied with birth ($p=<0.01$) (Hinic, 2016). In contrast to Hinic (2016), intended breastfeeding duration was not found to be a predictor of breastfeeding duration among women of African American descent according to McCarter-Spaulding and Gore (2009). McCarter-Spaulding and Gore (2009) found BSES-SF scores in the first week post-partum to be a significant predictor of breastfeeding duration and exclusivity at 1 months and 6 months post-partum ($p=<0.01$). Similarly, Pollard and Guill (2009), also found BSES-SF scores between 12 - 48 hours post-partum to be a significant predictor of breastfeeding duration among an American sample of 70 mothers ($p=0.049$).

A study of mood, self-efficacy and breastfeeding outcomes among 142 American primiparous women found higher BSES-SF scores at 2 days post-partum predicted breastfeeding exclusivity at 6 months ($p=<0.05$) (Henshaw, Fried, Siskind, Newhouse & Cooper, 2015). Although higher BSES-SF scores predicted breastfeeding outcomes at 6 months post-partum, they were not significantly predictive of breastfeeding exclusivity at 6 weeks post-partum (Henshaw et al., 2015). Contrary to Dennis (2006), Henshaw et al. (2015) found the only variable to predict breastfeeding outcomes at 6 weeks post-partum was the scores on the depressive risk inventory. The authors found BSES-SF scores at 2 days post-partum correlated with emotional adjustment ($p=<0.001$) and fewer depressive symptoms ($p=<0.001$) at six weeks post-partum (Henshaw et al., 2015).

Among a sample of low-income, predominately Latino community in New York City, breastfeeding self-efficacy, as measured by the BSES-SF, was the only significant variable found to be associated with exclusive breastfeeding at four to six weeks post-hospital discharge (Glassman, McKearney, Saslaw & Sirota, 2014).

As for the Canadian literature surrounding this topic, Dennis (2006) identified the predictors of breastfeeding self-efficacy among 522 breastfeeding mothers in Vancouver, BC. Through survey data it was shown that eight variables explained 54% of the variance in BSES scores at 1 week post-partum. The variables included: education, support from women with other children, vaginal delivery, satisfaction with pain relief during labour, satisfaction with post-partum care, perceived breastfeeding progress, feeding infant as planned and lack of anxiety (Dennis, 2006). There was no evidence of multicollinearity of the eight variables. In this sample, the inclusion criteria was not limited to primiparas. Of these eight variables, perceived breastfeeding progress was the single most significant predictor of breastfeeding self-efficacy ($r=0.55$). The sample showed 81.8% of women breastfeeding exclusively at one week post-partum. The majority of the women were of Caucasian decent (92%), married or common-law (91.2%), delivered vaginally (76%) and had obtained a college or university degree (62%). Women who were exclusively breastfeeding their infant had significantly higher BSES scores ($p=<0.001$) than those who were not exclusively breastfeeding (Dennis, 2006). This article provides a valuable understanding behind the characteristics of women with high levels of breastfeeding self-efficacy.

Dennis, Heaman and Mossman (2011) investigated breastfeeding self-efficacy prenatally and in the post-partum among pregnant adolescents in Manitoba, Canada. Breastfeeding self-efficacy scores, as measured by the BSES-SF modified for prenatal use, at 34 weeks gestation were found to predict breastfeeding initiation ($p=<0.001$) as defined as any breastfeeding for more than one times daily for a minimum of 3 days post-partum. Postnatal BSES-SF scores predicted breastfeeding duration and exclusivity to 4 weeks post-partum (p=<0.001). Adolescents who attended prenatal classes and those with professional prenatal support were found to have significantly higher BSES-SF scores with a p value of 0.02 and a p value of 0.02 respectively (Dennis et al., 2011).

A study exploring breastfeeding self-efficacy among Canadian Aboriginal women found multiparous women with previous breastfeeding experience had higher levels of breastfeeding self-efficacy, as measured by the BSES-SF, compared to women without previous breastfeeding experience (p=0.0009) (McQueen, Montelpare & Dennis, 2013). Consistent with other findings, breastfeeding self-efficacy in the immediate post-partum period was predictive of breastfeeding exclusivity to 4 weeks (p=0.001) as well as to 8 weeks (p=0.0002) post-partum (McQueen et al., 2013).

The link between breastfeeding self-efficacy and breastfeeding outcomes was explored among a group of mothers with infants in the Neonatal Intensive Care Unit (NICU) in Canada (Wheeler & Dennis, 2013). The BSES-SF results at 1 week post NICU discharge were predictive of breastfeeding and/or breast milk pumping at 6 weeks post discharge (p=0.001). There were no significant relationships between sociodemographic factors and BSES-SF results (Wheeler & Dennis, 2013).

Although the literature has established a link between breastfeeding self-efficacy and breastfeeding outcomes, how to actually increase a woman's self-efficacy has not been clearly established. A randomized controlled trial conducted in Northwestern Ontario designed to increase breastfeeding self-efficacy through a self-efficacy enhancing workshop found no significant differences in BSES-SF scores in the control group versus the intervention group after the workshop (McQueen, Dennis, Stremler & Norman, 2011). In contrast to the above finding, Noel-Weiss, Rupp, Cragg, Bassett and Woodend (2006) conducted a similar randomized controlled trial in Ontario in which women in the intervention group attended a prenatal breastfeeding education workshop. The women who attended the workshop reported higher BSES-SF scores at 4 weeks post-partum compared to those who did not attend (p=0.004) (Noel-Weiss et al., 2006).

Although there appears to be a vast amount of articles in North America and from around the world pertaining to the significance of breastfeeding self-efficacy and breastfeeding outcomes, it is apparent that further research is necessary to truly understand a woman's breastfeeding self-efficacy. While predictors of breastfeeding self-efficacy have been studied in the immediate postpartum period (Hinic, 2016; Dennis, 2006), prenatal predictors of breastfeeding self-efficacy of not yet been thoroughly explored. This highlights an identified gap in the literature.

The Importance of the Prenatal Period

While the link between breastfeeding self-efficacy scores and its positive effects on breastfeeding outcomes has been established, research has not yet identified predictors of breastfeeding self-efficacy in the prenatal period. The prenatal period is of critical importance for its effects on breastfeeding outcomes, thus warranting further research on prenatal breastfeeding self-efficacy. Upon reviewing the academic literature to evaluate the link between the prenatal period and breastfeeding outcomes, several key areas were identified. The following prenatal variables were found to have an impact on breastfeeding outcomes: prenatal care, prenatal group education, prenatal individual education, breastfeeding intention and breastfeeding knowledge. The following will explore the link between these identified concepts and their association with breastfeeding outcomes.

Prenatal care.

Several studies associated positive breastfeeding outcomes with the prenatal care received during pregnancy. The quantity, timing, quality and characteristics of prenatal care were all variables to consider. As for the quantity of prenatal care, a study of women from Nigeria found that those who received 4 or more antenatal visits were more likely to exclusively breastfeed compared to women who received less antenatal care (Agho, Dibley, Odiase & Ogbonmwan, 2011). Similarly, among a sample of Brazilian women, those who had reported less than 6 prenatal care visits had a higher risk of cessation of exclusive breastfeeding compared to women who had received more prenatal care. Other factors found to be associated with higher risk of cessation of exclusive breastfeeding were: younger maternal age (adolescent), early pacifier use and poor breastfeeding latch (Cordova do Espirto Santo, Dias de Oliveira & Justo Giugliani, 2007). In a study of adolescent mothers in Ohio, one of the risk factors found for a lack of breastfeeding initiation was fewer than 5 prenatal care visits reported. Other risk factors identified were: less social support, Medicaid insurance recipient, Black race, not married, cigarette smoking, caesarian delivery and preterm birth (Apostolakis-Krus, Valentine & DeFranco, 2013).

For timing of prenatal care, data from an Ohio state-wide survey found women who received early prenatal care had higher rates of breastfeeding. Other factors associated with higher breastfeeding rates were: Caucasian race, older maternal age, higher education level attained and married (Grossman, Larsen-Alexander, Fitzsimmons & Cordero, 1989). This is in congruence with more recent research by Tendfelde, Finnegan and Hill (2011). A secondary analysis of data among low-income Chicago based women identified predictors of breastfeeding initiation. Women who reported having received prenatal care in the first trimester were more likely to exclusively breastfeed their infant compared to women who reported first receiving prenatal care later in pregnancy (Tenfelde, Finnegan & Hill, 2011). Similarly, timing of prenatal care was found to be a significant predictor of maternal breastfeeding intent among American pregnant women (Azulay Chertok, Lup, Culp & Mullett, 2011).

A factor associated with the quality and characteristics of prenatal care was the type of care provider. The type of care provider seen during prenatal visits was found to be related to breastfeeding outcomes. One Canadian study found women who received prenatal care delivered by either a family physician or a midwife had significantly better breastfeeding outcomes compared to those who received prenatal care from an obstetrician (Costanian, Macpherson & Tamim, 2016).

The influence of infant formula company advertising must also be considered. American women who received information packets designed by an infant formula company at their first prenatal visit were compared to a group who received an educational package without formula company advertising on breastfeeding outcomes. There was no statistically significant differences on breastfeeding duration or initiation rates, however women who received the formula-specific information were significantly more likely to cease breastfeeding within the first two weeks post-partum (Howard, Howard, Lawrence, Andresen, DeBlieck & Weitzman, 2000).

Breastfeeding advice given to women in the prenatal period by a healthcare provider was also explored in the literature. A survey of American post-partum women who had initiated breastfeeding after birth found that only 33% of primiparous women and 15% of multiparous women had reported receiving prenatal breastfeeding advice by their healthcare provider (Izatt, 1997). Similarly, among group of American women, 81.5% of the women sampled self-identified at least one breastfeeding concern when choosing the type of infant feeding method to use, yet only 25.4% of these women discussed their concern with their care provider in the prenatal period. When the sample of women were prompted with specific breastfeeding concerns, 95.4% of women identified at least one of the concerns, and only 17.4% of these women discussed the concern with their healthcare provider (Archbald, Lundsberg, Triche, Norwitz & Illuzzi, 2011).

Receiving breastfeeding education from a lactation consultant during the prenatal period in addition to receiving prenatal care from a health provider has been associated with positive breastfeeding outcomes. A randomized controlled trial of American pregnant women were either assigned to standard care group, or intervention group. The intervention group were offered prenatal meetings, a post-partum visit at the hospital and access to telephone support and home visits with a lactation consultant. The intervention group had higher rates any breastfeeding until week 20 post-partum. Rates of exclusive breastfeeding did not differ significantly between the intervention and control groups (Bonuck, Trombley, Freeman & McKee, 2005).

Similarly, American women who saw lactation consultants both in the prenatal and postnatal period had significantly higher breastfeeding rates than those who received standard care alone (Bonuck, Stuebe, Barnett, Labbok, Fletcher, & Bernstein, 2014).

An American based obstetrician's office measured their breastfeeding rates for the practice before and after hiring a lactation consultant to provide prenatal breastfeeding education while women waited for their obstetric appointment. Exclusive breastfeeding rates rose from 33% to greater than 60% over a 6 month period after providing breastfeeding education by a lactation consultant (Bass, Rodgers & Baker, 2014).

Breastfeeding advice given by a healthcare provider has been shown to significantly increase breastfeeding intention among American women (Sable & Patton, 1998). This is in congruence with Balcazar, Trier and Cobas (1995) who found the strongest predictor of breastfeeding intention to be prenatal breastfeeding advice provided by a healthcare provider. Similarly, women who did not intend to breastfeed were less likely to have reported receiving information prenatally regarding breastfeeding benefits, breastfeeding methods and pumping breast milk (Gurka et al., 2014).

Prenatal group breastfeeding education.

Group breastfeeding education in the prenatal period and its effects on breastfeeding has been explored throughout the world. Mothers in Taiwan who received group prenatal education classes scored higher in both breastfeeding attitude and knowledge compared to the control group. The intervention group also scored higher on breastfeeding satisfaction at day 3 post-partum and at 1 month post-partum. However, no significant differences were found in actual exclusive breastfeeding rates (Lin, Chien, Tai & Lee, 2008). This is in contrast to a study of women in Singapore. Those assigned to either a prenatal breastfeeding education group or those assigned to a postnatal lactation support group both had significantly higher rates of exclusive breastfeeding rates at 6 weeks, 3 months and 6 months post-partum compared to the standard care group who received no educational intervention (Su et al., 2007).

The type of breastfeeding intervention has also been explored. Pregnant women in Chile were randomly assigned to two different breastfeeding education programs. The control group received 5 breastfeeding education workshops. The experimental group received the same 5 workshops as well as an additional workshop which focused on breastfeeding skills past the neonatal period. Women in the experimental group had significantly more exclusive breastfeeding at 6 months post-partum compared to the control group (Pugin, Valdes, Labbok, Perez & Aravena, 1996). Thus, the quality of the intervention must also be considered when evaluating its effect on breastfeeding outcomes.

Australian women who intended to breastfeed received either a group prenatal teaching session at greater than 36 weeks gestation or were assigned to a standard care group. Those in the intervention group were more likely to breastfeed at 6 weeks post-partum compared to the control group (Duffy, Percival & Kershaw, 1997).

In the United States, several studies have yielded similar results. Group prenatal breastfeeding education has been found to increase breastfeeding rates at hospital discharge (Tanner-Smith, Steinka-Fry & Lipsey, 2013), at 3 to 4 months post-partum (Reifsnider & Eckhart, 1997) and until 6 months post-partum (Rosen, Krueger, Carney & Graham, 2008). Similarly, low-income American women who participated in a peer counseling breastfeeding program in both the prenatal and postnatal period where significantly more likely to initiate breastfeeding than those who participated in the post-partum period only (Yun, Mertzlufft, Kruse, White, Fuller & Zhu, 2009).

An American study evaluated the effect of a breastfeeding workshop on expectant fathers. Expectant fathers were assigned to either the intervention group, which received breastfeeding education plus infant care education or a control group which received infant care education only. Those in the intervention group had partners with significantly higher breastfeeding initiation rates compared to the control group (Wolfberg, Michels, Shields, O'Campo, Dronner & Bienstock, 2004). Abbass-Dick, Stern, Nelson, Watson and Dennis (2015) conducted a breastfeeding intervention for expectant couples in Toronto, Ontario. Results showed that those who received the intervention had significantly higher rates of any breastfeeding at 12 weeks post-partum. The amount of exclusive breastfeeding at 12 weeks post-partum was not significant between the intervention and control group. Mothers in the intervention group reported significantly higher rates of satisfaction with breastfeeding information received, satisfaction with their partner's breastfeeding involvement as well as higher rates of satisfaction with the breastfeeding help their partner provided (Abbass-Dick et al., 2015).

The effect of prenatal class attendance on breastfeeding outcomes has been in explored in Canada. A survey of mothers from Moncton, New Brunswick found that those who reported prenatal class attendance were significantly more likely to initiate breastfeeding than those who did not report prenatal class attendance (Leger-Leblanc & Rioux, 2008). Among the primiparous women in the study, those who reported attending prenatal class has higher rates of prenatal breastfeeding intention (Leger-Leblanc & Rioux, 2008). Similarly, an Ontario-based retrospective study found women who did not report the attendance of prenatal classes were significantly less likely to intend to breastfeed compared to women who reported attending prenatal classes (Lutsiv et al., 2013).

Individual prenatal education.

The impact of individual prenatal education has also been explored around the world. Among primiparous women in Taiwan who delivered via planned caesarean section, those who perceived prenatal breastfeeding education, through booklets, videos and telephone were significantly more likely to exclusively breastfeed both at discharge and 1 month post-partum. The intervention group also scored higher on breastfeeding attitude compared to the control group (Lin, Kuo, Lin & Chang, 2008). An internet-based prenatal breastfeeding education program was evaluated in Taiwan as well. Those who utilized the internet-based education program scored higher in breastfeeding attitude and knowledge compared to the control group, as well as had higher rates of both exclusive and partial breastfeeding after controlling for cofounding variables (Huang, Kuo, Avery, Chen, Lin & Gau, 2007). This is in contrast to a study in Hong Kong, which did not find any differences in breastfeeding outcomes among women who received one-time individual antenatal breastfeeding counseling and those who did not (Wong, Tak Fong, Yin Lee, Chu & Tarrant, 2014).

However, among mothers in India, those who had received antenatal breastfeeding counseling were less likely to supplement breastfeeding with infant formula. There were no differences found between those who did and those who did not receive the intervention with respect to reported breastfeeding difficulties, such as engorgement, tenderness or insufficient breast milk (Ananthakrishnan, Kasinathan, & S., 2012).

Among a group of Vietnamese immigrant women in Australia, those who attended a culturally-specific breastfeeding program scored significantly higher on breastfeeding knowledge, breastfeeding attitude and breastfeeding intent. The intervention group had significantly higher breastfeeding initiation rates and breastfeeding rates at 4 weeks post-partum. No significant differences were found between the groups at 6 months post-partum (Rossiter, 1994).

Lasting effects were found in a subsequent Australian study. Women who received a prenatal breastfeeding counseling session with a healthcare provider were 55% less likely to discontinue exclusive breastfeeding prior to 6 months post-partum and 50% less likely to discontinue any breastfeeding prior to one year post-partum compared to standard care group (Pannu, Giglia, Binns, Scott & Oddy, 2011). Similarly, pregnant women in Australia were either given a parenting workbook (control group) or a workbook designed to increase maternal breastfeeding self-efficacy (intervention group). At 4 weeks post-partum, women in the intervention group had significantly higher breastfeeding self-efficacy, breastfeeding exclusivity and breastfeeding duration compared to the control group (Nichols, Schutte, Brown, Dennis & Price, 2009).

Among low income Hispanic American women, those who received individual breastfeeding counseling sessions in the prenatal period has significantly higher exclusive breastfeeding rates in the first week post-partum after adjusting for cofounding variables compared to those who did not receive the intervention (Sandy, Anisfeld & Ramirez, 2009).

Similarly, Hispanic American women who received both individual prenatal education with a lactation consultant, as well as post-natal support either via telephone or home visit were 2.31 times more likely to initiate breastfeeding, twice as likely to breastfeed until at least 6 months post-partum and half as likely to discontinue breastfeeding at any given time compared to the standard care group (Gill, Reifsnider & Lucke, 2007).

Mothers who received prenatal education by a case manager were more likely to initiate breastfeeding than those who did not received the intervention, after controlling for cofounding variables among low-income, predominantly visible minority American women. The intensity of case management was also significant. Those who were classified as receiving high intensity case management were 3.55 times more likely to breastfeed for at least 6 months compared to the women who received low intensity case management (Caine, Smith, Beasley & Brown, 2012).

An American obstetric office in a multicultural, low-income area offered prenatal breastfeeding education by a nutritionist to all women in the clinic. Videos about breastfeeding were played in waiting room, all infant formula advertisement was removed in the office and a monthly breastfeeding support group for both prenatal and post-partum women was offered. Breastfeeding initiation rates in the office increased significantly from 36% to 55% after year 2 and the rate of breastfeeding at 2 weeks post-partum increased significantly from 50% at baseline to 67% at year 2 (Zimmerman, 1999).

Breastfeeding intention.

A secondary analysis of data found prenatal breastfeeding intention to be a positive predictor for breastfeeding among American women (DiGirolamo, Thompson, Martorell, Fein & Grummer-Strawn, 2005). Similarly, prenatal planned length of breastfeeding, maternal confidence, social learning, normative breastfeeding beliefs and behavioural breastfeeding beliefs were all significantly correlated with breastfeeding duration among a study of American women (O'Campo, Faden, Giele & Wang, 1992). In Canada, a sample of women from Moncton, New Brunswick found those who reported prenatal breastfeeding intention were significantly more likely to initiate breastfeeding (Leger-Leblanc & Rioux, 2008).

Breastfeeding knowledge.

Among women in New Zealand, those who reported not having received adequate breastfeeding education in the prenatal period were less likely to exclusively breastfeed between 6 to 10 weeks post-partum compared to women who reported satisfaction with the amount of breastfeeding education received in the prenatal period (McLeod, Pullon & Cookson, 2002).

A qualitative thematic analysis of African American women in Florida found mothers who breastfed were more aware of the benefits of breastfeeding. Mothers who did not breastfeed had uncomfortable feelings toward breastfeeding (Cottrell & Detman, 2013). A quantitative American study found women who scored higher on breastfeeding knowledge were 11.2 times more likely to initiate breastfeeding than those who scored low on breastfeeding knowledge. Women who scored high on breastfeeding knowledge were also 5.62 times more likely to breastfeed until at least 2 months post-partum compared to those with low breastfeeding knowledge scores (Kornides & Kitsantas, 2013).

Therefore, the prenatal period is of critical importance to promote breastfeeding outcomes. Studies have consistently demonstrated the link between breastfeeding self-efficacy and positive breastfeeding outcomes in both the prenatal and post-partum period. Predictors of breastfeeding self-efficacy have been identified in the immediate post-partum period. By identification of predictors of breastfeeding self-efficacy in the prenatal period, this study has aided to fill this gap in the literature through answering the following research questions:

1. What are the prenatal predictors of breastfeeding self-efficacy?
2. What are the prenatal predictors of breastfeeding self-efficacy among primiparous women?
3. What are the prenatal predictors of breastfeeding self-efficacy among multiparous women?

CHAPTER 3

METHODOLOGY

Research Design

The research design for the study was a quantitative cross-sectional web-based survey design. This methodology was chosen as web-based surveys are described as convenient, whereby participants can complete the survey at the desired time of their choosing (Daley, McDermott, McCormack Brown & Kittleson, 2003). Participants may also be more comfortable in their own home thereby allowing web-based surveys to be more conducive to thorough completion (Daley et al., 2003). According to Gordon and McNew (2008), online surveys are comparable to paper-based surveys in terms of the quality and type of data collected.

Sample and Setting

The sample consisted of 401 Canadian pregnant women. The inclusion criteria for the study included: Canadian pregnant women, with a maternal age of greater than 18 years, at least 28 weeks gestation, intending to breastfeed, expecting a singleton pregnancy, with proficiency in reading and writing in the English language. The exclusion criteria was: multiple pregnancy, high-risk pregnancy or any known serious medical condition of the fetus which may impede breastfeeding such as a known birth defect. The inclusion and exclusion criteria was developed based on previous studies exploring breastfeeding self-efficacy which collected data in the prenatal period. De Jager et al (2015), collected prenatal data at 32 weeks gestation, Thomas et al (2015) collected data between 26-32 weeks gestation, Lemons Uchoa et al (2014) collected data at >30 weeks gestation, and Blyth et al (2004) collected data at 36 weeks gestation. Due to the variation in the literature, 28 weeks gestation was chosen as it is the commencement of the third trimester when women may be considering infant feeding methods. Including women at 28 weeks gestation, as opposed to later in pregnancy is more inclusive. By asking women how far along they are, differences between women of various gestational ranges (between 28 – 42+ weeks) can be compared. In an effort to maintain homogeneity of the population, this study excluded adolescents to decrease the potential of confounding variables associated with breastfeeding during the adolescent period and limited maternal age to equal to or greater than 18 years of age. This is consistent with previous research on breastfeeding self-efficacy (Blyth et al., 2004; De Jager et al., 2015).

There is variation in the literature with respect to primiparous women versus multiparous women populations. As the theoretical framework chosen for the study is Bandura's (1977) self-efficacy theory, which includes prior related experience to be a major component of the theory, the decision was made to include multiparous women to capture this aspect of the theory. In Hinic's (2016) and Dennis' (2006), studies which identified breastfeeding self-efficacy predictors in the immediate post-partum, the authors did not limit their sample to strictly primiparous women. As we know parity has been shown to have an effect on breastfeeding outcomes, predictors of prenatal breastfeeding self-efficacy was examined separately for primiparous women and multiparous women to allow for comparison between the two groups.

The estimated sample size was calculated using the Fluid Surveys Sample Size Calculator the suggested sample size for a population of 86242, with a confidence level of 95% and a 5% margin of error is 383 participants (FluidSurveys, 2017).

As the study was web-based, the setting was online. Participants could complete the survey in the privacy of their own home. Potential participants were invited to participate via social media advertising, including Facebook, Kijiji and Craigslist. A Facebook page entitled “Prenatal Breastfeeding Confidence Study” was created, which linked potential participants direct to the survey. Paid advertisements through Facebook Ads were used which targeted Canadian women with an interest in pregnancy between the ages of 18-45. The survey was developed using FluidSurveys. Online links to the survey were posted on Canadian-based social media pages. The link brought potential participants directly to the fluid survey webpage. E-mails were sent to Canadian healthcare organizations encouraging healthcare professionals to share the link with potential eligible participants. E-mails were also sent to public health units asking permission to advertise a link to the survey on their webpages or Facebook pages. Links to the survey were made available on Canadian pregnancy forums, including BabyCentre.ca, where pregnant women openly chat about pregnancy-related concerns.

A prize incentive was advertised to increase participation. Participants had the opportunity to enter in a draw to win one of two $50 CAD Shoppers Drug Mart gift card. The gift cards were mailed to the two winners using Canada Post Standard Letter Mail with tracking. Expenses related to prize incentives and postage costs were covered by the University of Windsor – Faculty of Nursing Thesis Research Award.

Measurement Instruments

Participant information form.

The participant information form was developed by the author based on the information collected in the literature review. Demographic, socioeconomic and obstetrical data was collected. The items measured were reflective of previous research on breastfeeding self-efficacy and included questions regarding: maternal age and obstetric history, including number of children, previous breastfeeding experience (Hinic, 2016) and planned mode of delivery. Planned mode of delivery was included due to the finding that vaginal delivery was found to be a predictive variable of breastfeeding self-efficacy (Dennis, 2006). Additional variables included were: education, income, ethnicity, marital status, attendance of prenatal education classes, breastfeeding intentions, including planned length of breastfeeding and planned exclusivity of breastfeeding (Hinic, 2016), smoking status, feeling prepared for labour and birth (Hinic, 2016), and support for breastfeeding, including both partner (Hinic, 2016) and professional support (Dennis et al., 2011). The demographic questions also included questions related to planned length of maternity leave and return to work questions. The impact of the type of care provider on breastfeeding self-efficacy has not previously been explored. This warrants exploration as it has been shown to be a variable associated with breastfeeding outcomes (Costanian et al., 2016). Refer to Appendix A for the sample participant information form.

Breastfeeding self-efficacy scale - short form.

The original Breastfeeding Self-Efficacy Scale (BSES), was developed by Dennis & Faux (1999) as a 33-item self-report scale to measure breastfeeding self-efficacy in a sample of 130 Canadian postnatal women breastfeeding in-hospital. The measurement was designed using Bandura's (1977) self-efficacy theory as a theoretical construct. All items are designed to be presented in a positive way as recommended by Bandura (1977). The scale is a 5-point Likert scale, where 1 = "not at all confident"; and 5 = "always confident". Each item begins with the phrase "I can always". The scores range from 33 to 165, with higher scores indicating a higher level of breastfeeding self-efficacy. The instrument was deemed reliable for internal consistency, scoring a Cronbach's alpha coefficient of 0.96, whereby the coefficient alpha did not increase by more than 0.10 if any items were deleted (Dennis & Faux, 1999). The scale was also determined to have construct validity through factor analysis as well as through comparisons with constructs theoretically related to self-efficacy theory. Bandura's performance appraisal suggests that women with prior breastfeeding experience will have higher levels of breastfeeding self-efficacy. Dennis and Faux (1999) found that multiparous women with previous breastfeeding experience had significantly higher BSES scores than primiparous women with no prior experience (p=<0.001), thereby demonstrating construct validity. Predictive validity was also shown whereby women with higher BSES scores were more likely to be exclusively breastfeeding at 6 weeks post-partum compared to women with low BSES scores (Dennis & Faux, 1999).

According to Dennis (2003), internal consistency measures identified the need to reduce the number of items on the BSES. A 14-item short form was developed, known as the Breastfeeding Self-Efficacy Scale - Short Form (BSES-SF). Dennis' (2003) shortened version of the scale was deemed to show reliability, construct validity, and predictive validity using the same methods as Dennis and Laux (1999) among a population of 491 breastfeeding mothers. It was hypothesized that the BSES-SF would be positively correlated with self-esteem, as measured by the Rosenburg Self-Esteem Scale; and negatively correlated with post-partum depression symptoms and stress levels, as measured by the Edinburg Postnatal Depression Scale and the Perceived Stress Scale respectively. This hypothesis held true (Dennis, 2003).

The BSES and the BSES-SF have since been translated and validated in other populations and languages including: Australia (Cronbach alpha 0.96) (Creedy, Dennis, Blyth, Moyle, Pratt & De Vries, 2003); Puerto Rico (Cronbach alpha 0.96) (Molina Torres et al., 2003); Brazil (Cronbach alpha 0.71) (Zubaran, Foresti, Schumacher, Rossi Thorell, Amoretti, Muller & Dennis, 2010); Spain (Cronbach alpha 0.92) (Oliver-Roig et al., 2012); Italy (Cronbach alpha 0.92) (Petrozzi & Gagliardi, 2016); Poland (Cronbach alpha 0.89) (Wutke & Dennis, 2007); Croatia (Cronbach alpha 0.86) (Pavicic Bosnjak et al., 2012); Turkey (Cronbach alpha 0.87 and 0.92 respectively) (Alus Tokat et al., 2010; Eksioglu & Ceber, 2011); China, including Cantonese (Cronbach alpha 0.95) (Ip et al., 2012) and Mandarin (Cronbach alpha 0.93) (Dai & Dennis, 2003).

The BSES-SF has also been validated in specific ethnic groups within a population, such as black American women, with a Cronbach's alpha of 0.94 and predominantly Southeast Asian women in the United Kingdom, with a Cronbach's alpha of 0.90 (McCarter-Spaulding & Dennis, 2010; Gregory et al., 2008). In addition, the BSES-SF has been validated among mothers of preterm and ill infants with a Cronbach's alpha of 0.88 (Wheeler & Dennis, 2013). Furthermore, the BSES-SF has been validated among Canadian Aboriginal women with a Cronbach's alpha of 0.95 (McQueen et al., 2013).

Support for use of the BSES and the BSES-SF in the prenatal period has also been demonstrated in the literature (Dennis et al., 2011; Creedy et al., 2003; Alus Tokat et al., 2010; Oria et al., 2009). When used prenatally, the scale was modified to fit the prenatal period, by replacing each question from “I can” to “I think I can”.

Creedy et al (2003) measured BSES scores prenatally among an Australian sample pregnant women greater than 36 weeks gestation. Prenatal BSES scores were found to be predictive of breastfeeding at 1 week postpartum (p=<0.001) as well as 4 months postpartum (p=<0.001) (Creedy et al., 2003).

Alus Tokat et al (2010) measured BSES-SF prenatally in third trimester among sample of Turkish women. Prenatal BSES-SF scores were found to be predictive of breastfeeding duration and exclusivity to 12 weeks postpartum (p=0.04) with Cronbach’s alpha coefficient for internal consistency found to be 0.87 (Alus Tokat et al., 2010).

Dennis et al (2011) utilized the BSES prenatally at greater than 34 weeks gestation among a group of pregnant Canadian adolescents. For this population, the Cronbach’s alpha coefficient was found to be 0.84 for the prenatal period. Prenatal BSES scores were found to be predictive of breastfeeding initiation (p=<0.001) which was defined as any breastfeeding one or more times daily for a minimum of 3 days postpartum. It was also predictive of breastfeeding duration (p=<0.001) and exclusivity (p=<0.001) to 4 weeks postpartum (Dennis et al., 2011).

Oria et al (2009) translated and psychometrically assessed the BSES into Portuguese and measured self-efficacy scores among pregnant Brazilian woman greater than 30 weeks gestation. The Cronbach’s alpha was found to be 0.88 (Oria et al., 2009).

Therefore, the BSES-SF, modified to reflect the prenatal period, was included in the study as it has been deemed to be a valid and reliable measure of breastfeeding self-efficacy as well as a predictive tool of breastfeeding outcomes when used both in the prenatal and postpartum period. Permission to utilize the tool was received directly from the tool's author, Dr. Cindy Lee Dennis.

Perceived stress scale-10.

As the purpose of this study is to identify prenatal predictors of breastfeeding self-efficacy, it modelled both Hinic’s (2016) and Dennis’ (2006) studies which examined breastfeeding predictors in the immediate postpartum period. Both of the above studies utilized the Perceived Stress Scale-10 (PSS-10), which is a 10-item self-report measure of perceived stress utilizing a five point Likert scale (ranges of 0 - 4). Therefore the PSS-10 was utilized for the study to measure perceived stress levels. Higher scores are associated with a higher level of perceived stress (Cohen, Kamarck & Mermelstein, 1983). The Cronbach’s alpha was found to be 0.90 by Dennis (2006) and 0.88 by Hinic (2016). The PSS-10 is not copyrighted and is available for public use. Refer to Appendix B for a copy of the PSS-10 tool.

State-trait anxiety inventory.

Maternal anxiety was found to be a predictor of breastfeeding self-efficacy in the immediate postpartum period (Dennis, 2006). Previous research has measured anxiety using the state-anxiety subscale of the State-Trait Anxiety Inventory (Spielberger, 1970 as cited in Dennis, 2006). The state-anxiety subscale is a 20-item self-report survey on a 4-point Likert scale. Scores can range from 0 to 60, where high scores are reflective of high anxiety levels. This scale was used by Dennis (2006) and was found to have a Cronbach’s alpha of 0.87. The state-subscale measures one's acute level of anxiety, whereby the trait-subscale of the tool measures how prone one is to anxiety. For the purpose of this research, the trait-anxiety subscale was chosen to measure anxiety in the prenatal period, as the pregnant woman may not have the same acute level of anxiety as the post-partum woman. Due to the copyrighted nature of the State-Trait anxiety inventory, a copy has not been included in the appendices. Permission to utilize the scale was received through www.MindGarden.com, where the survey is hosted and is associated with a fee per usage. The cost associated with the use of the scale was partially paid for by the University of Windsor – Faculty of Nursing Thesis Research Award with the difference paid for out of pocket from the author.

Breastfeeding knowledge.

Breastfeeding knowledge has been shown in the literature to improve breastfeeding outcomes (Kornides & Kitsantas, 2013; Cottrell & Detman, 2013). Higher levels of breastfeeding knowledge has also been associated with higher rates of intention to breastfeed exclusively (Stuebe & Bonuck, 2011). Measurement of maternal breastfeeding knowledge was assessed using the same method as both Kornides and Kitsantas (2013) and Stuebe and Bonuck (2011). Participants were asked to which extent they agree or disagree on a series of 6 statements regarding breastfeeding benefits. Items were scored on a 3-point Likert scale, whereby an "agree" response yielded two points, a "neither" response yielded one point, and a "disagree" response yielded zero points. According to this calculation of score, participants could receive between zero to twelve points, whereby a higher score indicates a higher level of breastfeeding knowledge. Refer to Appendix C for the breastfeeding knowledge scale, termed the breastfeeding benefits questionnaire.

Definition of Variables

Conceptual definition.

The conceptual definition of self-efficacy reflects Bandura's (1995) definition of self-efficacy as "the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations" (Bandura, 1995, p. 2). Furthermore, the conceptual definition of breastfeeding self-efficacy specifically, is adapted based on Dennis' (2010) definition which describes breastfeeding self-efficacy as a "mother's confidence in her ability to breastfeed her infant". It is influenced by four key information sources: (1) performance accomplishments (i.e. previous breastfeeding experience); (2) vicarious experiences (i.e. exposure to breastfeeding women); (3) verbal persuasion (i.e. reinforcement from family, friends, healthcare providers); and (4) physiological responses (i.e., stress, anxiety, fatigue, pain) (Dennis, 2010).

Operational definition.

For the purpose of this research, the operational definition of breastfeeding self-efficacy comprised of the summed total score of the prenatal BSES-SF scale.

Data Collection Procedures

Prior to commencement of the study, research ethical clearance was granted from the University of Windsor's Research Ethics Board.

The method of data collection was an online survey through the FluidSurveys website. The data collection period took place for approximately six weeks between April to May 2017. The survey remained open online until the sample size quota of 400 participants was met.

A page outlining various online resources was included after the survey had been submitted. This page provided participants with websites containing Canadian health information related to breastfeeding. Refer to Appendix D for a copy of the post-study information page.

Data Analysis

All data was analyzed using the statistical software program SPSS version 23. Descriptive statistics for demographic data, each of the independent variables and the dependent variable were each computed. Variables were computed for their means, standard deviations, frequencies and percentages.

Statistical analysis were performed utilizing the same tests outlined by Hinic (2016) and Dennis (2006). For the entire sample as a whole, independent samples t-tests were conducted to identify mean differences between two groups and analysis of variance (ANOVA) tests were conducted for categories with more than two groups. The post-hoc analysis test Bonferroni was performed for independent variables with significant ANOVA tests. Pearson's Product moment correlations were performed to identify potentially significant variables influencing prenatal breastfeeding self-efficacy. Spearman's rho correlations were used to analyze ranked data. Finally, stepwise multiple linear regression analysis was conducted utilizing the significant variables identified by the appropriate statistical tests to identify which variables were predictors of prenatal breastfeeding self-efficacy. The level of significance was set at a *p* value of 0.05 and was based on two-tailed tests.

After completion of data analysis of the entire sample as a whole, the data analysis was repeated utilizing the same methods as described above with a split sample, comparing primiparous women to multiparous women. Independent variables that were deemed to be significantly related to prenatal breastfeeding self-efficacy among the primiparous women were inputted into a stepwise multiple linear regression model to identify significant predictors of breastfeeding self-efficacy among primiparous women. Likewise, variables that were found to be significantly related to prenatal breastfeeding self-efficacy among the multiparous women were entered into a stepwise multiple linear regression model to reveal significant predictors of prenatal breastfeeding self-efficacy among the multiparous women.

CHAPTER 4

RESULTS

The focus of this chapter is to describe the sample, screening techniques, the statistical methods used to analyze the data and the subsequent findings. First, the results of the entire sample as a whole are presented. This is followed by analysis of the sample divided into two distinct groups, primiparous women and multiparous women. All data analysis techniques were performed using IBM Statistical Package for the Social Sciences software (SPSS) version 23.

A total of 1197 potential participants accessed the survey, 659 potential participants were deemed ineligible as they did not meet the inclusion criteria requirements and 137 potential participants did not complete the survey and were excluded. This yielded a sample size of 401 participants whom met the eligibility requirements and completed the survey.

Description of Sample

The vast majority of the sample described themselves as Caucasian (87.5%). The next highest ethnic group in the sample was Aboriginal (4.2%). The mean age of the sample was 30 years old with an age range of 18 – 41 years and a standard deviation of 4.58. The sample was highly educated, with 82.8% of participants having completed post-secondary education. The majority of the sample (41.4%) reported an estimated gross household income of above $100,000 annually. The majority of participants were in a relationship, whereby 63.6% of participants were married and 27.7% were common law.

The largest number of cases in the sample were from the province of Ontario (45.9%). A total of 13.7% of participants were from Alberta and similarly, 13.7% were from British Columbia. Due to the small number of cases in each category, provinces and territories were grouped together by geographical location. See below for descriptive frequency chart:

Table 2: Frequency chart of geographical location among entire sample		
Province	Frequency	Percentage
Ontario	184	45.9%
Eastern (QC, PEI, NB, NS, NFLD)	56	14%
Western (AB, BC, MB, SK)	157	39.2%
Northern (NU, NWT, YK)	3	0.7%
Missing	1	0.2%

The planned length of maternity leave revealed 84% of participants intended to stay home for six months or longer. The majority of the sample (59.6%) planned to return to work full-time, while 34.7% planned to return to work either part-time or casually and 5.5% did not plan to return to work.

The sample was equally divided between primiparous women (50.4%) and multiparous women (49.6%). Previous breastfeeding experience was reported with 48.9% of women and of these women, 64.2% exclusively breastfed for the recommended duration of six months or greater. Most of the participants (85.5%) planned to exclusively breastfeed and of these women, 72.4% planned to exclusively breastfeed for six or more months. The majority of women were planning a vaginal delivery (87.3%) and were planning a delivery with either a family physician or an obstetrician-gynecologist

(OBGYN) (70.1%). Only 36.3% of participants reported attending prenatal classes with the current pregnancy. The majority (95%) of participants sampled were non-smokers.

Missing Data Screening

The data was screened for missing data including the pattern of missing data, the presence of univariate outliers and for normality

Of the demographic and health history variables, no variables had greater than 5% missingness. The number of weeks pregnant variable and the marital status variable each had the highest percentage of missing data, both at 1%. Little's Missing Completely at Random (MCAR) test was deemed to be not significant (p = 0.791), indicating there was no pattern to the missing data and the data was missing completely at random (MCAR). According to Tabacknik and Fidell (2007), if the percentage of missing data is less than 5% and in a random pattern, the missing data is not significant, thereby any method of handling the missing data is appropriate. Due to the small percentage of missing data and the pattern of missingness, the missing data was left as is for the demographic and health history variables.

Missing data was also analyzed for each of the scales used, including the Perceived Stress Scale 10 (PSS-10), the State-Trait Anxiety Scale –Trait Anxiety subset (STAI-Y2), the breastfeeding knowledge questionnaire and the prenatal Breastfeeding Self-Efficacy Scale-Short Form (BSES-SF).

On the PSS-10, one item had one missing response (0.2% missing) and another item had two missing responses (0.5% missing), with an insignificant Little's MCAR test (p = 0.235), indicating the data was missing completely at random. On the STAI-Y2, six items each had 1 missing response (0.2% missing) and one item had two missing responses (0.5% missing) with an insignificant Little's MCAR test of $p = 0.306$. Two items on the breastfeeding knowledge questionnaire each had one missing response (0.2% missing), with an insignificant Little's MCAR test ($p = 0.385$). For the BSES-SF scale items, six questions each had one missing response (0.2% missing), with a Little's MCAR *p* value of 0.703, indicating all responses were missing completely at random. For each of the scales, the expectation maximization technique was used to input missing data in order to preserve sample size. The expectation maximization technique is an appropriate technique for handling missing data in a random pattern (Tabachnick & Fidell, 2007).

Univariate Outliers

Data was assessed for the presence of univariate outliers for all continuous variables by converting scores into standardized values (z-scores). Values that are either above or below +/- 3.29 are considered to be univariate outliers with a p of <0.001 for two-tailed tests (Tabacknik & Fidell, 2007). Breastfeeding knowledge scores, PSS-10, age, income, the number of weeks pregnant and the number of past pregnancies did not have any outliers. The BSES-SF and the STAI-Y2 each had one case that fell outside of +/- 3.29. For each of the two outliers, the value was replaced using the Winsorized method, whereby the value was replaced with the closest value that was not considered a univariate outlier (Kovach & Weiming, 2016). The number of living children revealed seven cases that were considered outliers, whereby the women reported four or more living children. Due to the potential clinical relevance of this question, the data for this variable was left as is.

Normality

The dependent variable, BSES-SF, was assessed for normality by examining the skewness, kurtosis and the histogram. In order to determine if the data was either significantly skewed or kurtosed, the test statistic was divided by its standard error:

Skewness: - 0.158 / 0.122 = - 1.295

Kurtosis: - 0.001 / .0243 = - 0.004

Neither value falls outside of +/- 1.96, therefore no significant skewness or kurtosis was found.

The distribution appeared to be normally distributed through visual assessment of the histogram and the Q-Q plot. While there appeared to be an outlier case on the lower side of the Q-Q plot as well as the histogram, the converted Z score did not reveal the score to be an outlier and it therefore remained in the analysis. Table 1 reveals the frequency statistics for prenatal breastfeeding self-efficacy scores.

Table 1: Frequency statistics for prenatal breastfeeding self-efficacy scores among entire sample

N	401
Mean	49.52
Median	50.00
Standard deviation	10.11
Range	52.00
Minimum	18.00
Maximum	70.00

Statistical Analysis for Potential Predictors

The dependent variable of all statistical tests performed was the summed total of the prenatal breastfeeding self-efficacy scores, as measured by the prenatal Breastfeeding Self-Efficacy Scale – Short Form (BSES-SF). Independent samples t-tests were performed on nominal independent variables with two groups. Results are reported in Table 3. For each of these variables, the Levene's test of equal variances was not found to be significant and therefore the assumption of equal variances was met. One-way analysis of variance (ANOVA) tests were performed on each of the independent nominal variables with more than two groups, see Table 4 for results. Post-hoc Bonferroni tests were completed for variables with significant findings, refer to Table 5 for results. Ordinal data was analyzed utilizing Spearman's Rho correlations (Table 6) and continuous data was analyzed using Pearson Moment correlations (Table 7). Variables deemed significant (*p* value of <0.05) were then entered into a multiple linear regression equation. This process was repeated twice. First, with the entire sample. Second, with the data split into two groups comparing primiparous and multiparous women and analyzed utilizing the same techniques as described above. Due to missing data in some of the demographic variables the sample size (N) varies with each independent variable. Therefore, the corresponding sample size is provided for each independent variable.

Statistical Analysis for Entire Sample (primiparous and multiparous women combined).

Table 3: Independent samples t-test for nominal variables with two categories among entire sample. Dependent variable: BSES-SF score

Variable	N	Mean	σ	95% CI	t	*p*
Education						
High school or less	68	52.14	9.39			
Post-secondary or more	332	49.99	10.20			
Total	400			- 5.785 - -0.514	- 2.350*	0.019

Ethnicity						
Caucasian	351	49.45	9.93			
Other	50	50.02	11.40			
Total	401			- 3.573 - 2.445	- 0.369	0.713
Marital Status						
Married/Common Law	366	49.20	10.15			
Single/Divorced	31	53.87	8.42			
Total	397			- 8.359 - -0.978	- 2.487*	0.013
Healthcare Provider						
Physician/OBGYN	281	45.55	10.25			
Midwife	120	51.80	9.43			
Total	401			- 5.392 - -1.096	- 2.970**	0.003
Prenatal Class Attendance						
Yes	145	47.04	9.63			
No	254	50.94	10.16			
Total	399			- 5.942 - -1.859	-3.756**	<0.001
Prior Breastfeeding Experience						
Yes	196	53.89	9.58			
No	204	45.34	8.79			
Total	400			6.747 - 10.361	9.308**	<0.001
Smoking						
Yes	20	52.00	9.34			
No	381	49.39	10.14			
Total	401			-1.957 - - 7.164	1.122	0.262
Return to work status						
Not returning to work	22	54.81	13.33			
Returning to work	378	49.24	9.83			
Total	400			1.243 - 9.911	2.530*	0.012
Plan to EBF						
No/Unsure	58	43.31	9.37			
Yes	343	50.57	9.86			
Total	401			-10.002 - 4.531	-5.223**	<0.001
Length of Plan to EBF						
< 6 months/unsure	108	44.41	9.36			
> 6+ months	284	51.65	9.55			
Total	392			-9.346 - - 5.122	-6.734**	<0.001

σ = standard deviation 95% CI = 95% confidence interval

* significant at the 0.05 level (2-tailed)

** significant at the 0.01 level (2-tailed)

Table 4: One-Way ANOVA for nominal variables with more than two categories among entire sample. Dependent variable: BSES-SF score

Variable	N	Mean	σ	$\sigma_{\bar{x}}$	95% CI	F	*p*
Province							

Ontario	184	49.26	9.87	0.727	47.830 - 50.702		
Eastern	56	50.07	10.17	1.360	47.345 - 52.797		
Western	157	49.61	10.46	0.835	47.962 - 51.261		
Northern	3	48.33	10.69	6.173	21.773 - 74.895		
Total	400	49.50	10.12	0.506	48.512 - 50.502	0.111	0.954
Planned Length of Maternity Leave							
Unsure	27	50.81	8.33	1.60	47.517 - 54.111		
< 6 months	37	45.08	12.00	1.97	41.079 - 49.083		
> 6+ months	337	49.91	9.92	0.54	48.847 - 50.974		
Total	401	49.52	10.11	0.50	48.533 - 50.519	4.097*	0.017
Planned Mode of Delivery							
Vaginal	350	49.28	10.07	0.53	48.220 - 50.339		
Caesarean	22	51.13	11.11	2.36	46.208 - 56.064		
VBAC	18	53.55	6.74	1.58	50.203 - 56.907		
Total	390	49.58	10.03	0.50	48.583 - 50.580	1.842	0.160

σ = standard deviation $\sigma_{\bar{x}}$ = standard error 95% CI = 95% confidence interval

* significant at the 0.05 level (2-tailed)

Table 5: Post-hoc analysis (Bonferroni) for variables with significant ANOVA among entire sample. Dependent variable: BSES-SF score

Variable		Mean Difference	$\sigma_{\bar{x}}$	*p*
Planned length of maternity leave				
Unsure	< 6 months	5.73	2.54	0.074
	> 6 months	0.90	2.00	1.00
< 6 months	Unsure	-5.73	2.54	0.074
	> 6 months	-4.82*	1.73	0.017
> 6 months	Unsure	-0.90	2.00	1.00
	< 6 months	4.82*	1.73	0.017

$\sigma_{\bar{x}}$ = standard error

* significant at the 0.05 level (2-tailed)

Table 6: Spearman's Rho correlation for ordinal variables among entire sample. Dependent variable: BSES-SF score

Variable	N	Spearman's Rho	*p*
Number of weeks pregnant	401	-0.022	0.655
Length of prior EBF experience	193[1]	0.435**	<0.001
Length of plan to EBF dichotomous	392[2]	0.330**	<0.001
Income	376[3]	-0.128*	0.013
Intimate partner support	400	0.035	0.483
Friends support	400	0.123*	0.014
Mother support	399	0.081	0.105

Other family support	400	0.108*	0.031
Healthcare provider support	400	0.100*	0.046
Feeling prepared for labour and birth	401	0.446**	<0.001

EBF = exclusively breastfeed
[1]Only women with prior breastfeeding experience included
[2]Those not planning to EBF labelled as missing
[3]Prefer not to disclose labelled as missing
* significant at the 0.05 level (2-tailed)
** significant at the 0.01 level (2-tailed)

Table 7: Pearson correlation for continuous variables among entire sample. Dependent variable: BSES-SF score

Variable	N	Pearson correlation	*p*
Age	401	0.028	0.574
Number of previous pregnancies	401	0.306**	<0.001
Number of living children	400	0.398**	<0.001
Breastfeeding knowledge score	401	0.276**	<0.001
Perceived stress score	401	-0.208**	<0.001
Trait anxiety score	401	-0.274**	<0.001

** significant at the 0.01 level (2-tailed)

Multiple Regression Analysis for Entire Sample (primiparous and multiparous women combined).

The following independent variables were found to have a significant association with prenatal BSES-SF scores at an alpha of 0.5 or less (p = 0.05) among the entire mixed sample of primiparous and multiparous women and were entered into the multiple regression analysis for the entire sample:

- Education (high school or less vs. post-secondary or higher)
- Marital status (single/divorced vs. married/common law)
- Healthcare provider (physician/OBGYN vs. midwife)
- Prenatal class attendance in current pregnancy (yes vs no)

- Planned length of maternity leave (unsure vs less than six months vs six months or greater)
- Return to work status (not returning vs returning to work)
- Plan to exclusively breastfeed (yes vs no/unsure)
- Length of plan to exclusively breastfeed (< 6 months vs > 6 months)
- Income (<$100,000 vs >$100,000)
- Support from friends to breastfeed
- Support from other family members to breastfeed
- Support from healthcare provider to breastfeed
- Feeling prepared for labour and birth
- Number of previous pregnancies
- Number of living children
- Breastfeeding knowledge score
- Perceived stress score
- Trait anxiety score

Independent variables that were not applicable primiparous women (previous breastfeeding experience and length of previous breastfeeding experience) were solely considered for inclusion in the multiple regression analysis among multiparous women and were not entered in into the multiple linear regression model for the entire mixed sample of both primiparous and multiparous women.

All dichotomous variables were coded as 0, 1 and entered into the multiple linear regression model. Continuous variables were entered into the model as is. For the planned length of maternity leave variable, dummy codes were created, and therefore two variables were entered into the model for this variable. The method of entry of variables into the multiple linear regression model chosen was the stepwise approach. This approach was chosen as it yields the best prediction equation (Tabachnick & Fidell, 2007). A total of 18 independent variables were entered into the model, which reflects the total number of independent variables, including all dummy codes.

The ratio of cases to the number of independent variables must also be considered. According to Tabachnick and Fidell (2007), the general rule of thumb is N must be greater than or equal to 50+8*m* where *m* is equal to the number of independent variables. In this case:

$$50 + 8\ \mathit{(18)} = 194$$

Therefore a sample size of at least 194 is deemed required. The total sample size (N) of the regression model was 366 participants, meeting the ratio of cases to the number of independent variables requirement. Participants with missing data on at least one of the significant independent variables included in the regression equation were eliminated.

The multiple linear regression model revealed the following eight variables explained 41.2% of the variance in prenatal BSES-SF scores (adjusted r^2= 0.412) among the entire sample of both primiparous and multiparous women, see Table 8:

- Feeling prepared for labour and birth
- Number of living children
- Breastfeeding knowledge score
- Trait anxiety score

- Length of plan to exclusively breastfeed (< 6 months vs 6 months or greater)
- Income (<$100,000 vs >$100,000)
- Plan to exclusively breastfeed (yes vs no/unsure)
- Healthcare provider (physician/OBGYN vs. midwife)

Table 8: Multivariate linear regression model among entire sample

Variable	$\sigma_{\bar{x}}$	t	β	B	95% CI	*p*
Number of living children	0.488	7.252	0.315	3.541	2.581 - 4.502	<0.001
Feeling prepared for labour and birth	0.517	4.106	0.190	2.121	1.105 - 3.137	<0.001
Breastfeeding knowledge	0.147	3.337	0.143	0.490	0.201 - 0.779	0.001
Trait anxiety	0.045	-5.156	-0.224	-0.231	-0.319 - -0.143	<0.001
Length of plan to EBF	0.969	3.264	0.144	3.162	1.256 - 5.067	0.001
Income	0.814	-3.482	-0.143	-2.833	-4.433 - -1.233	0.001
Plan to EBF	1.293	-2.438	-0.106	-3.151	-0.608 - -0.250	0.015
Healthcare provider	0.896	2.016	0.086	1.806	3.567 - 0.166	0.045

EBF = exclusively breastfeed

$\sigma_{\bar{x}}$ = standard error β = standardized Beta B= unstandardized B

95% CI = 95% confidence interval

According to Tabachnick and Fidell (2007), visual examination of residual scatterplots are used to test the assumptions of homoscedasticity, normality and linearity. If the assumptions are met, the distribution of residuals will be concentrated around along the center in a rectangular shape (Tabachnick & Fidell, 2007). Visual analysis of the scatter plot demonstrated homoscedasticity was met, whereby a symmetrical distribution was apparent between the standardized residuals (y) and the standardized predicted values (x).

Tests for multivariate outliers among entire sample.

Mahalanobis distance was calculated to examine the presence of multivariate outliers and Cook's distance was calculated to determine the presence of influential multivariate outliers. Mahalanobis distance must be compared to the critical chi square value at the desired alpha, whereby the degrees of freedom is equal to the number of independent variables. If a value is greater than the critical value, it is considered a multivariate outlier (Tabacknik & Fidell, 2007). An influential multivariate outlier is present when the Cook's distance score is greater than 1.00 (Tabachnick & Fidell, 2007). According to the chi square critical value distribution table, with eight independent variables and an alpha of 0.001, the critical chi square value is a Mahalanobis distance of 26.125 (Tabachnick & Fidell, 2007). One Mahalanobis distance value was found to be 27.986, which exceeded the critical value, suggesting it is a multivariate outlier. The Cook's distance value for that case was 0.0089, indicating it was not an influential multivariate outlier and it remained in the analysis. All other Mahalanobis distance values were less than the critical value. There were no Cook's distance values greater than 1.00 in the analysis, indicating an absence of influential multivariate outliers among the sample of both primiparous and multiparous women.

Tests for multicollinearity of entire sample.

According to Field, Miles and Field (2012), multicollinearity of variables may be present if either the tolerance is less than 0.10 or the variance inflation factor (VIF) is greater than 10. No variables in the model had significant multicollinearity, as all tolerance values were greater than 0.10 and all VIF values were less than 10. Therefore, there was no evidence of multicollinearity for any variables within the regression model of the entire sample.

Statistical Analysis for Independent Variables Comparing Primiparous and Multiparous Women

All statistical analyses were repeated utilizing a split file on SPSS, whereby primiparous women were compared to multiparous women, using the same techniques as described above. Table 9 below shows the results for the independent samples t-tests for nominal independent variables with two categories. One-way ANOVA tests were performed for ordinal independent variables, refer to Table 10. No post-hoc analysis tests were necessary, as there were no significant findings at a *p* value of less than 0.05. Spearman's rho correlations (Table 11) were performed for ranked data and Pearson's moment correlations (Table 12) were performed for continuous data. All independent variables with significant findings ($p = <0.05$) were analyzed separately among primiparous and multiparous women. Significant variables were inputted into a stepwise multiple linear regression model to find the best fit of predictors of breastfeeding self-efficacy among both primiparous and multiparous women. The dependent variable in all statistical analyses run was the summed total of prenatal BSES-SF scores.

Table 9: Independent samples t-test for nominal variables with two categories comparing primiparous and multiparous women. Dependent variable: BSES-SF score

Variable		N	Mean	σ	95% CI	t	*p*
Education	**Primiparous**						
	High school or less	33	49.93	8.58			
	Post-Secondary or more	168	44.45	8.42			
	Total	201			-8.700 - -2.273	-3.367**	0.001
	Multiparous						
	High school or less	35	54.22	9.89			
	Post-Secondary or more	164	53.65	9.63			
	Total	199			-4.129 - 2.977	-0.320	0.750
Ethnicity	**Primiparous**						
	Caucasian	174	45.18	8.44			
	Other	28	46.46	10.5			
	Total	202		9	-4.800 - 2.239	-0.717	0.509

	Multiparous Caucasian Other Total	 177 22 199	 53.65 54.54	 9.50 10.9 7	 -5.203 - 3.423	 -0.407	 0.253
Marital status	**Primiparous** Married/Common Law Single/Divorced Total	 183 17 200	 44.80 52.05	 8.60 7.65	 -11.516 - 2.983	 -3.351**	 0.001
	Multiparous Married/Common Law Single/Divorced Total	 183 14 197	 53.59 56.07	 9.69 9.06	 -7.755 - 2.803	 -0.925	 0.356
Healthcare provider	**Primiparous** Physician/OBGYN Midwife Total	 143 59 202	 44.82 46.66	 9.17 7.55	 -4.502 - 0.830	 -1.358	 0.058
	Multiparous Physician/OBGYN Midwife Total	 138 61 199	 52.42 56.77	 9.90 8.38	 -7.221 - -1.650	 -2.988	 0.335
Prenatal class attendence	**Primiparous** Yes No Total	 119 82 201	 45.21 45.57	 8.77 8.83	 -2.853 - 2.127	 -0.288	 0.866
	Multiparous Yes No Total	 26 172 198	 55.46 53.51	 9.03 9.77	 -2.067 - 5.967	 0.957	 0.648
Prior BF experience	**Primiparous** Yes No	 0 201	 -	 -	 -	 -	 -
	Multiparous Yes No Total	 196 3 199	 53.89 44.33	 9.58 12.0 5	 -1.459 - 20.588	 1.711	 0.089
Smoking	**Primiparous** Yes No Total	 7 195 202	 50.28 45.18	 5.15 8.81	 -1.519 - 11.722	 1.519	 0.130
	Multiparous Yes No Total	 13 186 199	 52.92 53.81	 11.0 6 9.58	 -6.364 - 4.586	 -0.320	 0.749
Return to work status	**Primiparous** Not returning to work Returning to work	 4 197	 44.75 45.39	 10.5 6			

	Total	201		8.76	-9.404 - 8.113	-0.145	0.824
	Multiparous						
	Not returning to work	18	57.05	13.0			
	Returning to work	181	53.42	7			
	Total	199		9.23	-1.060 - 8.113	1.526	0.129
Plan to EBF	**Primiparous**						
	Yes	173	46.19	8.57			
	No/unsure	29	40.41	8.34			
	Total	202			2.398 - 9.155	3.372**	0.001
	Multiparous						
	Yes	170	55.04	9.08			
	No/unsure	29	46.20	9.58			
	Total	199			5.205 - 12.463	4.801**	<0.001
Length of plan to EBF	**Primiparous**						
	< 6 months / unsure	69	42.59	8.41			
	>6 months	130	47.06	8.40			
	Total	199			-6.944 - -2.005	-3.574**	<0.001
	Multiparous						
	< 6 months /unsure	39	47.64	10.1			
	>6 months	154	55.51	8			
	Total	193		8.73	-11.076 - 4.680	-4.859**	<0.001

BF= breastfeeding EBF=exclusively breastfeeding

σ = standard deviation 95% CI = 95% confidence interval

* significant at the 0.05 level (2-tailed)

** significant at the 0.01 level (2-tailed)

Table 10: One-way ANOVA for nominal variables with more than two categories comparing primiparous and multiparous women. Dependent variable: BSES-SF score

Variable		N	Mean	σ	$\sigma_{\bar{x}}$	95% CI	F	*p*
Province	**Primiparous**							
	Ontario	92	45.42	9.10	0.94	43.539 - 47.308		
	Eastern	29	44.10	8.30	1.54	40.943 - 47.263		
	Western	79	45.75	8.56	0.96	43.841 - 47.678		
	Northern	2	45.00	12.72	9.00	-69.355 - 159.355		
	Total	202	45.36	8.75	0.61	44.146 - 46.576	0.254	0.859
	Multiparous							
	Ontario	92	53.10	9.12	0.95	51.218 - 54.999		
	Eastern	27	56.48	7.90	1.52	53.356 - 59.606		
	Western	78	53.51	10.80	1.22	51.075 - 55.950		
	Northern	1	55.00	-	-	-		
	Total	198	53.73	9.67	9.67	52.381 - 55.093	0.871	0.457
Planned length of	**Primiparous**							
	Unsure	14	45.92	4.48	1.19	43.341-48.515		

maternity leave	< 6 months	21	42.52	11.96	2.61	37.077-47.970		
	> 6 months or more	167	45.67	8.53	0.66	44.366-46.975		
	Total	202	45.36	8.75	0.61	44.146-46.576	1.239	0.292
	Multiparous							
	Unsure	13	56.07	8.42	2.33	50.988 - 61.165		
	< 6 months	16	48.43	11.56	2.89	42.275 - 54.599		
	> 6+ months	170	54.07	9.44	0.72	52.647 - 55.505		
	Total	199	53.75	9.65	0.68	52.403 - 55.103	2.953	0.054
Planned mode of delivery	**Primiparous**							
	Vaginal	191	45.15	8.25	0.59	43.974 - 46.329		
	Caesarean	3	47.33	19.21	11.09	-0.406 - 95.073		
	Total	194	45.18	8.42	0.60	43.992 - 46.378	0.197	0.657
	Multiparous							
	Vaginal	159	54.23	9.84	0.78	52.696 - 55.781		
	Caesarean	19	51.73	10.01	2.29	46.909 - 56.564		
	VBAC	18	53.55	6.74	1.58	50.203 - 56.907		
	Total	196	53.93	9.60	0.68	52.579 - 55.287	0.588	0.556

σ = standard deviation $\sigma_{\bar{x}}$ = standard error 95% CI = 95% confidence interval

Table 11: Spearman's Rho correlation for ordinal variables comparing primiparous and multiparous women. Dependent variable: BSES-SF score

Variable		N	Spearman's Rho	*p*
Number of weeks pregnant	Primiparous	202	-0.099	0.162
	Multiparous	196	0.014	0.843
Length of prior EBF experience	Primiparous	-	-	-
	Multiparous	193	0.435**	<0.001
Income	Primiparous	190	-0.255**	<0.001
	Multiparous	186	-0.045	0.541
Intimate partner support	Primiparous	202	0.129	0.069
	Multiparous	198	0.082	0.251
Friends support	Primiparous	202	0.075	0.290
	Multiparous	198	0.199**	0.005
Mother support	Primiparous	201	0.002	0.973
	Multiparous	198	0.286**	<0.001
Other family support	Primiparous	202	0.047	0.504
	Multiparous	198	0.281**	<0.001
Healthcare provider support	Primiparous	202	0.155*	0.028

	Multiparous	198	0.125	0.079
Feeling prepared for labour and birth	Primiparous	202	0.423**	<0.001
	Multiparous	199	0.279**	<0.001

* significant at the 0.05 level (2-tailed)
** significant at the 0.01 level (2-tailed)

Table 12: Pearson Correlation for continuous variables comparing primiparous and multiparous women. Dependent variable: BSES-SF score

Variable		N	Pearson Correlation	*p*
Age	Primiparous	202	-0.168*	0.017
	Multiparous	199	0.021	0.770
Number of previous pregnancies	Primiparous	202	0.029	0.684
	Multiparous	199	0.100	0.158
Number of living children	Primiparous	0	-	-
	Multiparous	198	0.170*	0.017
Breastfeeding knowledge	Primiparous	202	-0.230**	0.001
	Multiparous	199	0.359**	<0.001
Perceived stress score	Primiparous	202	-0.249**	<0.001
	Multiparous	199	-0.259**	<0.001
Trait anxiety score	Primiparous	202	-0.261**	<0.001
	Multiparous	199	-0.340**	<0.001

* significant at the 0.05 level (2-tailed)
** significant at the 0.01 level (2-tailed)

Multiple Linear Regression Model for Primiparous Women

Upon examination of the results among the primiparous women in the sample, the following eleven independent variables were found to have a statistically significant (p = <0.05) relationship with prenatal breastfeeding self-efficacy:

- Education (high school or less vs. post-secondary or higher)
- Marital status (single/divorced vs. married/common law)
- Plan to exclusively breastfeed (yes vs no/sure)
- Length of plan to exclusively breastfeed (< 6 months vs 6 months or greater)

- Income (<$100,000 vs >$100,000)
- Support from healthcare provider to breastfeed
- Feeling prepared for labour and birth
- Age
- Knowledge score
- Perceived stress score
- Trait anxiety score

The ratio of cases to the number of independent variables was assessed to ensure reliability of the multiple linear regression model. The total number of independent variables entered into this model was ten. According to Tabachnick and Fiddell (2007), the equation below represents the minimum sample size needed for multiple linear regression:

$$50 + 8\,m$$

For this analysis:

$$50 + 8\,(11) = 138$$

Therefore 138 cases is the minimum sample size required for this case of multiple linear regression. A total of 184 (N = 184) primiparous participants remained in the model after participants with missing data on any one of the included independent variables were excluded, thereby meeting the requirement for the ratio of independent variables to the number of participants.

Stepwise multiple linear regression (refer to Table 13) revealed the following six variables explained 31.6% (adjusted $r^2 = 0.316$) of the variance in prenatal BSES-SF scores among primiparous women:

- Feeling prepared for labour and birth
- Income
- Trait anxiety score
- Length of plan to exclusively breastfeed (< 6 months vs 6 months or greater)
- Education (high school or less vs. post-secondary or higher)
- Marital status (single/divorced vs. married/common law)

Table 13: Multiple linear regression model for primiparous women

Variable	$\sigma_{\bar{x}}$	t	β	B	95% CI	*p*
Feeling prepared for labour and birth	0.608	3.768	0.244	2.290	1.091 - 3.489	<0.001
Income	1.102	-2.713	-0.184	-2.990	-5.164 - -0.815	0.007
Trait anxiety	0.054	-4.482	-0.291	-0.243	-0.351 - -0.136	<0.001
Length of plan to EBF	1.047	3.432	0.212	3.594	1.527 - 5.661	0.001
Maternal education	1.416	2.429	0.159	3.439	0.645 - 6.234	0.016
Marital status	1.887	2.379	0.152	4.489	0.765 - 8.213	0.018

EBF = exclusively breastfeed
$\sigma_{\bar{x}}$ = standard error β = standardized Beta B= unstandardized B
95% CI = 95% confidence interval

The histogram and scatterplot demonstrated a visual depiction of the plotted predicted values and the residual scores. The distribution of residual values was symmetrical across the mid line, indicating the assumption of homoscedasticity has been met for the regression model of primiparous women in the sample (Tabachnick and Fidell, 2007).

Tests for multivariate outliers among primiparous women.

The presence of multivariate outliers was assessed for primiparous women by examination of Mahalanobis distance. Cook's distance was calculated to examine the presence of influential multivariate outliers among primiparous women. Mahalanobis distances were compared to the critical chi square value of 22.458 on the chi square distribution chart where $p = 0.001$ and degrees of freedom (df) = 6 (where df is equal to the number of independent variables) (Tabachnick & Fidell, 2007). No values exceeded 22.458, indicating an absence of multivariate outliers. There were no influential multivariate outliers among the primiparous women in the sample as all Cook's values were less than 1.00 (Tabachnick & Fidell, 2007).

Tests for multicollinearity among primiparous women.

Multicollinearity was assessed by tolerance and VIF values. There was no indication of multicollinearity of the independent variables as all tolerance values are above 0.10 and all VIF values are less than 10 among the regression model for primiparous women (Field et al., 2012).

Multiple Linear Regression Model for Multiparous Women

Among the multiparous women in the sample, the following 11 independent variables were found to be statistically associated with prenatal BSES-SF scores at a p value of < 0.05 and were inputted into a stepwise multiple linear regression model as possible predictors of prenatal breastfeeding self-efficacy for multiparous women:

- Plan to exclusively breastfeed (yes vs no/sure)

- Length of plan to exclusively breastfeed (< 6 months vs 6 months or greater)
- Length of prior exclusively breastfeeding experience (< 6 months vs 6 months or greater)
- Support from friends to breastfeed
- Support from mother to breastfeed
- Support from other family members to breastfeed
- Feeling prepared for labour and birth
- Number of living children
- Breastfeeding knowledge score
- Perceived stress score
- Trait anxiety score

The total sample size for multiparous women in the multiple linear regression equation was 191 (N=191) after the exclusion of any cases with missing data on any one of the independent variables entered in the model. The ratio of independent variables to the number of cases was assessed utilizing the equation 50 + 8 *m*, where *m* is equal to the number of independent variables, in this case 11 (Tabachnick & Fidell, 2007).

$$50 + 8\,(11) = 138$$

Therefore, the ratio of cases to independent variables has been met with 191 multiparous women included in the regression analysis.

The multiple linear regression equation yielded four variables which explained 33.6% of the variance in prenatal BSES-SF scores (adjusted $r^2 = 0.336$) of multiparous women (refer to Table 14). The following variables were significant predictors of prenatal breastfeeding self-efficacy among multiparous women:

- Length of prior exclusive breastfeeding experience (< 6 months vs 6 months or greater)
- Trait anxiety total score
- Breastfeeding knowledge score
- Plan to exclusively breastfeed (yes vs no/unsure)

Table 14: Multiple linear regression model for multiparous women

Variable	$\sigma_{\bar{x}}$	t	β	B	95% CI	*p*
Trait anxiety	0.061	-4.756	-0.285	-0.289	-0.409 - -0.169	<0.001
Length of prior EBF experience	1.286	4.742	0.309	6.096	3.560 - 8.632	<0.001
Breastfeeding knowledge	0.204	3.023	0.188	0.616	0.214 - 1.017	0.003
Plan to EBF	1.837	-2.434	-0.153	-4.472	-8.096 - -0.847	0.016

EBF = exclusively breastfeed

$\sigma_{\bar{x}}$ = standard error β = standardized Beta B= unstandardized B

95% CI = 95% confidence interval

Visual inspection of the histogram and scatterplot revealed the assumption of homoscedasticity was met, as evidenced by a symmetrical appearance of residual values across the mid line of the Q-Q plot for multiparous women (Tabachnick & Fidell, 2007).

Tests for multivariate outliers among multiparous women.

Tests for multivariate outliers were repeated for the sample of multiparous women. The critical chi square value for Mahalanobis distance at a *p* value of 0.001 with 4 degrees of freedom (where *df* is equal to the number of independent variables) is 18.467

(Tabachnick & Fidell, 2007). There were eight cases with Mahalanobis distance values exceeding 18.467, suggesting the presence of multivariate outliers. For each of the cases with Mahalanobis distance values exceeding the critical value, each corresponding Cook's distance values were less than 1.00, indicating the multivariate outliers were not influential and therefore remained in the model. Similarly, all other Cook's distance values in the model were less than 1.00, indicating an absence of influential multivariate outliers among the sample of multiparous women (Tabachnick & Fidell, 2007).

Tests for multicollinearity among multiparous women.

Multicollinearity was once again assessed by tolerance and VIF values for the multiple linear regression model of multiparous women. There was no indication of multicollinearity as all tolerance values were above 0.10 and all VIF values were less than 10 (Field et al., 2012).

CHAPTER 5

DISCUSSION

The following chapter will summarize the significant findings and compare the differences and similarities found between primiparous and multiparous women. The chapter will compare and contrast the study results as it relates to the current state of literature on breastfeeding self-efficacy. This will be followed by implications for further research and implications for nursing practice.

Summary of Significant Findings

To the author's knowledge, this study was the first to explore predictors of breastfeeding self-efficacy in the prenatal period. It was also the first study to investigate breastfeeding self-efficacy predictors separately across groups by gravida. First, the study explored predictors of prenatal breastfeeding self-efficacy among a mixed sample of primiparous and multiparous women. Next, predictors of prenatal breastfeeding self-efficacy were explored among the primiparous women in the sample. Finally, the study explored predictors of prenatal breastfeeding self-efficacy among the multiparous women in the sample. By investigating the group as a whole, then by comparing the differences in predictors between both primiparous women and multiparous women, this study provides a new perspective into the differences between these two distinct groups, each with their own set of unique needs related to breastfeeding self-efficacy in the prenatal period.

Analysis revealed 18 independent variables to be significantly related to breastfeeding self-efficacy in the prenatal period among both primiparous and multiparous women. The significant variables were: maternal education (*p*=0.019), marital status (*p*=0.013), healthcare provider (*p*=0.003), prenatal class attendance in current pregnancy (*p*=<0.001), planned length of maternity leave (*p*=0.017), return to work status (*p*=0.012), plan to exclusively breastfeed (*p*=<0.001), length of plan to exclusively breastfeed (*p*=<0.001), income (*p*=0.013) support from friends to breastfeed (*p*=0.014), support from other family members to breastfeed (*p*=0.031), support from healthcare provider to breastfeed (*p*=0.046), feeling prepared for labour and birth (*p*=<0.001), number of previous pregnancies (*p*=<0.001), number of living children (*p*=<0.001), breastfeeding knowledge score (*p*=<0.001), perceived stress score (*p*=<0.001) and trait anxiety score (*p*=<0.001). Stepwise multiple linear regression was used to find the most parsimonious model of predictors, which is the model that explains the highest amount of variance with the least number of independent variables. Eight variables predicted prenatal breastfeeding self-efficacy among both primiparous and multiparous women:

- Feeling prepared for labour and birth
- Number of living children
- Breastfeeding knowledge
- Trait anxiety score
- Length of plan to exclusively breastfeed
- Income
- Plan to exclusively breastfeed
- Healthcare provider.

These eight variables explained 41.2% (adjusted r^2=0.412) of the variance in prenatal breastfeeding self-efficacy scores.

Among primiparous women in the sample, the following eleven variables were significantly related to breastfeeding self-efficacy: education (p=0.001), marital status (p=0.001), plan to exclusively breastfeed (p=0.001), length of plan to exclusively breastfeed (p=<0.001), income (p=<0.001), healthcare provider support (p=0.028), feeling prepared for labour and birth (p=0.001), age (p=0.017), breastfeeding knowledge score (p=0.001), perceived stress score (p=<0.001) and trait anxiety score (p=0.001). Of these independent variables, the following six remained in the stepwise multiple regression model as significant predictors of prenatal breastfeeding self-efficacy for primiparous women:

- Feeling prepared for labour and birth
- Income
- Trait anxiety score
- Length of plan to exclusively breastfeed
- Education
- Marital status

The above six variables accounted for 31.6% (adjusted r^2=0.316) of the variance in breastfeeding self-efficacy scores among primiparous women in the prenatal period.

Investigation of the multiparous women in the sample found the following 11 independent variables to be significantly associated with prenatal breastfeeding self-efficacy: plan to exclusively breastfeed (p=<0.001), length of plan to exclusively breastfeed (p=<0.001), length of prior exclusive breastfeeding experience (p=<0.001), support from friends to breastfeed (p=0.005), support from mother to breastfeed (p=<0.001), support from other family to breastfeed (p=<0.001), feeling prepared for labour and birth (p=<0.001), number of living children (p=0.017), breastfeeding knowledge score (p=<0.001), perceived stress score (p=<0.001) and trait anxiety score (p=<0.001). Stepwise multiple linear regression revealed the following four variables explained 33.6% (adjusted r^2= 0.336) of the variance in prenatal breastfeeding self-efficacy scores among the multiparous women in the sample:

- Length of prior exclusive breastfeeding experience
- Trait anxiety score
- Breastfeeding knowledge score
- Plan to exclusively breastfeed

Differences in Prenatal Breastfeeding Self-Efficacy Predictors between Primiparous and Multiparous women

Demographic variables.

The impact of demographic variables on prenatal breastfeeding self-efficacy was notably more meaningful among primiparous women compared to multiparous women in the sample. Education, marital status, income and age were not significantly related to prenatal breastfeeding self-efficacy among the multiparous women in the sample. However, among primiparous women, maternal education (p=0.001), marital status (p=0.001), income (p=<0.001) and age (p=0.017) were all significantly related to breastfeeding self-efficacy in the prenatal period. Surprisingly these demographic variables were inversely related to breastfeeding self-efficacy. The primiparous women who were less educated, single or divorced, in a lower combined household income bracket and those who were younger had significantly higher prenatal breastfeeding self-efficacy scores compared to their primiparous counterparts. Maternal education, marital status and income all remained in the multiple regression model as predictors of prenatal breastfeeding self-efficacy among primiparous women. No demographic variables were identified as predictors of breastfeeding self-efficacy among multiparous women.

Prenatal class attendance.

Surprisingly, initial analysis of the entire sample found a significant relationship between prenatal class attendance and prenatal breastfeeding self-efficacy score, whereby those who had attended prenatal education for their current pregnancy had lower prenatal breastfeeding self-efficacy. However, after analyzing the split sample, prenatal class attendance did not remain statistically significant for neither the primiparous group, nor the multiparous group. Women who attended prenatal education classes were more likely to be primiparous women, thus this statistical difference in breastfeeding self-efficacy was in actuality a reflection of parity, not of prenatal class attendance. Prenatal class attendance did not remain in the final multiple linear regression equation. Previous research supports the finding that primiparous women are more likely to attended prenatal classes compared to multiparous women (Edwards, 1994). The maternal experiences survey found 65.6% of primiparous women reported prenatal class attendance compared to only 6% of multiparous women (PHAC, 2009).

Breastfeeding support.

Among the multiparous women, perceived breastfeeding support from friends, mother and other family members were all positively correlated with prenatal breastfeeding self-efficacy. Remarkably, this is in contrast to the primiparous women where there was no statistically detectable differences in prenatal breastfeeding self-efficacy scores and perceived breastfeeding support from friends, mother and other family members.

Dennis (2006) found a significant correlation between husband support and breastfeeding self-efficacy. Likewise, partner support was identified as a predictor of breastfeeding self-efficacy in the immediate post-partum period among an American sample of women (Hinic, 2016). These findings are inconsistent with the current study, where perceived intimate partner breastfeeding support was not found to be significantly related to prenatal breastfeeding self-efficacy for either group.

Healthcare provider support was statistically related to prenatal breastfeeding self-efficacy among the primiparous women, but not among the multiparous women in the sample. Among a mixed sample of primiparous and multiparous women, support from other women with children was found to be a predictor of breastfeeding self-efficacy in the immediate post-partum (Dennis, 2006). While support from friends was correlated with prenatal breastfeeding self-efficacy among the multiparous women in the current study, this variable did not remain in the final multiple regression equation and therefore, was not a significant predictor of prenatal breastfeeding self-efficacy.

Comparison of Study Findings to the Current State of the Literature

The following section will compare the independent variables that were found to be significant predictors of prenatal breastfeeding self-efficacy as they relate to the current state of the literature.

Marital status.

Marital status was found to be a significant predictor of prenatal breastfeeding self-efficacy among the primiparous women in the sample and was significantly related to prenatal breastfeeding self-efficacy among the entire sample. Surprisingly, women who were either single or divorced had higher breastfeeding self-efficacy scores compared to women who were married or common law. This is inconsistent to previous research whereby marital status was not found to be a predictor of breastfeeding self-efficacy in the immediate post-partum period (Hinic, 2016). Similarly, studies conducted in Australia and Japan did not find a correlation between marital status and breastfeeding self-efficacy (Blyth et al., 2002; Otsuka et al., 2008). Among women in Brazil, marital status was found to be significantly associated with breastfeeding self-efficacy (Lemos Uchoa et al., 2014; Oria et al., 2009).

Highest education level attained.

Higher maternal education has been found in the literature to be linked to a longer breastfeeding duration (Meedya et al., 2010). The impact of maternal education on breastfeeding self-efficacy is inconsistent across the literature. While some studies did not find any significant association between maternal education status and breastfeeding self-efficacy (Eksioglu & Ceber, 2011; Zubaran & Foresti, 2011; Alus Tokat et al., 2010; Otsuka et al., 2008; Blyth, 2002), other studies found a link between maternal education status and breastfeeding self-efficacy (Lemon Uchoa et al., 2014; Oria et al., 2009).

The impact of maternal education status as a predictor of breastfeeding self-efficacy is also inconsistent. In the current study, highest level of education attained was significantly related to prenatal breastfeeding self-efficacy among the entire sample as well as among primiparous women, however this was not significant for multiparous women. With regards to predictors of breastfeeding self-efficacy, maternal education was found to be a significant predictor of breastfeeding self-efficacy strictly among the primiparous women, whereby women with lower levels of education (completion of high school or less) had higher breastfeeding self-efficacy scores. In contrast, Dennis (2006), who examined predictors of breastfeeding self-efficacy among Canadian women in the immediate post-partum period, found maternal education to be a positive predictor of breastfeeding self-efficacy, whereby women with higher education levels had higher levels of breastfeeding self-efficacy. This finding is incongruent with Hinic (2016) who looked at predictors of breastfeeding self-efficacy among American women in the immediate post-partum period. No significant differences were found between maternal education levels and breastfeeding self-efficacy and therefore maternal education was not found to be a significant predictor of breastfeeding self-efficacy (Hinic, 2016). In all three studies examining predictors of breastfeeding self-efficacy, the majority of women were highly educated, with 82.8% having post-secondary education or higher in the current study. In previous studies by Dennis (2006) and Hinic (2016), 62% had a college degree or higher and 92.5% had some college education or higher, respectively.

Income.

Income was found to be significantly negatively correlated with breastfeeding self-efficacy among the entire sample as a whole and remained in the multiple linear regression model as a significant predictor of breastfeeding self-efficacy. When examining the primiparous and multiparous women separately, income was found to be a negative predictor of breastfeeding self-efficacy among solely primiparous women.

A literature review found income to be positively associated with breastfeeding duration (Meedya et al., 2010). However the effect of its impact on breastfeeding self-efficacy has been mixed. Similar to the current study's findings, Thomas et al (2015) found income to be inversely correlated with breastfeeding self-efficacy among a sample of women from rural Bangladesh; while other studies from Brazil, Turkey and China have found income to be positively correlated with breastfeeding self-efficacy scores (Alus Tokat et al., 2010; Lemos Uchoa et al., 2014; Oria et al., 2009; Ku & Chow, 2010). This was inconsistent with findings from women in Japan, where income had no significant relationship to breastfeeding self-efficacy (Otsuka et al., 2008).

Plan to exclusively breastfeed.

Intention to breastfeed has been associated with positive breastfeeding outcomes in the literature (DiGirolamo et al., 2005; O'Campo et al., 1992; Leger-Leblanc & Rioux, 2008). With regards to predictors of breastfeeding self-efficacy, findings from this study are consistent with Hinic (2016) who found both intention to breastfeed, and intention to breastfeed exclusively for six months, to be positive predictors of breastfeeding self-efficacy in the immediate postpartum period. Intention to breastfeed exclusively, and intention to breastfeed exclusively for six months were both found to be predictors of breastfeeding self-efficacy in the prenatal period in the current study. For the entire sample as a whole, both intending to exclusively breastfeed (yes vs no/unsure) and intending to breastfeed exclusively for six or more months were both significant predictors of prenatal breastfeeding self-efficacy.

Feeling prepared for labour and birth.

Consistent with Hinic (2016), feeling prepared for labour and birth was found to be a significant predictor of breastfeeding self-efficacy. This study found women who felt more prepared for labour and birth had higher prenatal breastfeeding self-efficacy compared to those who felt less prepared for labour and birth. This was significantly correlated across the entire sample as well as both the primiparous sample and the multiparous sample and it was found to be a predictor of breastfeeding self-efficacy among the entire sample and primiparous women. It did not remain in the multiple linear regression model as a predictor of breastfeeding self-efficacy among the multiparous women.

Breastfeeding knowledge.

While previous research has found higher breastfeeding knowledge to positively impact both breastfeeding outcomes and breastfeeding intention (Entwistle et al., 2010; Kornides & Kitsantas, 2013; Cottrell & Detman, 2013; Stuebe & Bonuck, 2011), few studies have investigated the impact of breastfeeding knowledge on breastfeeding self-efficacy. Ku and Chow (2010) found a positive correlation between breastfeeding knowledge and breastfeeding self-efficacy. Furthermore, qualitative analysis has shown women want realistic education on breastfeeding (Leurer & Misskey, 2015).

This study is the first to examine breastfeeding knowledge as a potential predictor of breastfeeding self-efficacy in the prenatal period. Breastfeeding knowledge was found to be a positive predictor of prenatal breastfeeding self-efficacy across the entire sample and across the multiparous women. While breastfeeding knowledge was found to be significantly correlated with prenatal breastfeeding self-efficacy among the primiparous women, it was not found to be a significant predictor of prenatal breastfeeding self-efficacy.

Anxiety.

Anxiety was found to be a negative predictor of breastfeeding self-efficacy across the entire sample. This is consistent with previous research, which found anxiety to be a negative predictor of breastfeeding self-efficacy in the immediate post-partum period (Dennis, 2006). While Dennis (2006) utilized the state-anxiety subscale of the state-trait anxiety inventory to measure acute anxiety in the post-partum period; the current study utilized the trait-anxiety subscale to measure one's predisposition to anxiety with participants in the prenatal period. According to Bandura's self-efficacy theory, a person's level of emotional arousal, which includes anxiety levels, contributes to one's perceived level of self-efficacy (1977). Therefore, anxiety as a predictor of prenatal breastfeeding self-efficacy is consistent with Bandura's self-efficacy theory.

Number of living children.

The number of living children was positively correlated with higher breastfeeding self-efficacy among multiparous women. This is consistent with previous studies (Hinic, 2016; Oliver-Roig et al., 2012; Dennis, 2006). The number of living children was found to be a predictor of prenatal breastfeeding self-efficacy among the sample as a whole, but not among the multiparous women as a distinct group. Similarly, Hinic (2016) found the number of living children to be a predictor of breastfeeding self-efficacy in the immediate post-partum period among a sample of mixed primiparous and multiparous women.

Length of prior breastfeeding experience.

When examining strictly the multiparous women, those with prior exclusive breastfeeding experience of six months or more had higher breastfeeding self-efficacy compared to women who exclusively breastfed for less than six months. The length of prior exclusive breastfeeding experience was a significant predictor of prenatal breastfeeding self-efficacy among the multiparous women. This finding is theoretically consistent with Bandura's self-efficacy theory, whereby one's prior related experience is an antecedent for self-efficacy (Bandura, 1977). This is congruent with previous literature in Canada which found prior breastfeeding experience to be associated with breastfeeding self-efficacy scores (Dennis & Faux, 1999). Similarly, Japanese women with a history of exclusive breastfeeding experience for longer than three months had significantly higher breastfeeding self-efficacy compared to women without this experience (Otsuka et al., 2008).

Healthcare provider.

Prenatal care delivered by a midwife was positively correlated with prenatal breastfeeding self-efficacy and was found to be a positive predictor of breastfeeding self-efficacy among the entire sample. When looking at this variable among primiparous and multiparous women as distinct groups, the type of healthcare provider was not significantly related to breastfeeding-self efficacy in the prenatal period. Previous studies on breastfeeding self-efficacy have not examined the relationship between type of healthcare provider and self-efficacy, however, women who received prenatal care delivered by a midwife were shown to have significantly better breastfeeding outcomes compared to women who received prenatal care from an OBGYN (Costanian et al., 2016).

Implications for Nursing Practice

No prior studies to date have examined predictors of breastfeeding self-efficacy in the prenatal period. This study has filled the gap in the literature pertaining to prenatal predictors of breastfeeding self-efficacy. Through the identification of predictors of breastfeeding self-efficacy in the prenatal period, nurses can use this information to help target prenatal women who may be at higher risk of not meeting their breastfeeding goals through early intervention in the prenatal period.

Breastfeeding advice from healthcare providers has been linked with positive breastfeeding outcomes (Sable & Patton, 1998; Balcazar et al., 1995). Conversely, women who did not intend to breastfeed were less likely to have reported receiving breastfeeding advice in the prenatal period (Gurka et al., 2014). Findings from the current study indicate a primiparous woman's perceived level of breastfeeding support from her healthcare provider is associated with higher levels of breastfeeding self-efficacy. This finding suggests nurses can have meaningful role in empowering primiparous women and boosting their breastfeeding self-efficacy through a supportive breastfeeding environment in the prenatal period.

With multiparous women, support from one's healthcare provider did not significantly influence breastfeeding self-efficacy, whereas support from friends and family did. This suggests an urgent need to target primiparous women specifically, while healthcare provider support may still be influential, and support these women in the prenatal period to help improve their breastfeeding self-efficacy and ultimately, breastfeeding outcomes.

Differences were found between primiparous and multiparous women with respect to how various variables influence breastfeeding self-efficacy in the prenatal period. Among primiparous women, prenatal breastfeeding self-efficacy was influenced by demographic variables. In contrast, demographic variables were not found to be predictors of breastfeeding self-efficacy among the multiparous women. Therefore, as findings from this study suggest primiparous women are more influenced by healthcare providers, targeting primiparous women who are most likely to have lower breastfeeding self-efficacy based on demographic factors could be a strategy to target women who are at highest risk when resources are low. The identification of predictors of breastfeeding self-efficacy in the prenatal period is one step toward meeting the World Health Organization's (WHO) recommendation of exclusive breastfeeding for the first six months of life by better equipping nurses to identify women who need the most support in achieving exclusive breastfeeding.

Implications for Further Research

Among multiparous women in the sample, breastfeeding support from friends, support from one's mother and support from other family members was associated with higher prenatal self-efficacy. In contrast, no significant correlations were found between friend and family support and breastfeeding self-efficacy among primiparous women. Surprisingly, no significant correlations were found between intimate partner support and breastfeeding self-efficacy. Further research investigating the impact of the influence of friend and family support on breastfeeding self-efficacy among primiparous and multiparous women is suggested in order to understand this difference between gravida. Further research exploring why friend and family breastfeeding support is more influential than healthcare provider support among multiparous women may help to improve the methods healthcare providers provide breastfeeding education in the prenatal period to make it more meaningful for multiparous women.

The link between breastfeeding and mental health is an area requiring more research to fully understand. Consistent with a previous study which found acute anxiety (state-anxiety) to be a negative predictor of breastfeeding self-efficacy in the immediate post-partum period (Dennis, 2006), results from this study found trait anxiety to be a negative predictor of breastfeeding self-efficacy in the prenatal period. Further research exploring the link between anxiety and breastfeeding self-efficacy is warranted to help understand this relationship and implications for breastfeeding education during prenatal care. Considering 11.6% of the population in Canada has a mood or anxiety disorder (Government of Canada, 2015), and women are twice as likely to be diagnosed with generalized anxiety disorder compared to men (Statistics Canada, 2016) the need to further investigate the link between anxiety and breastfeeding outcomes, including breastfeeding self-efficacy is urgent. More research is needed to investigate if strategies to improve mental health in the preconception and/or prenatal period would have a positive impact on breastfeeding outcomes.

When examining the effects of prenatal class attendance separately for primiparous and multiparous women, it was found that prenatal class attendance did not significantly influence prenatal breastfeeding self-efficacy. This is in contrast to a previous study on Canadian adolescents, which found those who attended prenatal class had significantly higher BSES-SF scores compared to those who did not attend (Dennis et al., 2011). While prenatal class attendance has been shown to improve breastfeeding outcomes in several studies (Leger-Leblanc & Rioux, 2008; Tanner-Smith et al., 2013; Reifsnider & Eckhart, 1997; Rosen et al., 2008; Yun et al., 2009; Lutsiv et al., 2013; Duffy et al., 1997; Su et al., 2007), more research is needed to understand the influence of prenatal class attendance on breastfeeding self-efficacy, including differences in prenatal class structure and content.

According to the World Health Organization (WHO, 2016a), “virtually all mothers can breastfeed, provided they have accurate information, and the support of their family, the health care system and society at large”. This study examined several of the necessary components outlined by the WHO to achieve breastfeeding. Accurate information was assessed using the breastfeeding knowledge scale, and support of family and healthcare provider was assessed through self-report on the participant information form. Support from the society at large was not assessed in this study. Further research examining the relationship between breastfeeding self-efficacy and societal norms and values toward breastfeeding would be beneficial to address the WHO's component of a supportive breastfeeding society.

Conclusion

While this study provided a new understanding behind variables that influence a woman's breastfeeding self-efficacy in the prenatal period, limitations to the study must also be addressed. The study utilized online recruitment methods and a web-based survey which relied on self-report data. While the nature of this design has benefits including ease of recruitment over a large geographical region and decreased cost; there is no way of confirming the truthfulness of the survey responses. Strategies to decrease the likelihood of an ineligible participant completing the survey were utilized. The inclusion and exclusion criteria was not outwardly advertised. The initial page of the survey streamlined potential participants whereby only those meeting the inclusion/exclusion criteria were directed to complete the full survey. Ineligible participants were directed to a termination page on Fluid surveys. Advertising was strategically used to target webpages where Canadian pregnant women may frequent.

Strengths of this study include its unique design and approach. It was the first study to identify predictors of breastfeeding self-efficacy in the prenatal period utilizing online recruitment strategies. It was also the first to identify such predictors among the sample as a whole, followed by identifying predictors of breastfeeding self-efficacy separately between primiparous and multiparous women. The results of this study provide evidence to support the need to adjust the methods used to tailor breastfeeding promoting interventions specifically for either primiparous or multiparous women. By having an understanding of the predictors of breastfeeding self-efficacy in the prenatal period separately for primiparous and multiparous women, nurses and other healthcare providers will be better able to meet the unique needs of pregnant women to help improve their breastfeeding self-efficacy and ultimately to improve breastfeeding rates in Canada.

REFERENCES

Abbass-Dick, J., Stern, S., Nelson, L., Watson, W. & Dennis, C. L. (2015). Coparenting breastfeeding support and exclusively breastfeeding: a randomized controlled trial. *Pediatrics,* 135*(1),* 102-110.

Aghdas, K., Talat, K. & Sepideh, B. (2014). Effect of immediate and continuous mother-infant skin-to-skin contact on breastfeeding self-efficacy of primiparous women: A randomized control trial. *Women and Birth,* 27, 37-40.

Agho, K. E., Dibley, M. J., Odiase, J. I. & Ogbonmwan, S. M. (2011). Determinants of exclusive breastfeeding in Nigeria. *BMC Pregnancy and Childbirth,* 11*(2),* 1-8.

Alus Tokat, M., Okumus, H. & Dennis, C. L. (2010). Translation and psychometric assessment of the breast-feeding self-efficacy scale - short form among pregnant and postnatal women in Turkey. *Midwifery,* 26, 101-108.

American Academy of Pediatrics. (2011). Psychological benefits of breastfeeding. Retrieved November 10th, 2016 from https://www.healthychildren.org/English/agesstages/baby/breastfeeding/Pages/Psychological-Benefits-of-Breastfeeding.aspx

Ananthakrishnan, S., Kasinathan, B. & P., S. (2012). Antenatal counseling for breast feeding – are we doing it right? *Current Pediatric Research*, 16*(2)*, 142-144.

Andreas, N. J., Kampmann, B. & Le-Doare, K. M. (2015). Human breast milk: a review on its composition and bioactivity. *Early Human Development,* 91*(11)*, 629-635.

Apostolakis-Krus K., Valentine, C. & DeFranco, E. (2013). Factors associated with breastfeeding initiation in adolescent mothers. *Journal of Pediatrics,* 163*(5),* 1489-1494.

Archbald, K., Lundsberg, L., Triche, E., Norwitz, E. & Illuzzi, J. (2011). Women's prenatal concerns regarding breastfeeding: are they being addressed? *Journal of Midwifery & Women's Health,* 56, 2-7.

Azulay Chertok, I. R., Lup, J., Culp, S. & Mullett, M. (2011). Intent to breastfeeding: a population based perspective. *Breastfeeding Medicine,* 6*(3),* 125-129.

Babakazo, P., Donnen, P., Akilimali, P., Mala Ali., N. M. & Okitolonda, E. (2015). Predictors of discontinuing exclusive breastfeeding before six months among mothers in Kinshasa: A prospective study. *International Breastfeeding Journal,* 10*(19),* 1-9.

Baghurst, P., Pincombe, J., Peat, B., Henderson, A., Reddin, E. & Antoniou, G. (2007). Breast feeding self-efficacy and other determinants of the duration of breast feeding in a cohort of first-time mothers in Adelaide, Australia. *Midwifery,* 23, 382-391.

Balcazar, H., Trier, C. M. & Cobas, J. A. (1995). What predicts breastfeeding intention in Mexican-American and non-Hispanic White women? Evidence for a national survey. *Birth,* 22*(2),* 74-80.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review,* 84*(2),* 191-215.

Bandura, A. (1995). Self-efficacy in changing societies. Retrieved November 8th, 2016 from http://catdir.loc.gov/catdir/samples/cam034/94049049.pdf

Bartick, M. & Reinhold, A. (2010). The burden of suboptimal breastfeeding in the United States: a pediatric cost analysis. *Pediatrics*, 125*(5)*, 1048-1056.

Bass, C. A., Rodgers, M. & Baker, H. R. (2014). Can placing a lactation consultant in the obstetric office magically increase exclusive breastfeeding rates? *Journal of Obstetric, Gynecologic & Neonatal Nursing,* 43*(s1)*, 520

Best Start. (2016). Prenatal education in Ontario – better practices. Retrieved March 17, 2017 from http://www.beststart.org/resources/rep_health/pdf/prenatal_education_web.pdf

Blyth, R. J., Creedy, D. K., Dennis, C., Moyle, W., Pratt, J. & De Vries, S. M. (2002). Effect of maternal confidence on breastfeeding duration: An application of breastfeeding self-efficacy theory. *Birth,* 29*(4)*, 278-284.

Blyth, R. J., Creedy, D. K., Dennis, C., Moyle, W., Pratt, J., De Vries, S. M. & Healy, G. N. (2004). Breastfeeding duration in an Australian population: The influence of modifiable antenatal factors. *Journal of Human Lactation*, 20*(1),* 30-38.

Bode, L. (2012). Human milk oligosaccharides: every baby needs a sugar mama. *Glycobiology,* 22*(9)*, 1147-1162.

Bode, L., McGuire, M., Rodriguez, J. M., Geddes, D. T., Hassiotou, F., Hartmann, P. E. & McGuire, M. K. (2014). It's alive: microbes and cells in human milk and their potential benefits to mother and infant. *Advances in nutrition,* 5*(5)*, 571-573.

Bonuck., K., Stuebe, A., Barnett, J., Labbok, M., Fletcher, J. & Bernstein, P. S. (2014). Effect of primary care intervention on breastfeeding duration and intensity. *American Journal of Public Health*, 104, s119-s127.

Bonuck, K. A., Trombley, M., Freeman, K. & McKee, D. (2005). Randomized, controlled trial of a prenatal and postnatal lactation consultant intervention on duration and intensity of breastfeeding up to 12 months. *Pediatrics,* 116*(6)*, 1413-1426.

Borra, C., Iacovou, M. & Sevilla, A. (2015). New evidence on breastfeeding and postpartum depression: The importance of understanding women's intentions. *Journal of Maternal Child Health,* 19, 897-907.

Caine, V. A., Smith, M., Beasley, Y. & Brown, H. (2012). The impact of prenatal education on behavioral changes toward breast feeding and smoking cessation in a Healthy Start population. *Journal of the National Medical Association,* 104*(5,6),* 280-264.

Canadian Pediatric Society. (2016). Nutrition for healthy term infants, birth to six months: an overview. Retrieved October 20th, 2016 from http://www.cps.ca/en/documents/position/nutrition-healthy-term-infants-overview

Cohen, S., Kamarck, T. & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior,* 24, 385-396.

Cordova do Espirito Santo, L., Dias de Oliveira, L. & Justo Giugliani, E. R. (2007). Factors associated with low incidence of exclusive breastfeeding for the first 6 months. *Birth,* 34*(3),* 212-219.

Costanian, C., Macpherson, A. & Tamim, H. (2016). Inadequate prenatal care use and breastfeeding practices in Canada: a national survey of women. *BMC Pregnancy and Childbirth*, 16*(100),* 1-10.

Cottrell, B. H. & Detman, L. A. (2013). Breastfeeding concerns and experiences of African American mothers. *The American Journal of Maternal Child Nursing,* 38*(5),* 297-304.

Dai, X. & Dennis, C. L. (2003). Translation and validation of the breastfeeding self-efficacy scale into Chinese. *Journal of Midwifery and Women's Health,* 48*(5),* 350-356.

Daley, E. M., McDermott, R. J., McCormack Brown, K. R. & Kittleson, M. J. (2003). Conducting web-based survey research: a lesson in internet designs. *American Journal of Health Behavior,* 27*(2),* 116-124.

De Jager, E., Broadbent, J., Fuller-Tyszkiewicz, M., Nagle, C., McPhie, S. & Skouteris, H. (2015). A longitudinal study of the effect of psychosocial factors on exclusive breastfeeding duration. *Midwifery,* 31, 103-111.

Dennis, C. L. & Faux, S. (1999). Development and psychometric testing of the breastfeeding self-efficacy scale. *Research in Nursing & Health*, 22, 399-409.

Dennis, C. L. (2003). The breastfeeding self-efficacy scale: psychometric assessment of the short-form. *Journal of Obstetric, Gynecologic & Neonatal Nursing,* 32*(6),* 734-744.

Dennis, C. L. (2006). Identifying predictors of breastfeeding self-efficacy in the immediate postpartum period. *Research in Nursing & Health,* 29*(4)*, 256-268.

Dennis, C. L. (2010). Mothering transitions research – breastfeeding self-efficacy. Retrieved January 16, 2017 from http://www.cindyleedennis.ca/research/1-breastfeeding/breastfeeding -self-efficacy/

Dennis, C. L., Heaman, M. & Mossman, M. (2011). Psychometric testing of the breastfeeding self-efficacy scale short form among adolescents. *Journal of Adolescent Health,* 49, 265-271.

Dieticians of Canada. (2016). Feeding infants and toddlers. Retrieved October 20th, 2016 from http://www.dietitians.ca/Dietitians-Views/Prenatal-and-Infant/Infant-Feeding.aspx

DiGirolamo, A., Thompson, N., Martorell, R., Fein, S. & Grummer-Strawn, L. (2005). Intention or experience? Predictors of continued breastfeeding. *Health Education & Behavior,* 32*(2),* 208-226.

Duffy, E. P., Percival, P. & Kershaw, E. (1997). Positive effects of an antenatal group teaching session on postnatal nipple pain, nipple trauma and breast feeding rates. *Midwifery,* 13*(4)*, 189-196.

Edwards, N. (1994). Factors influencing prenatal class attendance among immigrants in Ottawa-Carleton. *Canadian Journal of Public Health*, 85*(4)*, 254-258.

Eksioglu, A. B. & Ceber, E. (2011). Translation and validation of the breast-feeding self-efficacy scale into Turkish. *Midwifery,* 27, 246-253.

Entwistle, F., Kendall, S. & Mead, M. (2010). Breastfeeding support - the importance of self-efficacy for low income women. *Maternal and Child Nutrition,* 6, 228-242.

Field, A., Miles, J. & Field, Z. (2012). *Discovering statistics using R.* London, England: Sage Publications.

FluidSurveys. (2017). Survey sample size calculator. Retrieved February 8th, 2017 from http://fluidsurveys.com/survey-sample-size-calculator/

Gill, S. L., Reifsnider, E. & Lucke, J. F. (2007). Effects of support on the initiation and duration of breastfeeding. *Western Journal of Nursing Research,* 29*(6)*, 708-723.

Glassman, M. E., McKearney, K., Saslaw, M. & Sirota, D. R. (2014). Impact of breastfeeding self-efficacy and sociocultural factors on early breastfeeding in an urban, predominantly Dominican community. *Breastfeeding Medicine,* 9*(6),* 301-307.

Gordon, J. S. & McNew, R. (2008). Developing the online survey. *Nursing Clinics of North America,* 43*(4)*, 605-619.

Government of Canada. (2015). Mood and anxiety disorders in Canada. Retrieved July 16, 2017 from https://www.canada.ca/en/publichealth/services/publications/diseases-conditions/mood-anxiety-disorders-canada.html

Gregory, E. F., Butz, A. M., Ghazarian, S. R., Gross, S. M. & Johnson, S. B. (2015). Are unmet breastfeeding expectations associated with maternal depressive symptoms? *Academic Pediatrics,* 15*(3),* 319-325.

Gregory, A., Penrose, K., Morrison, C., Dennis, C. L. & MacArthur, C. (2008). Psychometric properties of the breastfeeding self-efficacy scale-short form in an ethnically diverse U.K. sample. *Public Health Nursing,* 25*(3),* 278-284.

Grossman, L. K., Larsen-Alexander, J. B., Fitzsimmons, S. M. & Cordero, L. (1989). Breastfeeding among low-income, high risk women. *Clinical Pediatrics,* 28*(1),* 38-42.

Gurka, K. K., & Kellams, A. L. (2014). Exploring intended infant feeding decisions among low-income women [Abstract]. *Breastfeeding Medicine,* 9*(8),* 377-384.

Hauck, Y., Hall, W. A. & Jones, C. (2007). Prevalence, self-efficacy and perceptions of conflicting advice and self-management: Effects of a breastfeeding journal. *Journal of Advanced Nursing,* 57*(3),* 306-317.

Henshaw, E. J, Fried, R., Siskind, E., Newhouse, L. & Cooper, M. (2015). Breastfeeding self-efficacy, mood, and breastfeeding outcomes among primiparous women. *Journal of Human Lactation,* 31*(3),* 511-518.

Hinic, K. (2016). Predictors of breastfeeding confidence in the early postpartum period. *Journal of Obstetric, Gynecologic and Neonatal Nursing,* Article in Press.

Howard, C., Howard, F., Lawrence, R., Andresen, E., DeBlieck, E. & Weitzman, M. (2000). Office prenatal formula advertising and its effect on breast-feeding patterns. *Obstetrics and Gynecology*, 95*(2)*, 296-303.

Huang, M. Z., Kuo, S., Avery, M., Chen, W., Lin, K., Gau, M. (2007). Evaluating effects of a prenatal web-based breastfeeding education programme in Taiwan. *Journal of Clinical Nursing*, 16, 1571-1579.

Ip, W. Y., Yeung, L.S., Choi., K. C., Chair, S. Y. & Dennis, C. L. (2012). Translation and validation of the Hong Kong Chinese version of the breastfeeding self-efficacy scale-short form. *Research in Nursing & Health*, 35, 450-459.

Ingram, J., Johnson, D., Copeland, M., Churchill, C. & Taylor, H. (2015). The development for a new breast feeding assessment tool and the relationship with breast feeding self-efficacy. *Midwifery*, 31, 132-137.

Izatt, S. D. (1997). Breastfeeding counseling by health care providers. *Journal of Human Lactation*, 13*(2)*, 109-113.

Kim, P., Feldman, R., Mayes, L. C., Eicher, V., Thompson, N., Leckman, J. F. & Swain, J. E. (2011). Breastfeeding, brain activation to own infant cry, and maternal sensitivity. *Journal of Child Psychology and Psychiatry*, 52*(8)*, 907-915.

Kornides, M. & Kitsantas, P. (2013). Evaluation of breastfeeding promotion, support, and knowledge of benefits on breastfeeding outcomes. *Journal of Child Health Care*, 17*(3)*, 264-273.

Kovach, C. R. & Weiming. K. (2016). Handling those pesky statistical outliers. *Research in Gerontological Nursing,* 9*(5),* 206-207.

Ku, C. & Chow, S. K. Y. (2010). Factors influencing the practice of exclusive breastfeeding among Hong Kong Chinese women: A questionnaire survey. *Journal of Clinical Nursing,* 19, 2434-2445.

Laantera, S., Pietila, A. M., Ekstrom, A. & Polkki, T. (2012). Confidence in breastfeeding among pregnant women. *Western Journal of Nursing Research,* 34*(7),* 933-951.

Leeming, D., Williamson, I., Johnson, S. & Lyttle, S. (2015). Making use of expertise: a qualitative analysis of the experience of breastfeeding support for first-time mothers. *Journal of Maternal & Child Nutrition*, 11, 687-702.

Leger-Leblanc, G. & Rioux, F. M. (2008). Effect of a prenatal nutritional intervention program on initiation and duration of breastfeeding. *Canadian Journal of Dietetic Practice & Research,* 69*(2),* 101-105.

Lemos Uchoa, J., Araujo Gomes, A. L., Silva Joventino, E., Bastista Oria, M. O., Barbosa Ximenes, L. & de Almeida, P. C. (2014). Sociodemographic and obstetric history in maternal self-efficacy in nursing: A student in panel. *Online Brazilian Journal of Nursing*, 13*(4),* 645-655.

Leurer, M. D. & Misskey, E. (2015). "Be positive as well as realistic": a qualitative description analysis of information gaps experienced by breastfeeding mothers. *International Breastfeeding Journal,* 10*(10)*, 1-11.

Lin, S., Chien, L., Tai, C., Lee, C. (2008). Effectiveness of a prenatal education programme on breastfeeding outcomes in Taiwan. *Journal of Clinical Nursing,* 17, 296-303.

Lin, C., Kuo, S., Lin, K. & Chang, T. (2008). Evaluating effects of a prenatal breastfeeding education programme on women with caesarean delivery in Taiwan. *Journal of Clinical Nursing,* 17, 2838-2845.

Lutsiv, O., Pullenayegum, E., Foster, G., Vera, C., Giglia, L., Chapman, B., Fusch, D. & McDonald, S. D. (2013). Women's intentions to breastfeed: a population-based cohort study. *International Journal of Obstetrics & Gynaecology,* 120*(12)*, 1490-1499.

McCarter-Spaulding, D. E. & Dennis, C. L. (2010). Psychometric testing of the breastfeeding self-efficacy scale-short form in a sample of black women in the United States. *Research in Nursing & Health*, 33, 111-119.

McCarter-Spaulding, D., Gore, R. (2009). Breastfeeding self-efficacy in women of African descent. *Journal of Obstetric, Gynecologic & Neonatal Nursing,* 38*(2)*, 230-243.

McLeod, D., Pullon, S. & Cookson, T. (2002). Factors influencing continuation of breastfeeding in a cohort of women. *Journal of Human Lactation,* 18*(4)*, 335-343.

McQueen, K., Dennis, C., Stremler, R. & Norman, C. (2011). A pilot randomized controlled trial of a breastfeeding self-efficacy intervention with primiparous mothers. *Journal of Obstetric, Gynecologic & Neonatal Nursing,* 40*(1),* 35-46.

McQueen, K. A., Montelpare, W. J. & Dennis, C. L. (2013). Breastfeeding and Aboriginal women: validation of the breastfeeding self-efficacy scale - short form. *Canadian Journal of Nursing Research*, 45*(2),* 58-75

Meedya, S., Fahy, K. & Kable, A. (2010). Factors that positively influence breastfeeding duration to 6 months: a literature review. *Women and Birth,* 23, 135-145.

Molina Torres, M., Davila Torres, R. R., Parrilla Rodriguez, A. M., Dennis, C. L. (2003). Translation and validation of the breastfeeding self-efficacy scale into Spanish: data from a Puerto Rican population. *Journal of Human Lactation*, 19*(1),* 35-42.

Nichols, J., Schutte, N. S., Brown, R. F., Dennis, C. L. & Price, I. (2009). The impact of a self-efficacy intervention on short-term breast-feeding outcomes. *Health Education & Behavior*, 36*(2),* 250-259.

Noel-Weiss, J., Rupp, A., Cragg, B., Bassett, V. & Woodend, A. K. (2006). Randomized controlled trial to determine effects of prenatal breastfeeding workshop on maternal breastfeeding self-efficacy and breastfeeding duration. *Journal of Obstetric, Gynecologic & Neonatal Nursing,* 35*(5),* 616-624.

O'Campo, P., Faden, R. R., Gielen, A. C. & Wang, M. C. (1992). Prenatal factors associated with breastfeeding duration: recommendations for prenatal interventions. *Birth*, 19*(4),* 195-201.

Oliver-Roig, A., d'Anglade-Gonzalez, M. L., Garcia-Garcia, B., Silva-Tubio, J. R., Richart-Martinez, M. & Dennis, Cl L. (2012). The Spanish version of the breastfeeding self-efficacy scale-short form: reliability and validity assessment. *International Journal of Nursing Studies*, 49, 169-173.

Otsuka, K., Dennis, C., Tatsuoka, H. & Jimba, M. (2008). The relationship between breastfeeding self-efficacy and perceived insufficient milk among Japanese mothers. *Journal of Gynecologic, Obstetric and Neonatal Nursing,* 37*(5)*, 546-555.

Otsuka, K., Taguri, M., Dennis, C. L., Wakutani, K., Awano, M., Yamaguchi, T. & Jimba, M. (2014). Effectiveness of a breastfeeding self-efficacy intervention: Do hospital practices make a difference? *Journal of Maternal and Child Health,* 18, 296-306.

Pannu, P. K., Giglia, R. C., Binns, C. W., Scott, J. A. & Oddy, W. H. (2011). The effectiveness of health promotion materials and activities on breastfeeding outcomes. *Acta Paediatrica,* 100*(4),* 534-537.

Pavicic Bosnjak, A., Rumboldt, M., Stanojevic, M., Dennis, C. L. (2012). Psychometric assessment of the Croatian version of the breastfeeding self-efficacy scale-short form. (2012). *Journal of Human Lactation,* 28*(4)*, 565-569.

Peripolli Rodrigues, A., de Mello Padoin, S. M., de Azevedo Guido, L. & Dias Lopes, L. F. (2014). Pre-natal and puerperium factors that interfere on self-efficacy in breastfeeding. *Escola Anna Nery Revista de Enfermagem,* 18*(2)*, 257-261.

Peripolli Rodrigues, A., de Mello Padoin, S. M., de Paula, C. C., de Oliveira Souza, I. E., de Almeida, P. C. & Ximenes, L. B. (2015). Influence of sociodemographic and behavioral conditions on self-efficacy in breastfeeding: A cross-sectional study. *Online Brazilian Journal of Nursing,* 14*(3),* 1-7.

Petrozzi, A. & Gagliardi, L. (2016). Breastfeeding self-efficacy scale: Validation of the Italian version and correlation with breast-feeding at 3 months. *Journal of Pediatric Gastroenterology & Nutrition,* 62*(1),* 137-139.

Pollard, D. & Guill, M. (2009). The relationship between baseline self-efficacy and breastfeeding duration. *Southern Online Journal of Nursing Research,* 9*(4),* 1-8.

Public Health Agency of Canada. (2009). What mothers says: the Canadian maternity experiences survey. Ottawa, ON: Government of Canada.

Public Health Agency of Canada. (2014). Breastfeeding and infant nutrition. Retrieved October 20th, 2016 from http://www.phac-aspc.gc.ca/hp-ps/dca-dea/stages-etapes/childhood-enfance_ 0-2/nutrition/index-eng.php

Public Health Agency of Canada. (2015). Ten great reasons to breastfeed your baby. Retrieved November 7th, 2016 from http://www.phac-aspc.gc.ca/hp-ps/dca-dea/stages-etapes/childhood-enfance_0-2/nutrition/reasons-raisons-eng.php

Pugin, E., Valdes, V., Labbok, M., Perez, A. & Aravena, R. (1996). Does prenatal breastfeeding skills group education increase the effectiveness of a comprehensive breastfeeding promotion program? *Journal of Human Lactation,* 12*(1)*, 15-19.

Registered Nurses Association of Ontario. (2008). Breastfeeding Best Practice Guideline Supplement. Retrieved September 5th, 2016 from http://rnao.ca/sites/rnao-ca/files/storage/related/2457_Breastfeeding_Supplement.pdf

Reifsnider, E. & Eckhart, D. (1997). Prenatal breastfeeding education: its effect on breastfeeding among WIC participants. *Journal of Human Lactation,* 13, 121-125.

Rosen, I. M., Krueger, M. V., Carney, L. M. & Graham, J. A. (2008). Prenatal breastfeeding education and breastfeeding outcomes. *The American Journal of Maternal Child Nursing,* 33*(5),* 315-319.

Rossiter, J. C. (1994). The effect of a culture-specific education program to promote breastfeeding among Vietnamese women in Sydney. *International Journal of Nursing Studies,* 31*(4),* 369-379.

Sable, M. R. & Patton, C. B. (1998). Prenatal lactation advice and intention to breastfeed: selected maternal characteristics. *Journal of Human Lactation*, 14, 35-40.

Sandy, J. M., Anisfeld, E. & Ramirez, E. (2009). Effects of a prenatal intervention on breastfeeding initiation rates in a Latina immigrant sample. *Journal of Human Lactation,* 25*(4),* 404-411.

Statistics Canada. (2013). Breastfeeding trends in Canada. Retrieved October 20th, 2016 from http://www.statcan.gc.ca/pub/82-624-x/2013001/article/11879-eng.htm

Statistics Canada. (2016). Women in Canada: women and health. Retrieved July 16, 2017 from http://www.statcan.gc.ca/daily-quotidien/160308/dq160308b-eng.htm

Stuebe, A. M. & Bonuck, K. (2011). What predicts intent to breastfeed exclusively? Breastfeeding knowledge, attitudes, and beliefs in a diverse urban population. *Breastfeeding Medicine,* 6*(6)*, 413-420.

Su., L. L., Chong, Y. S., Chan, Y. S., Fok, D., Tun, K. T., Ng, F. S. & Rauff, M. (2007). Antenatal education and postnatal support strategies for improving rates of exclusive breast feeding: randomised controlled trial. *British Medical Journal,* 335*(7620)*, 596-602.

Symon, A. G., Whitford, H. & Dalzell, J. (2013). Infant feeding in Eastern Scotland: a longitudinal mixed methods evaluation of antenatal intentions and postnatal satisfaction- the feeding your baby study. *Midwifery*, 29, 49-56.

Tabachnick, B. G. & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston, MA: Pearson Education Inc.

Tanner-Smith, E. E., Steinka-Fry, K. T. & Lipsey, M. W. (2013). Effects of CenteringPregnancy group prenatal care on breastfeeding outcomes. *Journal of Midwifery & Women's Health,* 58, 389-395.

Tenfelde, S, Finnegan, L. & Hill, P. D. (2011). Predictors of breastfeeding exclusivity in a WIC sample. *Journal of Obstetric, Gynecological & Neonatal Nursing,* 40*(2),* 179-189.

Thomas, J. S., Yu, E. A., Tirmizi, N., Owais, A., Das, S. K., Rahman, S., Faruque, A. S. G., Schwartz, B. & Stein, A. D. (2015). Maternal knowledge, attitudes and self-efficacy in relation to intention to exclusively breastfeed among pregnant women in rural Bangladesh. *Journal of Maternal Child Health*, 19, 49-57.

Verduci, E., Banderali, G., Barberi, S., Radaelli, G., Lops, A., Betti, F., Giovannini, M. (2014). Epigenetic effects of human breast milk. *Nutrients,* 6, 1711-1724.

Wheeler, B. J. & Dennis, C. L. (2013). Psychometric testing of the modified breastfeeding self-efficacy scale (short form) among mothers of ill or preterm infants. *Journal of Obstetric, Gynecologic and Neonatal Nursing*, 42, 70-80.

Wolfberg, A. J., Michels, K. B., Shields, W., O'Campo, P., Dronner, Y. & Bienstock, J. (2004). Dads as breastfeeding advocates: results from a randomized controlled trial of an educational intervention. *American Journal of Obstetrics and Gynecology,* 193*(3)*, 708-712.

Wong, K. L., Tak Fong, D. Y., Yin Lee, I. L., Chu, S. & Tarrant, M. (2014). Antenatal education to increase exclusive breastfeeding a randomized controlled trial. *American College of Obstetricians and Gynecologists*, 124*(5)*, 961-968.

World Health Organization. (2013a). Short-term effects of breastfeeding: a systematic review on the benefits of breastfeeding on diarrhoea and pneumonia mortality. Retrieved November 7th, 2016 from http://www.who.int/maternal_child_adolescent/documents/breastfeeding_short_term_effects/en/

World Health Organization. (2013b). Short-term effects of breastfeeding: a systematic review on the benefits of breastfeeding on diarrhoea and pneumonia mortality.

Retrieved November 7th, 2016 from http://www.who.int/maternal_child_ adolescent/documents/breastfeeding_long_term_effects/en/

World Health Organization. (2016a). Health topics - breastfeeding. Retrieved October 15th, 2016 from http://www.who.int/topics/breastfeeding/en/

World Health Organization. (2016b). Exclusive breastfeeding. Retrieved October 20th, 2016 from http://www.who.int/elena/titles/exclusive_breastfeeding/en/

World Health Organization. (2016c). Baby-friendly hospital initiative. Retrieved October 15, 2016 from http://www.who.int/nutrition/topics/bfhi/en/

Wu, D. S., Hu, J., McCoy, T. P. & Efird, J. T. (2014). The effects of a breastfeeding self-efficacy intervention on short-term breastfeeding outcomes among primiparous mothers in Wuhan, China. *Journal of Advanced Nursing*, 70*(8)*, 1867-1879.

Wutke, K. & Dennis, C. L. (2007). The reliability and validity of the Polish version of the breastfeeding self-efficacy scale-short form: Translation and psychometric assessment. *International Journal of Nursing Studies*, 44, 1439-1446.

Yuen Loke, A. & Chan, L. (2013). Maternal breastfeeding self-efficacy and the breastfeeding behaviors of newborns in the practice of exclusive breastfeeding. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 42*(6)*, 672-684

Yun, S., Mertzlufft, K., Kruse, C., White, M., Fuller, P. & Zhu, B. (2009). Evaluation of the Missouri WIC (special supplemental nutrition program for women, infants, and children) breast-feeding peer counseling programme. *Public Health Nutrition,* 13*(2)*, 229-237.

Yotebieng, M., Lambert Chalachala, J., Labbok, M. & Behets, F. (2013). Infant feeding practices and determinants of poor breastfeeding behavior in Kinshasa, Democratic Republic of Congo: a descriptive study. *International Breastfeeding Journal,* 8*(11),* 1-9.

Zimmerman, D. R. (1999). You can make a difference: increasing breastfeeding rates in an inner-city clinic. *Journal of Human Lactation*, 15*(3)*, 217-220.

Zubaran, C. & Foresti, K. (2011). The correlation between breastfeeding and maternal quality of life in southern Brazil. *Breastfeeding Medicine,* 6*(1),* 25-30.

Zubaran, C., Foresti, K., Schumacher, M., Rossi Thorell, M., Amoretti, A., Muller, L. & Dennis, C. L. (2010). The Portuguese version of the breastfeeding self-efficacy scale-short form. *Journal of Human Lactation*, 26*(3)*, 297-302.

APPENDIX A

Participant Information Form

Part 1: Demographics

Age: ______________________________ *Province:* __________________________

Marital Status: □ Single □ Married □ Common Law □ Divorced

Estimated Combined Gross Household Income:

□ $0 - $14,999 □ $15,000 - $34,999 □ $35,000 - $49,999 □ $50,000 - $64,999

□ $65,000 - $79,999 □ $80,000 - $99,999 □ >$100,000 □ Prefer not to disclose

Highest Education Level Completed: □ None □ Primary school □ High school

□ College/University □ Prefer not to disclose

Ethnicity: □ Aboriginal (Inuit, Métis, North American Indian)

□ Arab/West Asian (e.g., Armenian, Egyptian, Iranian, Lebanese, Moroccan)

□ Black (e.g., African, Haitian, Jamaican, Somali)

□ Chinese

□ Filipino

□ Japanese

□ Korean

□ Latin American

□ South Asian

□ South East Asian

□ White (Caucasian)

□ Other ___________________

When do you plan to return to work after baby is born?

□ N/A- unemployed / stay at home parent / not planning to return to work

□ Less than 1 month □ 3 months or less □ 6 months or less □ 9 months or less

□ 12 months or less □18 months or less □ More than 18 months

Will you return to work full-time, part-time or casually? □ Full-time □ Part-time □ Casual

Part 2: Obstetric Information

Number of previous pregnancies: ________ *Number of living children*:____________

How many weeks pregnant are you currently? □ 28 – less than 30 □ 30 – less than 32 □ 32 – less than 34 □ 34 – less than 36 □ 36 – less than 38 □ 38 – less than 40 □ 40 – less than 42 □ 42+ weeks

What type of healthcare provider will attend your labour and delivery?

□ Family physician □ Midwife □ Obstetrician □ Perinatalogist □ Other ___

Previous breastfeeding experience: □ Yes □ No

If yes, *what is the longest you have exclusively breastfeed (provided nothing other than breastmilk) any previous child?*

□ less than 1 month □ 1 month - 3 months □ 3 months - 6 months □ 6 months or longer

Planned mode of delivery: □ Vaginal □ Caesarean □ Vaginal Birth After Caesarean (VBAC) □ Unsure

Have you attended prenatal classes during this pregnancy, online or in person?

□ Yes □ No

Do you plan to exclusively breastfeed (providing nothing other than breastmilk)?

□ Yes □ No

If yes; *How long do you intend to breastfeed exclusively?*

□ less than 1 month □ 1 month - 3 months □ 3 months - 6 months

□ 6 months or longer □ Unsure

Do you plan on mixed feeding (providing both breastmilk and infant formula?)

□ Yes □ No

If yes; *How long do you intend to breastfeed?*

□ less than 1 month □ 1 month - 3 months □ 3 months - 6 months

□ 6 months or longer □ Unsure

Are you a current smoker? □ Yes □ No

On a scale from 1 - 5, with 1 being not supportive at all and 5 being extremely supportive, how supportive are the following people to your decision to breastfeed?

Intimate Partner	□ 1	□ 2	□ 3	□ 4	□ 5	□ Not applicable
Friends	□ 1	□ 2	□ 3	□ 4	□ 5	□ Not applicable
Mother	□ 1	□ 2	□ 3	□ 4	□ 5	□ Not applicable
Other family members	□ 1	□ 2	□ 3	□ 4	□ 5	□ Not applicable
Healthcare provider	□ 1	□ 2	□ 3	□ 4	□ 5	□ Not applicable

On a scale from 1 - 5, with 1 being not prepared at all and 5 extremely prepared, how prepared do you feel for labour and birth? □ 1 □ 2 □ 3 □ 4 □ 5

APPENDIX B

Perceived Stress Scale-10

The questions in this scale ask you about your feelings and thoughts during THE LAST MONTH. In each case, please indicate your response by placing an "X" over the circle representing HOW OFTEN you felt or thought a certain way.

Question	Response				
	Never	Almost Never	Sometimes	Fairly Often	Often
1. In the last month, how often have you been upset because of something that happened unexpectedly?	☐	☐	☐	☐	☐
2. In the last month, how often have you felt that you were unable to control the important things in your life?	☐	☐	☐	☐	☐
3. In the last month, how often have you felt nervous and "stressed"?	☐	☐	☐	☐	☐
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	☐	☐	☐	☐	☐
5. In the last month, how often have you felt that things were going your way?	☐	☐	☐	☐	☐
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	☐	☐	☐	☐	☐
7. In the last month, how often have you been able to control irritations in your life?	☐	☐	☐	☐	☐
8. In the last month, how often have you felt that you were on top of things?	☐	☐	☐	☐	☐
9. In the last month, how often have you been angered because	☐	☐	☐	☐	☐

of things that were outside your control?					
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	☐	☐	☐	☐	☐

(Cohen, Kamarak and Mermelstein, 1983)

APPENDIX C

Breastfeeding Benefits Questionnaire

How much do you agree or disagree with the following statements:
Infant formula is as good as breastmilk. □ Agree □ Neither □ Disagree
Breastfed babies are less likely to get ear infections. □ Agree □ Neither □ Disagree
Breastfed babies are less likely to get respiratory infections. □ Agree □ Neither □ Disagree
Breastfed babies are less likely to get diarrhea. □ Agree □ Neither □ Disagree
Babies should be fed only breastmilk for the first 6 months. □ Agree □ Neither □ Disagree
Breastfed babies are less likely to become obese. □ Agree □ Neither □ Disagree

(Stuebe & Bonuck, 2011).

APPENDIX D

Post Study Information

For more information about breastfeeding, please visit the following websites:

The Canadian Pediatrics Society:
http://www.caringforkids.cps.ca/handouts/breastfeeding

La Leche League Canada: http://www.lllc.ca/breastfeeding-information

Public Health Agency of Canada: http://www.phac-aspc.gc.ca/hp-ps/dca-dea/stages-etapes/childhood-enfance_0-2/nutrition/index-eng.php

Canadian Telephone Health: http://www.cwhn.ca/en/yourhealth/provincialhealthlines

Toronto Public Health: http://www.toronto.ca/health

Alberta Community Health Services:
http://www.albertahealthservices.ca/info/service.aspx?id=1000870

Vancouver Coastal Health: http://www.vch.ca/your-health/

If you are interested in a breastfeeding app, the **WYNI: When You Need It** app is available for a free download on your mobile device.

VITA AUCTORIS

NAME:	Kathryn Corby
PLACE OF BIRTH:	Windsor, ON
YEAR OF BIRTH:	1987
EDUCATION:	Sandwich Secondary School, LaSalle, ON, 2005
	University of Windsor, B.Sc.N., Windsor, ON, 2009